ENVIRONMENTAL STANDARDS

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QUALITY ASSURANCE REVIEW

OF THE OU-4B AND OU-5 SOIL INVESTIGATION

METEORIC WATER MOBILITY PROCEDURE SAMPLES

COLLECTED ON NOVEMBER 21 AND 22, 2019

AT THE ANACONDA COPPER MINE SITE

IN YERINGTON, NEVADA

August 24, 2020

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1.0 Introduction

This quality assurance (QA) review is based upon a rigorous examination of all data generated from the analyses of the OU-4b and OU-5 soil investigation Meteoric Water Mobility Procedure (MWMP) samples that were collected by Wood Environment & Infrastructure Solutions, Inc., on November 21 and 22, 2019, at the Anaconda Copper Mine Site in Yerington, Nevada. These samples were analyzed by ACZ Laboratories, Inc. in Steamboat Springs, Colorado. The samples and analyses included in this QA review are specified on Table 1.

This review has been performed with guidance from the "National Functional Guidelines for Inorganic Data Review" (US EPA, February 1994). This document has been used to aid the data reviewer in the interpretation of the quality control (QC) analysis results and in the overall evaluation of the sample data deliverables. It should be noted, however, that results affected by blank contamination will be designated with a "UJ" qualifier (not the "U" qualifier typically used when following the National Functional Guidelines) in order to be consistent with historical project validation protocols.

The reported analytical results are presented as a summary of the data in Section 2. Data were examined to determine the usability of the analytical results and the compliance relative to the requirements specified in the published analytical methods and the Site-Wide Quality Assurance Project Plan Anaconda Copper Mine Site Yerington, Nevada, Update Version 5.1 (September 5, 2018). Qualifier codes have been placed next to results to enable the data user to quickly assess the qualitative and/or quantitative reliability of any result. This critical QA review identifies data quality issues for specific samples and specific evaluation criteria. The data qualifications allow the data's end-user to best understand the usability of the analytical results. Data not qualified in this report should be considered valid based on the QC criteria that have been reviewed. Details of this QA review are presented in Section 1 of this report. This report was prepared to provide a critical review of the laboratory analyses and reported analytical results. Rigorous QA reviews of laboratory-generated data routinely identify various problems associated with analytical measurements, even from the most experienced and capable laboratories.

TABLE 1

SAMPLES INCLUDED IN THIS QUALITY ASSURANCE REVIEW

Field Sample Identification	Laboratory Sample Identification	SDG	Matrix	Date Sample Collected	Parameter(s) Examined
STSB27_0.5-3	L56147-01	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB27_0.5-3MS (Matrix Spike)	L56147-01MS	L56147	MWMP	11/21/19	N, ^{228}Ra
STSB27_0.5-3DUP (Laboratory Duplicate)	L56147-01DUP	L56147	MWMP	11/21/19	^{226}Ra
STSB27_6-15	L56147-02	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB28_0.5-3	L56147-03	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB28_6-15	L56147-04	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB29_0.5-3	L56147-05	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB29_0.5-3MS (Matrix Spike)	L56147-05MS	L56147	MWMP	11/21/19	M^1, M^2, Hg, ^{226}Ra
STSB29_0.5-3MSD (Matrix Spike Duplicate)	L56147-05MSD	L56147	MWMP	11/21/19	M^1, M^2, Hg
STSB29_0.5-3DUP (Laboratory Duplicate)	L56147-05DUP	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, F, SO_4, N, TKN, ALK, TDS, ^{228}Ra
STSB29_6-15	L56147-06	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB29_6-15MS (Matrix Spike)	L56147-06MS	L56147	MWMP	11/21/19	M^1, Hg, Cl, N, F, TKN
STSB29_6-15MSD (Matrix Spike Duplicate)	L56147-06MSD	L56147	MWMP	11/21/19	M^1, Hg, F

TABLE 1 (Cont.)

Field Sample Identification	Laboratory Sample Identification	SDG	Matrix	Date Sample Collected	Parameter(s) Examined
STSB29-FD_6-15 (Field Duplicate of STSB29_6-15)	L56147-07	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB29-FD_6-15MS (Matrix Spike)	L56147-07MS	L56147	MWMP	11/21/19	M^2, CN
STSB29-FD_6-15MSD (Matrix Spike Duplicate)	L56147-07MSD	L56147	MWMP	11/21/19	M^2
STSB29-FD_6-15DUP (Laboratory Duplicate)	L56147-07DUP	L56147	MWMP	11/21/19	Cl, N
STSB30_0.5-3	L56147-08	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{26}Ra, ^{228}Ra
STSB30_0.5-3MS (Matrix Spike)	L56147-08MS	L56147	MWMP	11/22/19	^{228}Ra
STSB30_0.5-3DUP (Laboratory Duplicate)	L56147-08DUP	L56147	MWMP	11/22/19	^{226}Ra
STSB30_6-15	L56147-09	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB30_6-15MS (Matrix Spike)	L56147-09MS	L56147	MWMP	11/22/19	^{226}Ra
STSB30_6-15DUP (Laboratory Duplicate)	L56147-09DUP	L56147	MWMP	11/22/19	^{228}Ra
STSB31_0.5-3	L56147-10	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB31_0.5-3 DUP (Laboratory Duplicate)	L56147-10DUP	L56147	MWMP	11/22/19	ALK
STSB31_6-15	L56147-11	L56147	MWMP	11/21/19	M^1, M^2, Hg, CN, Cl, F, SO_4, N, TKN, ALK, TDS, ^{226}Ra, ^{228}Ra
STSB31_6-15MS (Matrix Spike)	L56147-11MS	L56147	MWMP	11/22/19	SO_4
STSB31_6-15DUP (Laboratory Duplicate)	L56147-11DUP	L56147	MWMP	11/22/19	TDS, SO_4

TABLE 1 (Cont.)

NOTES:

M^1	-	ICP Metals (specifically, aluminum, barium, boron, calcium, iron, lithium, magnesium, phosphorus, potassium, sodium, strontium, tin, and titanium) by SW-846 Method 6010D.
M^2	-	ICP/MS Metals (specifically, antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, thallium, thorium, uranium, vanadium, and zinc) by SW-846 Method 6020B.
Hg	-	Mercury by SW-846 Method 7470.
CN	-	Cyanide, Weak-Acid Dissociable (WAD) by Standard Method 4500-CN I.
Cl	-	Chloride by Standard Method 4500-Cl E.
F	-	Fluoride by Standard Method 4500-F C.
SO_4	-	Sulfate by ASTM Method D516-07.
N	-	Nitrate Nitrogen, Nitrite Nitrogen, and Nitrate/Nitrite Nitrogen by US EPA Method 353.2.
TKN	-	Total Kjeldahl Nitrogen by US EPA Method 351.2.
ALK	-	Total Alkalinity, Bicarbonate Alkalinity, Carbonate Alkalinity, and Hydroxide Alkalinity as $CaCO_3$ by Standard Method 2320B.
TDS	-	Total Dissolved Solids by Standard Method 2540C.
^{226}Ra	-	Radium-226 by US EPA Method 903.1 (modified).
^{228}Ra	-	Radium-228 by SW-846 Method 9320.
MWMP	-	Meteoric Water Mobility Procedure Extract.

2.0 Findings

Complete support documentation for this inorganic, general chemistry, and radiological QA review is presented in Section 8.0 of this report.

A. ICP Metals Analyses

Sixteen samples (including QC samples) were analyzed for inductively coupled plasma (ICP) metals (specifically aluminum, barium, boron, calcium, iron, lithium, magnesium, phosphorus, potassium, sodium, strontium, tin, and titanium) by SW-846 Method 6010D. The findings offered in this report for this fraction are based on the items on the following table:

Item Reviewed	Acceptable	Acceptable with Qualification	Not Acceptable
Holding Times	√		
Blank Analysis Results		√	
LCS Results	√		
MS/MSD Results	√		
Laboratory Duplicate Precision	√		
Serial Dilution Analysis	√		
Detection Limits/Sensitivity	√		
Calibrations	√		
RL Standard Recoveries	√		
ICP Interference Check Samples	√		
Field Duplicate Precision	√		
Analytical Sequence	√		
Sample Preparation	√		
Quantitation of Positive Results		√	
Evaluation of Raw Data	√		

Blank Analysis Results: Boron was observed in the method blanks associated with the project samples. The reported positive results for boron in all samples should be considered “not-detected” and have been flagged “UJ” on the data tables. The value in the result field of the data tables should be considered the revised method detection limit (MDL) and reporting limit (RL [if the reported result exceeded the RL]).

Quantitation of Positive Results: All positive results reported at concentrations greater than the MDL, but less than the RL, were qualified as estimated and have been flagged “J” on the data tables.

B. ICP/MS Metals Analyses

Sixteen samples (including QC samples) were analyzed for inductively coupled plasma/mass spectrometry (ICP/MS) metals (specifically, antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, thallium, thorium, uranium, vanadium, and zinc) by SW-846 Method 6020B. The findings offered in this report for this fraction are based on the items on the following table:

Item Reviewed	Acceptable	Acceptable with Qualification	Not Acceptable
Holding Times	√		
Blank Analysis Results	√		
LCS Results	√		
MS/MSD Results	√		
Laboratory Duplicate Precision	√		
Detection Limits/Sensitivity	√		
Calibrations	√		
RL Standard Recoveries	√		
Internal Standard Recoveries	√		
Serial Dilution Analysis	√		
Field Duplicate Precision		√	
Analytical Sequence	√		
Sample Preparation	√		
Quantitation of Positive Results		√	
Evaluation of Raw Data	√		

Field Duplicate Precision: Acceptable precision was not observed (the relative percent difference [RPD] was > 40% when both results were ≥ 5× the RL, or the difference was greater than 2× RL when at least one sample was less than 5× the RL) between the results for copper in sample STSB29_6-15 and its field duplicate, sample STSB29-FD_6-15. The positive results for copper in these samples should be considered estimated and have been flagged “J” on the data tables.

Quantitation of Positive Results: All positive results reported at concentrations greater than the MDL, but less than the RL, were qualified as estimated and have been flagged “J” on the data tables.

C. Mercury Analyses

Sixteen samples (including QC samples) were analyzed for mercury by SW-846 Method 7470. The findings offered in this report for this fraction are based on the items on the following table.

Item Reviewed	Acceptable	Acceptable with Qualification	Not Acceptable
Holding Times	√		
Blank Analysis Results	√		
LCS Results	√		
MS/MSD Results	√		
Laboratory Duplicate Precision	√		
Detection Limits/Sensitivity	√		
Calibrations	√		
RL Standard Recoveries	√		
Field Duplicate Precision	√		
Analytical Sequence	√		
Sample Preparation	√		
Quantitation of Positive Results		√	
Evaluation of Raw Data	√		

Quantitation of Positive Results: All positive results reported at concentrations greater than the MDL, but less than the RL, were qualified as estimated and have been flagged "J" on the data tables.

D. General Chemistry Analyses

Nineteen samples (including QC samples) were collectively analyzed for weak-acid dissociable (WAD) cyanide by Standard Method 4500-CN I; for chloride by Standard Method 4500-Cl E; for fluoride by Standard Method 4500-F C; for sulfate by ASTM Method D516-07; for nitrate nitrogen, nitrite nitrogen, and nitrate/nitrite nitrogen by US EPA Method 353.2; for total Kjeldahl nitrogen by US EPA Method 351.2; for total alkalinity, bicarbonate alkalinity, carbonate alkalinity, and hydroxide alkalinity as $CaCO_3$ by Standard Method 2320B; and for total dissolved solids by Standard Method 2540C. The findings offered in this report for this fraction are based on the items on the following table:

Item Reviewed	Acceptable	Acceptable with Qualification	Not Acceptable
Holding Times	√		
Sample Condition Upon Receipt	√		
Blank Analysis Results	√		

Item Reviewed	Acceptable	Acceptable with Qualification	Not Acceptable
MS/MSD Results	√		
LCS Results	√		
Detection Limits/Sensitivity	√		
Calibrations	√		
Laboratory Duplicate Precision	√		
Field Duplicate Precision	√		
Analytical Sequence	√		
Sample Preparation	√		
Quantitation of Positive Results		√	
Evaluation of Raw Data	√		

Quantitation of Positive Results: All positive results reported at concentrations greater than the MDL, but less than the RL, were qualified as estimated and have been flagged "J" on the data tables.

E. Radiological Analyses

Nineteen samples (including QC samples) were analyzed for radium-226 by US EPA Method 903.1 (modified) and for radium-228 by SW-846 Method 9320. The findings offered in this report for this fraction are based on the items on the following table:

Item Reviewed	Acceptable	Acceptable with Qualification	Not Acceptable
Holding Times	√		
Blank Results		√	
LCS Recoveries	√		
Laboratory Duplicate Precision		√	
MS/MSD Results	√		
Chemical Yield	√		
Efficiency Checks	√		
Background Checks	√		
Field Duplicate Precision	√		
Sample Preparation	√		
Quantitation of Results		√	
Evaluation of Raw Data	√		

Blank Analysis Results: Radium-226 was observed in a method blank associated with the project samples. The reported positive results for radium-226 in samples STSB29_6-15, STSB29-FD_6-15, STSB30_0.5-3, and STSB31_0.5-3 should be considered "not-detected" and have been flagged "UJ" on the data tables. The value in the result field of the data tables should be considered the revised MDL.

Laboratory Duplicate Precision: Acceptable precision was not observed (replicate error ratio [RER] was > 2) between the results for radium-226 in an associated laboratory duplicate analysis. The positive results for radium-226 in samples STSB27_0.5-3, STSB27_6-15, STSB28_0.5-3, STSB28_6-15, and STSB29_0.5-3 should be considered estimated and have been flagged "J" on the data tables.

Quantitation of Results: Based on standard project reporting requirements, all radium-226 and radium-228 results reported at concentrations less than the MDL were qualified as "not-detected" and have been flagged "U" on the data tables.

3.0 Qualifier Summary

A. ICP Metals Analyses

Analyte(s)	SDG(s)	Sample(s)	Validation Qualifier(s)	Reason(s) for Qualification
boron	L56147	All samples	UJ	2 – Method blank contamination

All positive results reported between the MDL and RL have been flagged "J." (Valid Reason Code: T)

B. ICP/MS Metals Analyses

Analyte(s)	SDG(s)	Sample(s)	Validation Qualifier(s)	Reason(s) for Qualification
copper	L56147	STSB29_6-15 and STSB29-FD_6-15	J	8 – Field duplicate imprecision

All positive results reported between the MDL and RL have been flagged "J." (Valid Reason Code: T)

C. Mercury Analyses

All positive results reported between the MDL and RL have been flagged "J." (Valid Reason Code: T)

D. General Chemistry Analyses

All positive results reported between the MDL and RL have been flagged "J." (Valid Reason Code: T)

E. Radiological Analyses

Analyte(s)	SDG(s)	Sample(s)	Validation Qualifier(s)	Reason(s) for Qualification
radium-226	L56147	STSB29_6-15, STSB29-FD_6-15, STSB30_0.5-3, and STSB31_0.5-3	UJ	2 – Method blank contamination
radium-226	L56147	STSB27_0.5-3, STSB27_6-15, STSB28_0.5-3, STSB28_6-15, and STSB29_0.5-3	J	D – Laboratory duplicate imprecision

All reported results less than the MDL have been flagged "U." (Valid Reason Code: 9)

4.0 Overall Assessment

Based on this QA review, the results for boron in all samples and for radium-226 in several samples were qualified as "not-detected" due to blank contamination. The results for copper in two samples were qualified as estimated due to field duplicate imprecision. The results for radium-226 in several samples were qualified as estimated due to laboratory duplicate imprecision. All radiological results less than the MDL have been flagged as "not-detected." In addition, several metals and general chemistry results were qualified as estimated because the reported results were between the MDL and the RL.

5.0 Inorganic, General Chemistry, and Radiological Data Qualifiers and Valid Reason Codes

<u>Inorganic, General Chemistry, and Radiological Data Qualifiers</u>

U Analyte not detected at the detection limit concentration.

J Reported value is an estimated concentration.

UJ Analyte not detected at an estimated detection limit concentration.

R These data were rejected and were not used for any purposes.

UR The analyte was not detected. The detection limit is unreliable and may be representative of a false negative. These data were rejected and are not usable for any purpose.

<u>Valid Reason Codes</u>

1 Holding time violation
2 Method blank contamination
3 Surrogate recovery
4 Matrix spike/matrix spike duplicate recovery
5 Matrix spike/matrix spike duplicate precision outside limits
6 Laboratory control sample recovery

7	Field blank contamination
8	Field duplicate precision outside limits
9	Other deficiencies (including cooler temperature)
A	Absence of supporting QC
S	ICV, CCV, or column performance check problem
Y	Initial and continuing calibration blank problem
M	Interference check samples problem
O	Post-digestion spike outside of QC criteria
F	MSA correlation coefficient < 0.995, or MSA not done
G	Serial dilution problem
K	DFTPP or BFB tuning problem
Q	Initial calibration problem
X	Internal standard recovery problem
V	Second-source standard calibration verification problem
L	Low bias
Z	Retention time problem
N	Counting time error (radionuclide chemistry)
W	Detector instability (radionuclide chemistry)
C	Co-elution of compounds
E	Value exceeds linear calibration range
I	Interferences present during analysis
T	Trace-level compound, poor quantitation
P	Dual-column precision outside of limits
B	LCS/LCSD precision outside limits
D	Lab Dup/Rep precision outside limits
H	High bias

6.0 Signatures

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7.0 ANALYTICAL RESULTS

Yerington
SDG: L56147

Lab Sample	L56147-01
Field Sample	STSB27_0.5-3
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.1	U		0.02	0.1		N
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	1620			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	0.3	J	T	0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.1	U		0.02	0.1		N
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	1.3	J	D	0.4		0.32	Y
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	89.2			2	20		Y
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	89.2			2	20		Y
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	2940			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	3.6			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	1.5			0.1	0.4		Y
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	0.5	U		0.1	0.5		N
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.03	J	T	0.01	0.07		Y
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.22	UJ	2	0.22	0.22		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	551			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.2	U		0.06	0.2		N
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.33			0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	72			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	0.3	J	T	0.2	1		Y
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	7			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	133			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	1.68			0.02	0.09		Y

Lab Sample	L56147-01
Field Sample	STSB27_0.5-3
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.07			0.01	0.05		Y
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.003	J	T	0.0008	0.004		Y
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.003			0.0004	0.002		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	5E-04	U		0.0002	0.0005		N
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	5E-04	U		0.0001	0.0005		N
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.004			0.0001	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	0.166			0.002	0.004		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	0.553			0.0008	0.004		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.032			0.0004	0.001		Y
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.007			0.0008	0.002		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.003			0.0002	0.0005		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.017			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.02	U		0.008	0.02		N
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	3.8	U	9	7.1		2.7	N

Lab Sample	L56147-02
Field Sample	STSB27_6-15
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.14			0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	1710			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	0.2	J	T	0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.14			0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	1.3	J	D	0.24		0.33	Y
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	55.4			2	20		Y
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	55.4			2	20		Y
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	2760			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	5.1			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	4.7			0.1	0.4		Y
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	0.5	U		0.1	0.5		N
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.02	J	T	0.01	0.07		Y
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.23	UJ	2	0.23	0.23		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	561			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.2	U		0.06	0.2		N
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.05	J	T	0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	101			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	32.3			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	36.2			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	3.12			0.02	0.09		Y

Lab Sample	L56147-02
Field Sample	STSB27_6-15
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.07			0.01	0.05		Y
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.004	U		0.0008	0.004		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.0008	J	T	0.0004	0.002		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0005	U		0.0002	0.0005		N
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0003	J	T	0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.0338			0.0001	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	0.148			0.002	0.004		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	3.01			0.0008	0.004		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.032			0.0004	0.001		Y
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.0211			0.0008	0.002		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0282			0.0002	0.0005		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.0285			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.02	U		0.008	0.02		N
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	0.99	U	9	5.6		2.4	N

Lab Sample	L56147-03
Field Sample	STSB28_0.5-3
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.29			0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	1610			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	1.5			0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.29			0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	0.87	J	D	0.55		0.37	Y
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	2750			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	2.2			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	40	U		10	40		N
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	6.6			0.1	0.5		Y
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.07	U		0.01	0.07		N
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.15	UJ	2	0.15	0.2		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	556			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.2	U		0.06	0.2		N
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.08	U		0.02	0.08		N
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	65.6			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	7.4			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	10.6			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	0.91			0.02	0.09		Y

Lab Sample	L56147-03
Field Sample	STSB28_0.5-3
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.07			0.01	0.05		Y
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.004	U		0.0008	0.004		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.0016	J	T	0.0004	0.002		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0013			0.0002	0.0005		Y
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0016			0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.134			0.0001	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	83			0.2	0.4		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.0004	J	T	0.0002	0.001		Y
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	1.03			0.0008	0.004		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.001	U		0.0004	0.001		N
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.103			0.0008	0.002		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0028			0.0002	0.0005		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.0003	J	T	0.0002	0.001		Y
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.0167			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.157			0.008	0.02		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	-0.64	U	9	6.1		2.5	N

Lab Sample	L56147-04
Field Sample	STSB28_6-15
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.13			0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	1730			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	0.5			0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.13			0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	0.96	J	D	0.43		0.33	Y
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	76			2	20		Y
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	76			2	20		Y
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	3040			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	20.9			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	3.6			0.1	0.4		Y
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	0.5	U		0.1	0.5		N
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.07	U		0.01	0.07		N
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.28	UJ	2	0.28	0.28		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	514			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.2	U		0.06	0.2		N
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.12			0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	161			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	37.4			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	92.3			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	3.07			0.02	0.09		Y

Lab Sample	L56147-04
Field Sample	STSB28_6-15
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.07			0.01	0.05		Y
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.004	U		0.0008	0.004		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.0009	J	T	0.0004	0.002		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0005			0.0002	0.0005		Y
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0021			0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.317			0.0001	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	3.16			0.04	0.1		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	9.41			0.02	0.1		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.0103			0.0004	0.001		Y
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.167			0.0008	0.002		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0578			0.0002	0.0005		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.0401			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.101			0.008	0.02		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	2.1	U	9	6		2.7	N

Lab Sample	L56147-05
Field Sample	STSB29_0.5-3
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.16			0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	1960			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	1			0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.16			0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	1.3	J	D	0.23		0.36	Y
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	3540			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	3.3			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	70	U		20	70		N
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	14.3			0.1	0.5		Y
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.07	U		0.01	0.07		N
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.15	UJ	2	0.15	0.2		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	560			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.21			0.06	0.2		Y
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.03	J	T	0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	67.7			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	9.1			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	19.6			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	0.9			0.02	0.09		Y

Lab Sample	L56147-05
Field Sample	STSB29_0.5-3
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.08			0.01	0.05		Y
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.0013	J	T	0.0008	0.004		Y
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.0013	J	T	0.0004	0.002		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.003			0.0002	0.0005		Y
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0018			0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.001	J	T	0.001	0.004		Y
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.165			0.0001	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	339			0.8	2		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.001			0.0002	0.001		Y
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	1.4			0.0008	0.004		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.001	U		0.0004	0.001		N
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.128			0.0008	0.002		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0162			0.0002	0.0005		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.0002	J	T	0.0002	0.001		Y
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.0193			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.214			0.008	0.02		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.0002	J	T	0.0002	0.001		Y
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	2.8	U	9	6		2.5	N

Lab Sample	L56147-06
Field Sample	STSB29_6-15
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.03	J	T	0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	1460			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	0.2	J	T	0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.03	J	T	0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	1	UJ	2	1		0.25	N
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	54.4			2	20		Y
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	54.4			2	20		Y
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	2440			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	10.2			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	5.1			0.1	0.4		Y
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	0.5	U		0.1	0.5		N
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.03	J	T	0.01	0.07		Y
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.16	UJ	2	0.16	0.2		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	492			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.2	U		0.06	0.2		N
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.11			0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	75.3			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	41.3			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	59.3			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	2.89			0.02	0.09		Y

Lab Sample	L56147-06
Field Sample	STSB29_6-15
Collect Date	11/21/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.07			0.01	0.05		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	3.77			0.0008	0.004		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.0217			0.0004	0.001		Y
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.0354			0.0008	0.002		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.004	U		0.0008	0.004		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.002	U		0.0004	0.002		N
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0005	U		0.0002	0.0005		N
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0006			0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.0904			0.0001	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	1.16	J	8	0.002	0.004		Y
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.0222			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.03			0.008	0.02		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0862			0.0002	0.0005		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	5.9	U	9	7.3		3.1	N

Lab Sample	L56147-07
Field Sample	STSB29-FD_6-15
Collect Date	11/21/2019
Type	FD
Parent	STSB29_6-15

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.1	U		0.02	0.1		N
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	1400			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	0.2	J	T	0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.1	U		0.02	0.1		N
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	0.99	UJ	2	0.99		0.25	N
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	59.3			2	20		Y
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	59.3			2	20		Y
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	2430			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	8.9			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	6.4			0.1	0.4		Y
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	0.5	U		0.1	0.5		N
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.03	J	T	0.01	0.07		Y
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.14	UJ	2	0.14	0.2		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	477			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.2	U		0.06	0.2		N
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.08			0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	90.4			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	40.8			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	54.1			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	2.85			0.02	0.09		Y

Lab Sample	L56147-07
Field Sample	STSB29-FD_6-15
Collect Date	11/21/2019
Type	FD
Parent	STSB29_6-15

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.06			0.01	0.05		Y
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.004	U		0.0008	0.004		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.002	U		0.0004	0.002		N
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0005	U		0.0002	0.0005		N
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0006			0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.106			0.0001	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	0.396	J	8	0.002	0.004		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.0003	J	T	0.0002	0.001		Y
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	5.22			0.02	0.1		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.0167			0.0004	0.001		Y
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.0406			0.0008	0.002		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0935			0.0002	0.0005		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.0236			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.017	J	T	0.008	0.02		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	4.2			4.1		1.9	Y

			Lab Sample			L56147-08						
			Field Sample			STSB30_0.5-3						
			Collect Date			11/22/2019						
			Type									
			Parent									
Method	**CAS Number**	**Chemical Name**	**TD**	**Test Type**	**Units**	**Result**	**Qual**	**Reason**	**MDL**	**RDL**	**Uncert**	**Detect Flag**
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.19			0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	1590			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	2.4			0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.19			0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	1	UJ	2	1		0.26	N
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	2730			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	1.9	J	T	0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	40	U		10	40		N
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	10.3			0.1	0.5		Y
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.04	J	T	0.01	0.07		Y
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.14	UJ	2	0.14	0.2		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	512			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.74			0.06	0.2		Y
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.03	J	T	0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	72			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	12.3			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	19.4			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	2.23			0.02	0.09		Y

Lab Sample	L56147-08
Field Sample	STSB30_0.5-3
Collect Date	11/22/2019
Type	
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.19	J	T	0.08	0.4		Y
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.07			0.01	0.05		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.0017			0.0002	0.001		Y
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	3.26			0.0008	0.004		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.001	U		0.0004	0.001		N
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.132			0.0008	0.002		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.001			0.0002	0.001		Y
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.004	U		0.0008	0.004		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.0038			0.0004	0.002		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0034			0.0002	0.0005		Y
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0017			0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.123			0.0001	0.0005		Y
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.024			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.168			0.008	0.02		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0022			0.0002	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	103			0.4	1		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	0.91	U	9	4.2		1.7	N

Lab Sample	L56147-09
Field Sample	STSB30_6-15
Collect Date	11/22/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.05	J	T	0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	2050			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	0.4	J	T	0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.05	J	T	0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	1.4			0.27		0.31	Y
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	39.7			2	20		Y
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	39.7			2	20		Y
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	3670			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	17.2			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	20	J	T	10	40		Y
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	8.1			0.1	0.5		Y
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.03	J	T	0.01	0.07		Y
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.17	UJ	2	0.17	0.2		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	574			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.2	U		0.06	0.2		N
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.15			0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	194			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	48.2			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	80.2			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	3.98			0.02	0.09		Y

Lab Sample	L56147-09
Field Sample	STSB30_6-15
Collect Date	11/22/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.07			0.01	0.05		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.001			0.0002	0.001		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.0027			0.0004	0.001		Y
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.574			0.0008	0.002		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.0003	J	T	0.0002	0.001		Y
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.004	U		0.0008	0.004		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.002			0.0004	0.002		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0042			0.0002	0.0005		Y
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0048			0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.994			0.0001	0.0005		Y
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.0416			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.412			0.008	0.02		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0852			0.0002	0.0005		Y
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	17.7			0.04	0.2		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	40.7			0.08	0.2		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	3.4	U	9	4.1		1.8	N

Lab Sample	L56147-10
Field Sample	STSB31_0.5-3
Collect Date	11/22/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.76			0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	3060			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	2.3			0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.76			0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	0.64	UJ	2	0.64		0.27	N
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	5130			40	80		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	12.6			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	200	U		60	200		N
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	40			0.3	1		Y
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.2	U		0.04	0.2		N
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.1	UJ	2	0.1	0.5		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	505			0.5	3		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	1.8			0.2	0.4		Y
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.1	J	T	0.04	0.2		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	239			1	5		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	3	U		0.5	3		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	17			1	5		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	38			1	5		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	0.62			0.05	0.2		Y

Lab Sample	L56147-10
Field Sample	STSB31_0.5-3
Collect Date	11/22/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.11			0.03	0.1		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.0175			0.0005	0.003		Y
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	6.34			0.002	0.01		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.003	U		0.001	0.003		N
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.461			0.002	0.005		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.003	U		0.0005	0.003		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.0025	J	T	0.0005	0.003		Y
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.03	U		0.005	0.03		N
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.006			0.001	0.005		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0044			0.0004	0.001		Y
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0094			0.0003	0.001		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.01	U		0.003	0.01		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	0.596			0.0003	0.001		Y
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.079			0.0005	0.003		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.01	U		0.003	0.01		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	2.02			0.02	0.05		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0155			0.0005	0.001		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	548			2	4		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.0004	J	T	0.0002	0.001		Y
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	3.4	U	9	4.5		2	N

Lab Sample	L56147-11
Field Sample	STSB31_6-15
Collect Date	11/22/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
Calculation	14797-55-8_N	Nitrogen, Nitrate as N	N	Initial	MG/L	0.06	J	T	0.02	0.1		Y
ASTM D516	14808-79-8	Sulfate	N	Initial	MG/L	2300			100	500		Y
EPA 351.2	7727-37-9_TKN	Nitrogen, Kjeldahl	N	Initial	MG/L	0.5			0.1	0.5		Y
EPA 353.2	14797-65-0_N	Nitrogen, Nitrite as N	N	Initial	MG/L	0.05	U		0.01	0.05		N
EPA 353.2	NO3NO2N	Nitrogen, Nitrate/Nitrite (as N)	N	Initial	MG/L	0.06	J	T	0.02	0.1		Y
EPA 903.1 MOD	13982-63-3	Radium-226	N	Initial	PCI/L	6.9			0.52		0.58	Y
SM 2320B	ALK_BICARB	Alkalinity, Bicarbonate as CaCO3	N	Initial	MG/L	10.1	J	T	2	20		Y
SM 2320B	ALK_CaCO3	Alkalinity as CaCO3	N	Initial	MG/L	10.1	J	T	2	20		Y
SM 2320B	ALK_CARB	Alkalinity, Carbonate as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2320B	ALK_H	Alkalinity, Hydroxide as CaCO3	N	Initial	MG/L	20	U		2	20		N
SM 2540C	TDS	Total Dissolved Solids	N	Initial	MG/L	3740			20	40		Y
SM 4500-Cl E	16887-00-6	Chloride	N	Initial	MG/L	7.6			0.5	2		Y
SM 4500-CN-I	57-12-5_WDC	WEAK ACID DISSOCIABLE CYANIDE	N	Initial	MG/L	0.01	U		0.003	0.01		N
SM 4500-F-C	16984-48-8	Fluoride	N	Initial	MG/L	40	U		10	40		N
SW-846 6010D	7429-90-5	Aluminum	N	Initial	MG/L	6.8			0.1	0.5		Y
SW-846 6010D	7440-39-3	Barium	N	Initial	MG/L	0.02	J	T	0.01	0.07		Y
SW-846 6010D	7440-42-8	Boron	N	Initial	MG/L	0.22	UJ	2	0.22	0.22		N
SW-846 6010D	7440-70-2	Calcium	N	Initial	MG/L	534			0.2	1		Y
SW-846 6010D	7439-89-6	Iron	N	Initial	MG/L	0.2	U		0.06	0.2		N
SW-846 6010D	7439-93-2	Lithium	N	Initial	MG/L	0.12			0.02	0.08		Y
SW-846 6010D	7439-95-4	Magnesium	N	Initial	MG/L	246			0.4	2		Y
SW-846 6010D	7723-14-0	Phosphorus	N	Initial	MG/L	1	U		0.2	1		N
SW-846 6010D	7440-09-7	Potassium	N	Initial	MG/L	37.8			0.4	2		Y
SW-846 6010D	7440-23-5	Sodium	N	Initial	MG/L	68.1			0.4	2		Y
SW-846 6010D	7440-24-6	Strontium	N	Initial	MG/L	2.63			0.02	0.09		Y

Lab Sample	L56147-11
Field Sample	STSB31_6-15
Collect Date	11/22/2019
Type	N
Parent	

Method	CAS Number	Chemical Name	TD	Test Type	Units	Result	Qual	Reason	MDL	RDL	Uncert	Detect Flag
SW-846 6010D	7440-31-5	Tin	N	Initial	MG/L	0.4	U		0.08	0.4		N
SW-846 6010D	7440-32-6	Titanium	N	Initial	MG/L	0.07			0.01	0.05		Y
SW-846 6020B	7439-92-1	Lead	N	Initial	MG/L	0.0006	J	T	0.0002	0.001		Y
SW-846 6020B	7439-98-7	Molybdenum	N	Initial	MG/L	0.0014			0.0004	0.001		Y
SW-846 6020B	7440-02-0	Nickel	N	Initial	MG/L	0.448			0.0008	0.002		Y
SW-846 6020B	7440-22-4	Silver	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 6020B	7440-28-0	Thallium	N	Initial	MG/L	0.0003	J	T	0.0002	0.001		Y
SW-846 6020B	7440-29-1	Thorium	N	Initial	MG/L	0.01	U		0.002	0.01		N
SW-846 6020B	7440-36-0	Antimony	N	Initial	MG/L	0.004	U		0.0008	0.004		N
SW-846 6020B	7440-38-2	Arsenic	N	Initial	MG/L	0.0024			0.0004	0.002		Y
SW-846 6020B	7440-41-7	Beryllium	N	Initial	MG/L	0.0021			0.0002	0.0005		Y
SW-846 6020B	7440-43-9	Cadmium	N	Initial	MG/L	0.0079			0.0001	0.0005		Y
SW-846 6020B	7440-47-3	Chromium, Total	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-48-4	Cobalt	N	Initial	MG/L	1.08			0.0001	0.0005		Y
SW-846 6020B	7440-61-1	Uranium	N	Initial	MG/L	0.0494			0.0002	0.001		Y
SW-846 6020B	7440-62-2	Vanadium	N	Initial	MG/L	0.004	U		0.001	0.004		N
SW-846 6020B	7440-66-6	Zinc	N	Initial	MG/L	0.595			0.008	0.02		Y
SW-846 6020B	7782-49-2	Selenium	N	Initial	MG/L	0.0432			0.0002	0.0005		Y
SW-846 6020B	7440-50-8	Copper	N	Initial	MG/L	39			0.08	0.2		Y
SW-846 6020B	7439-96-5	Manganese	N	Initial	MG/L	19.8			0.08	0.4		Y
SW-846 7470	7439-97-6	Mercury	N	Initial	MG/L	0.001	U		0.0002	0.001		N
SW-846 9320	15262-20-1	Radium-228	N	Initial	PCI/L	2	U	9	4.9		2.2	N

8.0 SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS SUPPORT DOCUMENTATION

Client Name:	ARCO	EnvStd Project Manager:	KV
Site/Project Name:	2020 Yerington DV	Reviewed by:	APB
Job Number/Task/Subtask:	20209110.A000 / 000DV	Approved by:	KV
Laboratory/Location:	ACZ / Steamboat Springs, CO	Completion Date:	7/2020
SDG:	L56147	Validation Level:	IV
Sample Collection Dates:	11/21/2019 – 11/22/2019		

The following table indicates criteria that were examined, the identified problems, and support documentation attachments.

Criteria Examined in Detail

Note: All items examined have been included in the Support Document unless otherwise noted.

Problems Identified

Check (√) if Yes or Footnote Letter for Comments Below

Parameter/ Method	Metals – 6010D	Metals – 6020B	Mercury – 7470	WAD – 4500-CN I	Chloride – 4500-Cl E	Fluoride – 4500-F C	Sulfate – D516-07	Metals – 6010D	Metals – 6020B	Mercury – 7470	WAD – 4500-CN I	Chloride – 4500-Cl E	Fluoride – 4500-F C	Sulfate – D516-07
Condition upon Receipt	√	√	√	√	√	√	√							
Sample Preservation	√	√	√	√	√	√	√							
Holding Times	√	√	√	√	√	√	√							
Blank Analysis Results	√	√	√	√	√	√	√	√						
Laboratory Control Sample	√	√	√	√	√	√	√							
Matrix Spike (Pre-Digestion Spike)	√	√	√	√	√	√	√							
Laboratory Duplicate				√			√							
Field Duplicate	√	√	√	√	√	√	√							
Total *vs.* Dissolved Results Comparison														
Sample Preparation	√	√	√	√	√	√	√							
Mass Tuning		√												
Initial Calibrations	√	√	√	√	√	√	√							
Continuing Calibrations	√	√	√	√	√	√	√							
Detection Limit/Reporting Limit Standards	√	√	√											
Negative Bias														
Interference Checks	√	√												
Post-Digestion Spike														
Serial Dilution	√	√												
Analytical Sequence	√	√	√	√	√	√	√							
Linear Range Analysis	√	√	√											
Interelement Correction Factors														
Detection Limit/Sensitivity	√	√	√	√	√	√	√							
Dilutions														
Internal Standard Performance		√												
Quantitation of Results	√	√	√	√	√	√	√							
Multiple Exposures %RSD														
Percent Solids														
Deliverable was Complete		√	√	√	√	√	√							
Others:														

Comments: Quantitation of Results and Multiple Exposures are not included in the Support Documentation unless a problem was identified.

INORGANIC ANALYSIS SUPPORT DOCUMENTATION

Client Name:	ARCO	EnvStd Project Manager:	KV
Site/Project Name:	2020 Yerington DV	Reviewed by:	APB
Job Number/Task/Subtask:	20209110.A000 / 000DV	Approved by:	KV
Laboratory/Location:	ACZ / Steamboat Springs, CO	Completion Date:	7/2020
SDG:	L56147	Validation Level:	IV
Sample Collection Dates:	11/21/2019 – 11/22/2019		

The following table indicates criteria that were examined, the identified problems, and support documentation attachments.

	Criteria Examined in Detail **Note:** All items examined have been included in the Support Document unless otherwise noted.							Problems Identified						
	Check (√) if Yes or Footnote Letter for Comments Below													
Parameter/ Method	NO_2/NO_3 – 353.2	TKN – 351.2	Alkalinity – 2320B	TDS – 2540C				NO_2/NO_3 – 353.2	TKN – 351.2	Alkalinity – 2320B	TDS – 2540C			
Condition upon Receipt	√	√	√	√										
Sample Preservation	√	√	√	√										
Holding Times	√	√	√	√							√			
Blank Analysis Results	√	√	√	√						√				
Laboratory Control Sample	√	√	√	√										
Matrix Spike (Pre-Digestion Spike)	√	√												
Laboratory Duplicate			√	√										
Field Duplicate	√	√	√	√										
Total *vs.* Dissolved Results Comparison														
Sample Preparation	√	√	√	√										
Mass Tuning														
Initial Calibrations	√	√												
Continuing Calibrations	√	√												
Detection Limit/Reporting Limit Standards	√	√	√	√										
Negative Bias														
Interference Checks														
Post-Digestion Spike														
Serial Dilution														
Analytical Sequence	√	√	√	√										
Linear Range Analysis	√	√												
Interelement Correction Factors														
Detection Limit/Sensitivity	√	√	√	√										
Dilutions														
Internal Standard Performance														
Quantitation of Results	√	√	√	√										
Multiple Exposures %RSD														
Percent Solids														
Deliverable was Complete	√		√	√					√					
Others:														

Comments: Quantitation of Results and Multiple Exposures are not included in the Support Documentation unless a problem was identified.

RADIOLOGICAL ANALYSIS SUPPORT DOCUMENTATION

Client Name:	ARCO	EnvStd Project Manager:	KV
Site/Project Name:	2020 Yerington DV	Reviewed by:	APB
Job Number/Task/Subtask:	20209110.A000 / 000DV	Approved by:	THW
Laboratory/Location:	ACZ / Steamboat Springs, CO	Completion Date:	7/2020
SDG:	L56147	Validation Level:	IV
Sample Collection Dates:	11/21/2019 – 11/22/2019		

The following table indicates criteria that were examined, the identified problems, and support documentation attachments.

	Criteria Examined in Detail **Note:** All items examined have been included in the Support Document unless otherwise noted.							Problems Identified						
	Check (√) if Yes or Footnote Letter for Comments Below													
Parameter/ Method	Ra-226 – 903.1 (mod)	Ra-228 – 904.0						Ra-226 – 903.1 (mod)	Ra-228 – 904.0					
Condition upon Receipt	√	√												
Sample Preservation	√	√												
Holding Times	√	√												
Blank Analysis Results	√	√						√						
Laboratory Control Sample	√	√												
Tracer/Carrier Yield	√	√												
Laboratory Duplicate	√	√												
Field Duplicate	√	√												
Matrix Spike/Matrix Spike Duplicate														
Sample Preparation	√	√												
Quantitation of Results	√	√						√	√					
Detection Limit	√	√												
Efficiency/Energy Calibrations														
Initial Calibration Verifications														
Annual Calibration Verifications														
Continuing Calibration Checks														
Resolution Checks														
Background Checks														
Analytical Sequence	√	√												
Standards Preparation Logs														
Deliverable was Complete														
Others:														

Comments: Quantitation of Results are not included in the Support Documentation unless a problem was identified.

EVALUATION OF INORGANIC FIELD DUPLICATE SAMPLE ANALYSIS PRECISION

Units see below	PRECISION OBJECTIVES*	
	Analyte > or = 5 X RL	RPD < or = 40
	Analyte < 5 X RL	Difference ≤ RL × 2

* Enter the project-specific or default acceptance criteria

ANALYTE	Units	STSB29_6-15 Analyte Concentration	Qual	RL	STSB29-FD_6-15 Analyte Concentration	Qual	RL	Difference	RPD	Notes
Alkalinity as CaCO3	MG/L	54.4		20	59.3		20	4.9	NA	IN
Alkalinity, Bicarbonate as C	MG/L	54.4		20	59.3		20	4.9	NA	IN
Alkalinity, Carbonate as Ca	MG/L	20	U	20	20	U	20	0	NA	IN
Alkalinity, Hydroxide as Ca	MG/L	20	U	20	20	U	20	0	NA	IN
Aluminum	MG/L	0.5	U	0.5	0.5	U	0.5	0	NA	IN
Antimony	MG/L	0.004	U	0.004	0.004	U	0.004	0	NA	IN
Arsenic	MG/L	0.002	U	0.002	0.002	U	0.002	0	NA	IN
Barium	MG/L	0.03	B	0.07	0.03	B	0.07	0	NA	IN
Beryllium	MG/L	0.0005	U	0.0005	0.0005	U	0.0005	0	NA	IN
Boron	MG/L	0.16	B	0.2	0.14	B	0.2	0.02	NA	IN
Cadmium	MG/L	0.0006		0.0005	0.0006		0.0005	0	NA	IN
Calcium	MG/L	492		1	477		1	NA	3%	IN
Chloride	MG/L	10.2		2	8.9		2	1.3	NA	IN
Chromium, Total	MG/L	0.004	U	0.004	0.004	U	0.004	0	NA	IN
Cobalt	MG/L	0.0904		0.0005	0.106		0.0005	NA	16%	IN
Copper	MG/L	1.16		0.004	0.396		0.004	NA	98%	1
Fluoride	MG/L	5.1		0.4	6.4		0.4	NA	23%	IN
Iron	MG/L	0.2	U	0.2	0.2	U	0.2	0	NA	IN
Lead	MG/L	0.0002	U	0.001	0.0003	B	0.001	0.0001	NA	IN
Lithium	MG/L	0.11		0.08	0.08		0.08	0.03	NA	IN
Magnesium	MG/L	75.3		2	90.4		2	NA	18%	IN
Manganese	MG/L	3.77		0.004	5.22		0.1	NA	32%	IN
Mercury	MG/L	0.001	U	0.001	0.001	U	0.001	0	NA	IN
Molybdenum	MG/L	0.0217		0.001	0.0167		0.001	NA	26%	IN
Nickel	MG/L	0.0354		0.002	0.0406		0.002	NA	14%	IN
Nitrogen, Kjeldahl	MG/L	0.2	B	0.5	0.2	B	0.5	0	NA	IN
Nitrogen, Nitrate as N	MG/L	0.03	B	0.1	0.02	U	0.1	0.01	NA	IN
Nitrogen, Nitrate/Nitrite (as	MG/L	0.03	B	0.1	0.02	U	0.1	0.01	NA	IN
Nitrogen, Nitrite as N	MG/L	0.05	U	0.05	0.05	U	0.05	0	NA	IN
pH (MWMT)	pH units	7.2		0.1	7.3		0.1	NA	1%	IN
pH Corrosivity	pH units	6.1		0.1	6.4		0.1	NA	5%	IN
Phosphorus	MG/L	1	U	1	1	U	1	0	NA	IN
Potassium	MG/L	41.3		2	40.8		2	NA	1%	IN
Radium-226	pCi/L	1		0.25	0.99		0.25	0.01	NA	IN
Radium-228	pCi/L	5.9		3.1	4.2		1.9	1.7	NA	IN
Selenium	MG/L	0.0862		0.0005	0.0935		0.0005	NA	8%	IN
Silver	MG/L	0.001	U	0.001	0.001	U	0.001	0	NA	IN
Sodium	MG/L	59.3		2	54.1		2	NA	9%	IN
Strontium	MG/L	2.89		0.09	2.85		0.09	NA	1%	IN
Sulfate	MG/L	1460		500	1400		500	60	NA	IN
Temperature (MWMT)	C	20.9		0.1	20.9		0.1	NA	0%	IN
Temperature Corrosivity	C	22.3		0.1	22.3		0.1	NA	0%	IN
Thallium	MG/L	0.001	U	0.001	0.001	U	0.001	0	NA	IN
Thorium	MG/L	0.01	U	0.01	0.01	U	0.01	0	NA	IN
Tin	MG/L	0.4	U	0.4	0.4	U	0.4	0	NA	IN
Titanium	MG/L	0.07		0.05	0.06		0.05	0.01	NA	IN
Total Dissolved Solids	MG/L	2440		40	2430		40	NA	0%	IN
Uranium	MG/L	0.0222		0.001	0.0236		0.001	NA	6%	IN
Vanadium	MG/L	0.004	U	0.004	0.004	U	0.004	0	NA	IN
WEAK ACID DISSOCIABL	MG/L	0.01	U	0.01	0.01	U	0.01	0	NA	IN
Zinc	MG/L	0.03		0.02	0.017	B	0.02	0.013	NA	IN

NOTES:

Qual) Column to enter J, U, U*, or B

RPD) Relative Percent Difference

RL) Reporting Limit

J) The analyte concentration should be considered estimated.

U) The analyte was not-detected in the sample. The numerical value of the EDL will be used for comparison purposes.

U* or B) The result was blank qualified. The numerical value will be used for comparison purposes.

NA) The RPD or Difference is not applicable.

1) Both results are > or = 5 X RL and RPD over acceptance limit, flag positive results "J".

2) At least one of the results is < 5 X RL and difference is over acceptance limit, flag positive results "J" and "not-detected" results "U

Comments:

RADIOLOGICAL BLANK CONTAMINATION

NORMALIZED ABSOLUTE DIFFERENCE (NAD 2-s) LIMIT: NAD > 2.58

NAD = ABS (SAMPLE ACT - BLANK ACT) / SQRT [(TPU SAMPLE)2 + (TPU BLANK)2]

SDG: L56147

Analyte: Ra-226 Blank ID: MB WG487250PBW

Sample No.	Sample Act	Sample TPU	Blank Act	Blank TPU	NAD 2-s	Qualifier
L56147-06	1	0.25	0.65	0.30	1.79	UJ
L56147-07	0.99	0.25	0.65	0.30	1.74	UJ
L56147-08	1	0.26	0.65	0.30	1.76	UJ
L56147-09	1.4	0.31	0.65	0.30	3.48	FALSE
L56147-10	0.64	0.27	0.65	0.30	0.05	UJ
L56147-11	6.9	0.58	0.65	0.30	19.14	FALSE

RADIOLOGICAL FIELD DUPLICATE EVALUATION

DUPLICATE ERROR RATIO (DER 2-s) LIMIT < 2

DER = ABS (SAMPLE ACT - DUPLICATE ACT) / SQRT [(TPU 2-s SAMPLE)2 + (TPU 2-s DUPLICATE)2]

RER = ABS (SAMPLE ACT - DUPLICATE ACT) / TPU 2-s SAMPLE + TPU 2-s DUPLICATE

SDG: L56147

Samples: STSB29_6-15 and STSB29-FD_6-15

Analyte	Sample Act	Sample TPU	Duplicate Act	Duplicate TPU	DER 2-s
radium-226	1	0.25	0.99	0.25	0.06
radium-228	5.9	3.1	4.2	1.9	0.94

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Revised Analytical Report

January 13, 2020

Report to:
Lynda Lombardi
Wood - E&I Solutions, Inc.
10940 White Rock Road
Suite 190
Rancho Cordova, CA 95670

Bill to:
Ashley Shively
Wood - E&I Solutions, Inc.
10940 White Rock Rd
Ste 190
Rancho Cordova, CA 95670

Project ID:
ACZ Project ID: L56147

Lynda Lombardi:

Enclosed are revised analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on November 26, 2019 and originally reported on December 27, 2019. Refer to the case narrative for an explanation of the changes. This project was assigned to ACZ's project number, L56147. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L56147. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 26, 2020. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

Sue Webber has reviewed and approved this report.

Wood - EI Solutions, Inc.

January 13, 2020

Project ID:
ACZ Project ID: L56147

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 11 miscellaneous samples from Wood - E&I Solutions, Inc. on November 26, 2019. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L56147. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times. See the Extended Qualifier Page for more information regarding analyses flagged with an "HD".

Sample Analysis

These samples were analyzed for inorganic, radiochemistry parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The following required further explanation not provided by the Extended Qualifier Report:

This project was revised on 01/13/20 to correct the unit for Nitrogen, Total Kjeldahl data. No other changes were made.

1. Boron (B1) - Boron was detected in method blank (PBS) and laboratory fortified blank (LFB) above the method reporting limit. The MWMT fluid is passed through the analytical column as part of the preparation procedure, resulting in trace contamination of some analytes.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Summary

ACZ Project ID: ***L56147***

SAMPLE ID	LAB NO.	SAMPLE DATE	SAMPLE TIME
STSB27_0.5-3	L56147-01	11/21/2019	9:25
STSB27_6-15	L56147-02	11/21/2019	9:55
STSB28_0.5-3	L56147-03	11/21/2019	11:55
STSB28_6-15	L56147-04	11/21/2019	12:25
STSB29_0.5-3	L56147-05	11/21/2019	15:10
STSB29_6-15	L56147-06	11/21/2019	15:45
STSB29-FD_6-15	L56147-07	11/21/2019	15:50
STSB30_0.5-3	L56147-08	11/22/2019	9:02
STSB30_6-15	L56147-09	11/22/2019	9:25
STSB31_0.5-3	L56147-10	11/22/2019	12:03
STSB31_6-15	L56147-11	11/22/2019	12:20

L56147 Chain of Custod

L56147

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Site Node Path: NV_YERINGTON
Req Due Date (mm/dd/yy):
Rush TAT: Yes ___ No X
BP/ARC Facility Name: Anaconda Copper Mine Site
Lab Work Order Number:

Lab Name:	ACZ Laboratories, Inc.	BP/ARC Facility Address:	1 Austin Circle	Consultant/Contractor:	Wood - E&I Solutions, Inc.
Lab Address:	2773 Downhill Dr, Steamboat Springs, CO, 80487	City, State, ZIP Code:	Yerington, Nevada	Consultant/Contractor Project No:	SA18170340.005.055B
Lab PM:	Sue Webber (suew@acz.com)	Lead Regulatory Agency:	NDEP Abandoned Mine Lands Program	Address:	10940 White Rock Rd, Ste 190, Rancho Cordova, CA 95670
Lab Phone:	970-879-6590	California Global ID No.:		Consultant/Contractor PM:	Kent Parrish
Lab Shipping Accnt:	2897-1804-4 (RC #)	Enfos Proposal No:	Work Release No:	Phone: 916-636-3200	Email: Kent.Parrish@woodplc.com
Lab Bottle Order No:		Accounting Mode:	Provision ___ OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@woodplc.com
Other Info:	OU-4b_OU-5_Soil	Stage:	Activity:	Invoice To:	BP/ARC ___ Contractor X
BP/ARC EBM:	Chuck Stilwell				
EBM Phone:	713-998-2443				
EBM Email:	Chuck.Stilwell@bp.com				

Report Type & QC Level: Standard ___ Full Data Package X

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl			MWMP Metals [1]	MWMP Anions - Cl, F, SO4, NO3+NO2 as N	MWMP TKN as N; WAD CN	MWMP TDS, pH, Alkalinity [2]	MWMP Ra-226/ Ra-228					LD/MS/MSD	Comments
	STSB27_0.5-3	11/21/19	0925	X			1	1						X	X	X	X	X						Analyses to be perfomed on
	~~STSB27_3-6~~																		BJ	11/21/19				extract following MWMP (E2242)
	STSB27_6-15	11/21/19	0955	X			1	1						X	X	X	X	X						[1]Metals are: Al, Ba, B, Ca, Fe, K, Li,
	STSB28_0.5-3	11/21/19	1155	X			1	1						X	X	X	X	X						Mg, Na, P, Sr, Sn, Ti, by SW6010B;
	STSB28_6-15	11/21/19	1225	X			1	1						X	X	X	X	X						As, Be, Cd, Cr, Co, Cu, Pb, Mn,
	STSB29_0.5-3	11/21/19	1510	X			1	1						X	X	X	X	X					X	Mo, Ni, Sb, Se, Ag, Th, Tl, U, V,
	STSB29_6-15	11/21/19	1545	X			1	1						X	X	X	X	X						Zn by SW6020; Hg by SW7470A.
	STSB29-FD_6-15	11/21/19	1550	X			1	1						X	X	X	X	X						[2] Total Alk, Bicarb Alk (as $CaCO_3$)
	STSB30_0.5-3	11/22/19	0902	X			1	1						X	X	X	X	X						
	STSB30_6-15	11/22/19	0925	X			1	1						X	X	X	X	X						

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Bryce Johnson						
Sampler's Company: Wood	[signature] / Wood	11/25/19	1030	[signature]	11-26-19	1312
Shipment Method: Fed Ex Ship Date: 11/25/19						
Shipment Tracking No: 813794141707, 1718, 1762, 1773, 1784, 1795						

Special Instructions: Use NV approved protocols for MWMP extractions.

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

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L56147

Atlantic Richfield Company
A BP affiliated company

Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Site Node Path: NV_YERINGTON
BP/ARC Facility Name: Anaconda Copper Mine Site
Req Due Date (mm/dd/yy): _____
Lab Work Order Number: _____
Rush TAT: Yes ___ No X

Lab Name:	ACZ Laboratories, Inc.	BP/ARC Facility Address:	1 Austin Circle	Consultant/Contractor:	Wood - E&I Solutions, Inc.
Lab Address:	2773 Downhill Dr, Steamboat Springs, CO, 80487	City, State, ZIP Code:	Yerington, Nevada	Consultant/Contractor Project No:	SA18170340.005.055B
Lab PM:	Sue Webber (suew@acz.com)	Lead Regulatory Agency:	NDEP Abandoned Mine Lands Program	Address:	10940 White Rock Rd, Ste 190, Rancho Cordova, CA 95670
Lab Phone:	970-879-6590	California Global ID No.:		Consultant/Contractor PM:	Kent Parrish
Lab Shipping Accnt:	2897-1804-4 (RC #)	Enfos Proposal No:	Work Release No:	Phone: 916-636-3200	Email: Kent.Parrish@woodplc.com
Lab Bottle Order No:		Accounting Mode:	Provision ___ OOC-BU ___ OOC-RM ___	Email Report/EDD To:	lynda.lombardi@woodplc.com
Other Info:	OU-4b_OU-5_Soil	Stage:	Activity:	Invoice To:	BP/ARC ___ Contractor X
BP/ARC EBM:	Chuck Stilwell				
EBM Phone:	713-998-2443				
EBM Email:	Chuck.Stilwell@bp.com				

Report Type & QC Level: Standard ___ Full Data Package X

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Requested Analyses: MWMP Metals [1]	MWMP Anions - Cl, F, SO4, NO3+NO2 as N	MWMP TKN as N; WAD CN	MWMP TDS, pH, Alkalinity [2]	MWMP Ra-226/ Ra-228	LD/MS/MSD
	STSB31_0.5-3	11/22/19	1203	X			1	1				X	X	X	X	X	
	STSB31_6-15	11/22/19	1220	X			1	1				X	X	X	X	X	

BJ 11/25/19

Comments
Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Analyses to be perfomed on extract following MWMP (E2242)
[1]Metals are: Al, Ba, B, Ca, Fe, K, Li, Mg, Na, P, Sr, Sn, Ti, by SW6010B; As, Be, Cd, Cr, Co, Cu, Pb, Mn, Mo, Ni, Sb, Se, Ag, Th, Tl, U, V, Zn by SW6020; Hg by SW7470A.
[2] Total Alk, Bicarb Alk (as $CaCO_3$)

Sampler's Name: Bryce Johnson
Sampler's Company: Wood
Shipment Method: Fed Ex Ship Date: 11/25/19
Shipment Tracking No: 813794141707, 1718, 1762, 1773, 1784, 1795

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / Wood	11/25/19	1030			

Special Instructions: Use NV approved protocols for MWMP extractions.

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Wood - E&I Solutions, Inc.

ACZ Project ID: L56147
Date Received: 11/26/2019 13:12
Received By:
Date Printed: 12/2/2019

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?		X	
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? [1]			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

NA indicates Not Applicable

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp(°C)	Temp Criteria(°C)	Rad(µR/Hr)	Custody Seal Intact?
NA31887	14.1	NA	15	Yes
NA31889	13.1	NA	15	Yes
NA31891	14.5	NA	15	Yes
NA31888	15.6	NA	15	Yes
NA31890	14.8	NA	15	Yes

Was ice present in the shipment container(s)?

No - Wet or gel ice was not present in the shipment container(s).

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Wood - E&I Solutions, Inc.

ACZ Project ID:	L56147
Date Received:	11/26/2019 13:12
Received By:	
Date Printed:	12/2/2019

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

[1] The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na2S2O3 preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).

pH was not validated per an email from Lynda Lombardi, Wood, received on 8/17/2020.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB27_0.5-3

ACZ Sample ID: ***L56147-01***
Date Sampled: *11/21/19 09:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 11:35	mss2
ICP MWMT Prep	M6010D ICP								12/06/19 10:53	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/06/19 12:00	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 15:28	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2		U	*	mg/L	0.1	0.5	12/10/19 9:37	kja
Antimony (MWMT)	M6020B ICP-MS	2	0.0029	B	*	mg/L	0.0008	0.004	12/10/19 10:40	mfm
Arsenic (MWMT)	M6020B ICP-MS	2	0.0031		*	mg/L	0.0004	0.002	12/10/19 10:40	mfm
Barium (MWMT)	M6010D ICP	2	0.03	B	*	mg/L	0.01	0.07	12/10/19 9:37	kja
Beryllium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.0005	12/10/19 10:40	mfm
Boron (MWMT)	M6010D ICP	2	0.22	UJ 2	*	mg/L	0.04	0.2	12/10/19 9:37	kja
Cadmium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0001	0.0005	12/10/19 10:40	mfm
Calcium (MWMT)	M6010D ICP	2	551			mg/L	0.2	1	12/10/19 9:37	kja
Chromium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:40	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.0043			mg/L	0.0001	0.0005	12/10/19 10:40	mfm
Copper (MWMT)	M6020B ICP-MS	2	0.166		*	mg/L	0.002	0.004	12/10/19 10:40	mfm
Iron (MWMT)	M6010D ICP	2		U	*	mg/L	0.06	0.2	12/10/19 9:37	kja
Lead (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:40	mfm
Lithium (MWMT)	M6010D ICP	2	0.33		*	mg/L	0.02	0.08	12/10/19 9:37	kja
Magnesium (MWMT)	M6010D ICP	2	72.0			mg/L	0.4	2	12/10/19 9:37	kja
Manganese (MWMT)	M6020B ICP-MS	2	0.553		*	mg/L	0.0008	0.004	12/10/19 10:40	mfm
Mercury (MWMT)	M7470 CVAA	1		U	*	mg/L	0.0002	0.001	12/06/19 15:03	slm
Molybdenum (MWMT)	M6020B ICP-MS	2	0.0323		*	mg/L	0.0004	0.001	12/10/19 10:40	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.0066			mg/L	0.0008	0.002	12/10/19 10:40	mfm
Phosphorus (MWMT)	M6010D ICP	2	0.3	B	*	mg/L	0.2	1	12/10/19 9:37	kja
Potassium (MWMT)	M6010D ICP	2	7.0			mg/L	0.4	2	12/10/19 9:37	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0031			mg/L	0.0002	0.0005	12/10/19 10:40	mfm
Silver (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:40	mfm
Sodium (MWMT)	M6010D ICP	2	133			mg/L	0.4	2	12/10/19 9:37	kja
Strontium (MWMT)	M6010D ICP	2	1.68			mg/L	0.02	0.09	12/10/19 9:37	kja
Thallium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:40	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/10/19 10:40	mfm
Tin (MWMT)	M6010D ICP	2		U	*	mg/L	0.08	0.4	12/10/19 9:37	kja
Titanium (MWMT)	M6010D ICP	2	0.07		*	mg/L	0.01	0.05	12/10/19 9:37	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0172			mg/L	0.0002	0.001	12/10/19 10:40	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:40	mfm
Zinc (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.008	0.02	12/10/19 10:40	mfm

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB27_0.5-3

ACZ Sample ID: ***L56147-01***
Date Sampled: *11/21/19 09:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	✓ 7.7			units	0.1	0.1	12/04/19 0:00	gkh
Temperature		1	20.8			C	0.1	0.1	12/04/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	6.1 J 1			units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.1			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/03/19 0:00	gkh
Extraction pH		1	5.19			units			12/03/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/03/19 0:00	gkh
Extraction Time		1	28.5			hrs			12/03/19 0:00	gkh
Leachate Volume		1	5005.7			mL			12/03/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/03/19 0:00	gkh
Post Filter pH		1	7.78			units			12/03/19 0:00	gkh
Pre Filter pH		1	7.70			units			12/03/19 0:00	gkh
Retained Moisture		1	13.12			%			12/03/19 0:00	gkh
Temperature		1	20.8			C	0.1	0.1	12/03/19 0:00	gkh
Time In		1							12/03/19 0:00	gkh
Time Out		1							12/03/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB27_0.5-3

ACZ Sample ID: ***L56147-01***
Date Sampled: *11/21/19 09:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	89.2 ✓		*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1	89.2		*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	3.6 ✓		*	mg/L	0.5	2	12/13/19 12:55	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U ✓	*	mg/L	0.003	0.01	12/12/19 15:46	mss2
Fluoride (MWMT)	SM4500F-C	1	1.5		*	mg/L	0.1	0.4	12/12/19 19:21	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2			U		mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.02	0.1	12/05/19 22:50	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/05/19 22:50	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	0.3 ✓	B	*	mg/L	0.1	0.5	12/14/19 2:02	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	2940 ✓		*	mg/L	20	40	12/05/19 16:32	nmc
Sulfate (MWMT)	D516-07 - Turbidimetric	100	1620		*	mg/L	100	500	12/12/19 14:29	ttg

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB27_6-15

ACZ Sample ID: ***L56147-02***
Date Sampled: *11/21/19 09:55*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 11:52	mss2
ICP MWMT Prep	M6010D ICP								12/06/19 11:26	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/06/19 12:30	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 15:46	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2		U	*	mg/L	0.1	0.5	12/10/19 9:41	kja
Antimony (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0008	0.004	12/10/19 10:42	mfm
Arsenic (MWMT)	M6020B ICP-MS	2	0.0008 ✓	B	*	mg/L	0.0004	0.002	12/10/19 10:42	mfm
Barium (MWMT)	M6010D ICP	2	0.02	B	*	mg/L	0.01	0.07	12/10/19 9:41	kja
Beryllium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.0005	12/10/19 10:42	mfm
Boron (MWMT)	M6010D ICP	2	0.23 UJ 2		*	mg/L	0.04	0.2	12/10/19 9:41	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0003	B		mg/L	0.0001	0.0005	12/10/19 10:42	mfm
Calcium (MWMT)	M6010D ICP	2	561 ✓			mg/L	0.2	1	12/10/19 9:41	kja
Chromium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:42	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.0338			mg/L	0.0001	0.0005	12/10/19 10:42	mfm
Copper (MWMT)	M6020B ICP-MS	2	0.148		*	mg/L	0.002	0.004	12/10/19 10:42	mfm
Iron (MWMT)	M6010D ICP	2		U	*	mg/L	0.06	0.2	12/10/19 9:41	kja
Lead (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:42	mfm
Lithium (MWMT)	M6010D ICP	2	0.05	B	*	mg/L	0.02	0.08	12/10/19 9:41	kja
Magnesium (MWMT)	M6010D ICP	2	101 ✓			mg/L	0.4	2	12/10/19 9:41	kja
Manganese (MWMT)	M6020B ICP-MS	2	3.01		*	mg/L	0.0008	0.004	12/10/19 10:42	mfm
Mercury (MWMT)	M7470 CVAA	1		U ✓	*	mg/L	0.0002	0.001	12/06/19 15:04	slm
Molybdenum (MWMT)	M6020B ICP-MS	2	0.032		*	mg/L	0.0004	0.001	12/10/19 10:42	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.0211			mg/L	0.0008	0.002	12/10/19 10:42	mfm
Phosphorus (MWMT)	M6010D ICP	2		U	*	mg/L	0.2	1	12/10/19 9:41	kja
Potassium (MWMT)	M6010D ICP	2	32.3			mg/L	0.4	2	12/10/19 9:41	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0282 ✓			mg/L	0.0002	0.0005	12/10/19 10:42	mfm
Silver (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:42	mfm
Sodium (MWMT)	M6010D ICP	2	36.2			mg/L	0.4	2	12/10/19 9:41	kja
Strontium (MWMT)	M6010D ICP	2	3.12			mg/L	0.02	0.09	12/10/19 9:41	kja
Thallium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:42	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/10/19 10:42	mfm
Tin (MWMT)	M6010D ICP	2		U	*	mg/L	0.08	0.4	12/10/19 9:41	kja
Titanium (MWMT)	M6010D ICP	2	0.07		*	mg/L	0.01	0.05	12/10/19 9:41	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0285			mg/L	0.0002	0.001	12/10/19 10:42	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:42	mfm
Zinc (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.008	0.02	12/10/19 10:42	mfm

** Please refer to Qualifier Reports for details.*

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB27_6-15

ACZ Sample ID: ***L56147-02***
Date Sampled: *11/21/19 09:55*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	7.6			units	0.1	0.1	12/04/19 0:00	gkh
Temperature		1	20.7			C	0.1	0.1	12/04/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	6.1	J 1		units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.5			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/03/19 0:00	gkh
Extraction pH		1	5.19			units			12/03/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/03/19 0:00	gkh
Extraction Time		1	28.58333			hrs			12/03/19 0:00	gkh
Leachate Volume		1	5001.4			mL			12/03/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/03/19 0:00	gkh
Post Filter pH		1	7.66			units			12/03/19 0:00	gkh
Pre Filter pH		1	7.59			units			12/03/19 0:00	gkh
Retained Moisture		1	20.4			%			12/03/19 0:00	gkh
Temperature		1	20.7			C	0.1	0.1	12/03/19 0:00	gkh
Time In		1							12/03/19 0:00	gkh
Time Out		1							12/03/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB27_6-15

ACZ Sample ID: ***L56147-02***
Date Sampled: *11/21/19 09:55*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	55.4		*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1	55.4		*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	5.1 ✓		*	mg/L	0.5	2	12/13/19 12:55	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/19 15:47	mss2
Fluoride (MWMT)	SM4500F-C	1	4.7 ✓		*	mg/L	0.1	0.4	12/12/19 19:30	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.14			mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.14 ✓		*	mg/L	0.02	0.1	12/05/19 22:53	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/05/19 22:53	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	0.2	B	*	mg/L	0.1	0.5	12/14/19 2:03	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	2760 ✓		*	mg/L	20	40	12/05/19 16:35	nmc
Sulfate (MWMT)	D516-07 - Turbidimetric	100	1710 ✓		*	mg/L	100	500	12/12/19 14:08	ttg

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB28_0.5-3

ACZ Sample ID: ***L56147-03***
Date Sampled: *11/21/19 11:55*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 12:09	mss2
ICP MWMT Prep	M6010D ICP								12/06/19 12:00	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/06/19 13:00	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 16:05	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2	6.6 ✓		*	mg/L	0.1	0.5	12/10/19 9:44	kja
Antimony (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0008	0.004	12/10/19 10:43	mfm
Arsenic (MWMT)	M6020B ICP-MS	2	0.0016	B	*	mg/L	0.0004	0.002	12/10/19 10:43	mfm
Barium (MWMT)	M6010D ICP	2		U	*	mg/L	0.01	0.07	12/10/19 9:44	kja
Beryllium (MWMT)	M6020B ICP-MS	2	0.0013 ✓		*	mg/L	0.0002	0.0005	12/10/19 10:43	mfm
Boron (MWMT)	M6010D ICP	2	0.15 UJ 2	B	*	mg/L	0.04	0.2	12/10/19 9:44	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0016			mg/L	0.0001	0.0005	12/10/19 10:43	mfm
Calcium (MWMT)	M6010D ICP	2	556			mg/L	0.2	1	12/10/19 9:44	kja
Chromium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:43	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.134			mg/L	0.0001	0.0005	12/10/19 10:43	mfm
Copper (MWMT)	M6020B ICP-MS	200	83.0 ✓		*	mg/L	0.2	0.4	12/10/19 16:16	bsu
Iron (MWMT)	M6010D ICP	2		U	*	mg/L	0.06	0.2	12/10/19 9:44	kja
Lead (MWMT)	M6020B ICP-MS	2	0.0004	B	*	mg/L	0.0002	0.001	12/10/19 10:43	mfm
Lithium (MWMT)	M6010D ICP	2		U	*	mg/L	0.02	0.08	12/10/19 9:44	kja
Magnesium (MWMT)	M6010D ICP	2	65.6			mg/L	0.4	2	12/10/19 9:44	kja
Manganese (MWMT)	M6020B ICP-MS	2	1.03		*	mg/L	0.0008	0.004	12/10/19 10:43	mfm
Mercury (MWMT)	M7470 CVAA	1		U	*	mg/L	0.0002	0.001	12/06/19 15:05	slm
Molybdenum (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0004	0.001	12/10/19 10:43	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.103			mg/L	0.0008	0.002	12/10/19 10:43	mfm
Phosphorus (MWMT)	M6010D ICP	2		U	*	mg/L	0.2	1	12/10/19 9:44	kja
Potassium (MWMT)	M6010D ICP	2	7.4			mg/L	0.4	2	12/10/19 9:44	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0028			mg/L	0.0002	0.0005	12/10/19 10:43	mfm
Silver (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:43	mfm
Sodium (MWMT)	M6010D ICP	2	10.6			mg/L	0.4	2	12/10/19 9:44	kja
Strontium (MWMT)	M6010D ICP	2	0.91			mg/L	0.02	0.09	12/10/19 9:44	kja
Thallium (MWMT)	M6020B ICP-MS	2	0.0003 ✓	B	*	mg/L	0.0002	0.001	12/10/19 10:43	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/10/19 10:43	mfm
Tin (MWMT)	M6010D ICP	2		U	*	mg/L	0.08	0.4	12/10/19 9:44	kja
Titanium (MWMT)	M6010D ICP	2	0.07		*	mg/L	0.01	0.05	12/10/19 9:44	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0167 ✓			mg/L	0.0002	0.001	12/10/19 10:43	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:43	mfm
Zinc (MWMT)	M6020B ICP-MS	2	0.157		*	mg/L	0.008	0.02	12/10/19 10:43	mfm

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB28_0.5-3

ACZ Sample ID: ***L56147-03***
Date Sampled: *11/21/19 11:55*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	4.6 ✓			units	0.1	0.1	12/04/19 0:00	gkh
Temperature		1	20.9			C	0.1	0.1	12/04/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	4.4	J 1		units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.3			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/03/19 0:00	gkh
Extraction pH		1	5.19			units			12/03/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/03/19 0:00	gkh
Extraction Time		1	26.91667			hrs			12/03/19 0:00	gkh
Leachate Volume		1	5002.4			mL			12/03/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/03/19 0:00	gkh
Post Filter pH		1	4.58			units			12/03/19 0:00	gkh
Pre Filter pH		1	4.63			units			12/03/19 0:00	gkh
Retained Moisture		1	8.77			%			12/03/19 0:00	gkh
Temperature		1	20.9			C	0.1	0.1	12/03/19 0:00	gkh
Time In		1							12/03/19 0:00	gkh
Time Out		1							12/03/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB28_0.5-3

ACZ Sample ID: ***L56147-03***
Date Sampled: *11/21/19 11:55*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	2.2		*	mg/L	0.5	2	12/13/19 12:55	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U ✓	*	mg/L	0.003	0.01	12/12/19 15:48	mss2
Fluoride (MWMT)	SM4500F-C	100		U	*	mg/L	10	40	12/12/19 19:42	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.29			mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.29 ✓		*	mg/L	0.02	0.1	12/05/19 22:54	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/05/19 22:54	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	1.5 ✓		*	mg/L	0.1	0.5	12/14/19 2:04	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	2750 ✓		*	mg/L	20	40	12/05/19 16:37	nmc
Sulfate (MWMT)	D516-07 - Turbidimetric	100	1610		*	mg/L	100	500	12/12/19 14:29	ttg

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB28_6-15

ACZ Sample ID: ***L56147-04***
Date Sampled: *11/21/19 12:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 12:26	mss2
ICP MWMT Prep	M6010D ICP								12/06/19 12:33	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/06/19 13:30	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 16:23	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2		U	*	mg/L	0.1	0.5	12/10/19 9:48	kja
Antimony (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0008	0.004	12/10/19 10:47	mfm
Arsenic (MWMT)	M6020B ICP-MS	2	0.0009	B	*	mg/L	0.0004	0.002	12/10/19 10:47	mfm
Barium (MWMT)	M6010D ICP	2		U	*	mg/L	0.01	0.07	12/10/19 9:48	kja
Beryllium (MWMT)	M6020B ICP-MS	2	0.0005		*	mg/L	0.0002	0.0005	12/10/19 10:47	mfm
Boron (MWMT)	M6010D ICP	2	0.28	UJ 2	*	mg/L	0.04	0.2	12/10/19 9:48	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0021			mg/L	0.0001	0.0005	12/10/19 10:47	mfm
Calcium (MWMT)	M6010D ICP	2	514			mg/L	0.2	1	12/10/19 9:48	kja
Chromium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:47	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.317			mg/L	0.0001	0.0005	12/10/19 10:47	mfm
Copper (MWMT)	M6020B ICP-MS	50	3.16		*	mg/L	0.04	0.1	12/10/19 16:18	bsu
Iron (MWMT)	M6010D ICP	2		U	*	mg/L	0.06	0.2	12/10/19 9:48	kja
Lead (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:47	mfm
Lithium (MWMT)	M6010D ICP	2	0.12		*	mg/L	0.02	0.08	12/10/19 9:48	kja
Magnesium (MWMT)	M6010D ICP	2	161			mg/L	0.4	2	12/10/19 9:48	kja
Manganese (MWMT)	M6020B ICP-MS	50	9.41		*	mg/L	0.02	0.1	12/10/19 16:18	bsu
Mercury (MWMT)	M7470 CVAA	1		U	*	mg/L	0.0002	0.001	12/06/19 15:06	slm
Molybdenum (MWMT)	M6020B ICP-MS	2	0.0103		*	mg/L	0.0004	0.001	12/10/19 10:47	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.167			mg/L	0.0008	0.002	12/10/19 10:47	mfm
Phosphorus (MWMT)	M6010D ICP	2		U	*	mg/L	0.2	1	12/10/19 9:48	kja
Potassium (MWMT)	M6010D ICP	2	37.4			mg/L	0.4	2	12/10/19 9:48	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0578			mg/L	0.0002	0.0005	12/10/19 10:47	mfm
Silver (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:47	mfm
Sodium (MWMT)	M6010D ICP	2	92.3			mg/L	0.4	2	12/10/19 9:48	kja
Strontium (MWMT)	M6010D ICP	2	3.07			mg/L	0.02	0.09	12/10/19 9:48	kja
Thallium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:47	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/10/19 10:47	mfm
Tin (MWMT)	M6010D ICP	2		U	*	mg/L	0.08	0.4	12/10/19 9:48	kja
Titanium (MWMT)	M6010D ICP	2	0.07		*	mg/L	0.01	0.05	12/10/19 9:48	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0401			mg/L	0.0002	0.001	12/10/19 10:47	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:47	mfm
Zinc (MWMT)	M6020B ICP-MS	2	0.101		*	mg/L	0.008	0.02	12/10/19 10:47	mfm

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB28_6-15

ACZ Sample ID: ***L56147-04***
Date Sampled: *11/21/19 12:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	6.9			units	0.1	0.1	12/04/19 0:00	gkh
Temperature		1	20.8			C	0.1	0.1	12/04/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	6.2	J 1		units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.3			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/03/19 0:00	gkh
Extraction pH		1	5.19			units			12/03/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/03/19 0:00	gkh
Extraction Time		1	28.83333			hrs			12/03/19 0:00	gkh
Leachate Volume		1	5005.8			mL			12/03/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/03/19 0:00	gkh
Post Filter pH		1	6.93			units			12/03/19 0:00	gkh
Pre Filter pH		1	6.91			units			12/03/19 0:00	gkh
Retained Moisture		1	26.92			%			12/03/19 0:00	gkh
Temperature		1	20.8			C	0.1	0.1	12/03/19 0:00	gkh
Time In		1							12/03/19 0:00	gkh
Time Out		1							12/03/19 0:00	gkh

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB28_6-15

ACZ Sample ID: ***L56147-04***
Date Sampled: *11/21/19 12:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	76.0		*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1	76.0		*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	20.9 ✓		*	mg/L	0.5	2	12/13/19 12:55	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/19 15:49	mss2
Fluoride (MWMT)	SM4500F-C	1	3.6 ✓		*	mg/L	0.1	0.4	12/12/19 19:51	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.13			mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.13 ✓		*	mg/L	0.02	0.1	12/05/19 22:56	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/05/19 22:56	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	0.5		*	mg/L	0.1	0.5	12/14/19 2:05	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	3040		*	mg/L	20	40	12/05/19 16:40	nmc
Sulfate (MWMT)	D516-07 - Turbidimetric	100	1730 ✓		*	mg/L	100	500	12/12/19 14:29	ttg

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29_0.5-3

ACZ Sample ID: ***L56147-05***
Date Sampled: *11/21/19 15:10*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 12:43	mss2
ICP MWMT Prep	M6010D ICP								12/06/19 13:06	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/06/19 14:00	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 16:41	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2	14.3		*	mg/L	0.1	0.5	12/10/19 9:56	kja
Antimony (MWMT)	M6020B ICP-MS	2	0.0013	B	*	mg/L	0.0008	0.004	12/10/19 10:49	mfm
Arsenic (MWMT)	M6020B ICP-MS	2	0.0013 ✓	B	*	mg/L	0.0004	0.002	12/10/19 10:49	mfm
Barium (MWMT)	M6010D ICP	2		U	*	mg/L	0.01	0.07	12/10/19 9:56	kja
Beryllium (MWMT)	M6020B ICP-MS	2	0.003		*	mg/L	0.0002	0.0005	12/10/19 10:49	mfm
Boron (MWMT)	M6010D ICP	2	0.15 UJ 2	B	*	mg/L	0.04	0.2	12/10/19 9:56	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0018			mg/L	0.0001	0.0005	12/10/19 10:49	mfm
Calcium (MWMT)	M6010D ICP	2	560 ✓			mg/L	0.2	1	12/10/19 9:56	kja
Chromium (MWMT)	M6020B ICP-MS	2	0.001	B	*	mg/L	0.001	0.004	12/10/19 10:49	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.165			mg/L	0.0001	0.0005	12/10/19 10:49	mfm
Copper (MWMT)	M6020B ICP-MS	1000	339 ✓		*	mg/L	0.8	2	12/10/19 16:21	bsu
Iron (MWMT)	M6010D ICP	2	0.21		*	mg/L	0.06	0.2	12/10/19 9:56	kja
Lead (MWMT)	M6020B ICP-MS	2	0.001		*	mg/L	0.0002	0.001	12/10/19 10:49	mfm
Lithium (MWMT)	M6010D ICP	2	0.03	B	*	mg/L	0.02	0.08	12/10/19 9:56	kja
Magnesium (MWMT)	M6010D ICP	2	67.7			mg/L	0.4	2	12/10/19 9:56	kja
Manganese (MWMT)	M6020B ICP-MS	2	1.4 ✓		*	mg/L	0.0008	0.004	12/10/19 10:49	mfm
Mercury (MWMT)	M7470 CVAA	1	0.0002 ✓	B	*	mg/L	0.0002	0.001	12/06/19 15:07	slm
Molybdenum (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0004	0.001	12/10/19 10:49	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.128			mg/L	0.0008	0.002	12/10/19 10:49	mfm
Phosphorus (MWMT)	M6010D ICP	2		U	*	mg/L	0.2	1	12/10/19 9:56	kja
Potassium (MWMT)	M6010D ICP	2	9.1			mg/L	0.4	2	12/10/19 9:56	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0162			mg/L	0.0002	0.0005	12/10/19 10:49	mfm
Silver (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.0002	0.001	12/10/19 10:49	mfm
Sodium (MWMT)	M6010D ICP	2	19.6			mg/L	0.4	2	12/10/19 9:56	kja
Strontium (MWMT)	M6010D ICP	2	0.90			mg/L	0.02	0.09	12/10/19 9:56	kja
Thallium (MWMT)	M6020B ICP-MS	2	0.0002	B	*	mg/L	0.0002	0.001	12/10/19 10:49	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/10/19 10:49	mfm
Tin (MWMT)	M6010D ICP	2		U	*	mg/L	0.08	0.4	12/10/19 9:56	kja
Titanium (MWMT)	M6010D ICP	2	0.08 ✓		*	mg/L	0.01	0.05	12/10/19 9:56	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0193			mg/L	0.0002	0.001	12/10/19 10:49	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.001	0.004	12/10/19 10:49	mfm
Zinc (MWMT)	M6020B ICP-MS	2	0.214		*	mg/L	0.008	0.02	12/10/19 10:49	mfm

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29_0.5-3

ACZ Sample ID: ***L56147-05***
Date Sampled: *11/21/19 15:10*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	4.3 ✓			units	0.1	0.1	12/04/19 0:00	gkh
Temperature		1	20.2			C	0.1	0.1	12/04/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	4.1 J 1			units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.0			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/04/19 0:00	gkh
Extraction pH		1	5.19			units			12/04/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/04/19 0:00	gkh
Extraction Time		1	27.75			hrs			12/04/19 0:00	gkh
Leachate Volume		1	5007.5			mL			12/04/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/04/19 0:00	gkh
Post Filter pH		1	4.31			units			12/04/19 0:00	gkh
Pre Filter pH		1	4.34			units			12/04/19 0:00	gkh
Retained Moisture		1	14.5			%			12/04/19 0:00	gkh
Temperature		1	20.2			C	0.1	0.1	12/04/19 0:00	gkh
Time In		1							12/04/19 0:00	gkh
Time Out		1							12/04/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29_0.5-3

ACZ Sample ID: ***L56147-05***
Date Sampled: *11/21/19 15:10*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	3.3		*	mg/L	0.5	2	12/13/19 12:55	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U ✓	*	mg/L	0.003	0.01	12/12/19 15:50	mss2
Fluoride (MWMT)	SM4500F-C	200		U	*	mg/L	20	70	12/12/19 20:17	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.16			mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.16		*	mg/L	0.02	0.1	12/05/19 22:57	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/05/19 22:57	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	1.0 ✓		*	mg/L	0.1	0.5	12/14/19 2:06	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	3540 ✓		*	mg/L	20	40	12/05/19 16:42	nmc
Sulfate (MWMT)	D516-07 - Turbidimetric	100	1960		*	mg/L	100	500	12/12/19 14:29	ttg

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29_6-15

ACZ Sample ID: ***L56147-06***
Date Sampled: *11/21/19 15:45*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 9:20	mss2
ICP MWMT Prep	M6010D ICP								12/10/19 10:10	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/16/19 11:41	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 13:01	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2		U		mg/L	0.1	0.5	12/11/19 14:17	kja
Antimony (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0008	0.004	12/17/19 12:40	mfm
Arsenic (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0004	0.002	12/17/19 12:40	mfm
Barium (MWMT)	M6010D ICP	2	0.03 ✓	B		mg/L	0.01	0.07	12/11/19 14:17	kja
Beryllium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.0005	12/17/19 12:40	mfm
Boron (MWMT)	M6010D ICP	2	0.16	B	UJ 2	mg/L	0.04	0.2	12/11/19 14:17	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0006			mg/L	0.0001	0.0005	12/17/19 12:40	mfm
Calcium (MWMT)	M6010D ICP	2	492			mg/L	0.2	1	12/11/19 14:17	kja
Chromium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:40	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.0904			mg/L	0.0001	0.0005	12/17/19 12:40	mfm
Copper (MWMT)	M6020B ICP-MS	2	1.16 j 8		*	mg/L	0.002	0.004	12/17/19 12:40	mfm
Iron (MWMT)	M6010D ICP	2		U		mg/L	0.06	0.2	12/11/19 14:17	kja
Lead (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.001	12/17/19 12:40	mfm
Lithium (MWMT)	M6010D ICP	2	0.11			mg/L	0.02	0.08	12/11/19 14:17	kja
Magnesium (MWMT)	M6010D ICP	2	75.3			mg/L	0.4	2	12/11/19 14:17	kja
Manganese (MWMT)	M6020B ICP-MS	2	3.77 ✓		*	mg/L	0.0008	0.004	12/17/19 12:40	mfm
Mercury (MWMT)	M7470 CVAA	1		U ✓	*	mg/L	0.0002	0.001	12/09/19 16:21	slm
Molybdenum (MWMT)	M6020B ICP-MS	2	0.0217			mg/L	0.0004	0.001	12/17/19 12:40	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.0354 ✓			mg/L	0.0008	0.002	12/17/19 12:40	mfm
Phosphorus (MWMT)	M6010D ICP	2		U		mg/L	0.2	1	12/11/19 14:17	kja
Potassium (MWMT)	M6010D ICP	2	41.3			mg/L	0.4	2	12/11/19 14:17	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0862			mg/L	0.0002	0.0005	12/17/19 12:40	mfm
Silver (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.001	12/17/19 12:40	mfm
Sodium (MWMT)	M6010D ICP	2	59.3			mg/L	0.4	2	12/11/19 14:17	kja
Strontium (MWMT)	M6010D ICP	2	2.89			mg/L	0.02	0.09	12/11/19 14:17	kja
Thallium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.001	12/17/19 12:40	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/17/19 12:40	mfm
Tin (MWMT)	M6010D ICP	2		U		mg/L	0.08	0.4	12/11/19 14:17	kja
Titanium (MWMT)	M6010D ICP	2	0.07 ✓		*	mg/L	0.01	0.05	12/11/19 14:17	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0222			mg/L	0.0002	0.001	12/17/19 12:40	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:40	mfm
Zinc (MWMT)	M6020B ICP-MS	2	0.030			mg/L	0.008	0.02	12/17/19 12:40	mfm

** Please refer to Qualifier Reports for details.*

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29_6-15

ACZ Sample ID: ***L56147-06***
Date Sampled: *11/21/19 15:45*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	7.2			units	0.1	0.1	12/05/19 0:00	gkh
Temperature		1	20.9			C	0.1	0.1	12/05/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	6.1	J 1		units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.3			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/04/19 0:00	gkh
Extraction pH		1	5.95			units			12/04/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/04/19 0:00	gkh
Extraction Time		1	29.66667			hrs			12/04/19 0:00	gkh
Leachate Volume		1	5011.5			mL			12/04/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/04/19 0:00	gkh
Post Filter pH		1	7.23			units			12/04/19 0:00	gkh
Pre Filter pH		1	7.15			units			12/04/19 0:00	gkh
Retained Moisture		1	19.2			%			12/04/19 0:00	gkh
Temperature		1	20.9			C	0.1	0.1	12/04/19 0:00	gkh
Time In		1							12/04/19 0:00	gkh
Time Out		1							12/04/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29_6-15

ACZ Sample ID: ***L56147-06***
Date Sampled: *11/21/19 15:45*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	54.4 ✓		*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1	54.4		*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	10.2 ✓		*	mg/L	0.5	2	12/13/19 12:53	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/19 15:37	mss2
Fluoride (MWMT)	SM4500F-C	1	5.1 ✓		*	mg/L	0.1	0.4	12/12/19 17:26	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.03	B		mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.03 ✓	B	*	mg/L	0.02	0.1	12/06/19 21:59	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/06/19 21:59	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	0.2	B	*	mg/L	0.1	0.5	12/14/19 1:50	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	2440 ✓		*	mg/L	20	40	12/06/19 14:16	eep
Sulfate (MWMT)	D516-07 - Turbidimetric	100	1460		*	mg/L	100	500	12/12/19 14:07	ttg

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29-FD_6-15

ACZ Sample ID: ***L56147-07***
Date Sampled: *11/21/19 15:50*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 9:37	mss2
ICP MWMT Prep	M6010D ICP								12/10/19 11:50	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/16/19 11:58	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 13:38	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2		U		mg/L	0.1	0.5	12/11/19 14:28	kja
Antimony (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0008	0.004	12/17/19 12:41	mfm
Arsenic (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0004	0.002	12/17/19 12:41	mfm
Barium (MWMT)	M6010D ICP	2	0.03	B		mg/L	0.01	0.07	12/11/19 14:28	kja
Beryllium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.0005	12/17/19 12:41	mfm
Boron (MWMT)	M6010D ICP	2	0.14	B	UJ 2	mg/L	0.04	0.2	12/11/19 14:28	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0006			mg/L	0.0001	0.0005	12/17/19 12:41	mfm
Calcium (MWMT)	M6010D ICP	2	477			mg/L	0.2	1	12/11/19 14:28	kja
Chromium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:41	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.106			mg/L	0.0001	0.0005	12/17/19 12:41	mfm
Copper (MWMT)	M6020B ICP-MS	2	0.396 ✓	j 8	*	mg/L	0.002	0.004	12/17/19 12:41	mfm
Iron (MWMT)	M6010D ICP	2		U		mg/L	0.06	0.2	12/11/19 14:28	kja
Lead (MWMT)	M6020B ICP-MS	2	0.0003	B		mg/L	0.0002	0.001	12/17/19 12:41	mfm
Lithium (MWMT)	M6010D ICP	2	0.08			mg/L	0.02	0.08	12/11/19 14:28	kja
Magnesium (MWMT)	M6010D ICP	2	90.4			mg/L	0.4	2	12/11/19 14:28	kja
Manganese (MWMT)	M6020B ICP-MS	50	5.22 ✓		*	mg/L	0.02	0.1	12/18/19 15:12	bsu
Mercury (MWMT)	M7470 CVAA	1		U	*	mg/L	0.0002	0.001	12/09/19 16:23	slm
Molybdenum (MWMT)	M6020B ICP-MS	2	0.0167 ✓			mg/L	0.0004	0.001	12/17/19 12:41	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.0406			mg/L	0.0008	0.002	12/17/19 12:41	mfm
Phosphorus (MWMT)	M6010D ICP	2		U		mg/L	0.2	1	12/11/19 14:28	kja
Potassium (MWMT)	M6010D ICP	2	40.8 ✓			mg/L	0.4	2	12/11/19 14:28	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0935			mg/L	0.0002	0.0005	12/17/19 12:41	mfm
Silver (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.001	12/17/19 12:41	mfm
Sodium (MWMT)	M6010D ICP	2	54.1			mg/L	0.4	2	12/11/19 14:28	kja
Strontium (MWMT)	M6010D ICP	2	2.85 ✓			mg/L	0.02	0.09	12/11/19 14:28	kja
Thallium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.001	12/17/19 12:41	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/17/19 12:41	mfm
Tin (MWMT)	M6010D ICP	2		U		mg/L	0.08	0.4	12/11/19 14:28	kja
Titanium (MWMT)	M6010D ICP	2	0.06		*	mg/L	0.01	0.05	12/11/19 14:28	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0236			mg/L	0.0002	0.001	12/17/19 12:41	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:41	mfm
Zinc (MWMT)	M6020B ICP-MS	2	0.017	B		mg/L	0.008	0.02	12/17/19 12:41	mfm

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29-FD_6-15

ACZ Sample ID: ***L56147-07***
Date Sampled: *11/21/19 15:50*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	7.3 ✓			units	0.1	0.1	12/05/19 0:00	gkh
Temperature		1	20.9			C	0.1	0.1	12/05/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	6.4 J 1			units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.3			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/05/19 0:00	gkh
Extraction pH		1	5.95			units			12/05/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/05/19 0:00	gkh
Extraction Time		1	29.5			hrs			12/05/19 0:00	gkh
Leachate Volume		1	5008.4			mL			12/05/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/05/19 0:00	gkh
Post Filter pH		1	7.44			units			12/05/19 0:00	gkh
Pre Filter pH		1	7.26			units			12/05/19 0:00	gkh
Retained Moisture		1	18.66			%			12/05/19 0:00	gkh
Temperature		1	20.9			C	0.1	0.1	12/05/19 0:00	gkh
Time In		1							12/05/19 0:00	gkh
Time Out		1							12/05/19 0:00	gkh

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29-FD_6-15

ACZ Sample ID: ***L56147-07***
Date Sampled: *11/21/19 15:50*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	59.3 ✓		*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1	59.3		*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	8.9		*	mg/L	0.5	2	12/13/19 12:53	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U ✓	*	mg/L	0.003	0.01	12/12/19 15:38	mss2
Fluoride (MWMT)	SM4500F-C	1	6.4 ✓		*	mg/L	0.1	0.4	12/12/19 18:04	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2			U		mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.02	0.1	12/06/19 22:02	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/06/19 22:02	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	0.2	B	*	mg/L	0.1	0.5	12/14/19 1:53	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	2430		*	mg/L	20	40	12/06/19 14:18	eep
Sulfate (MWMT)	D516-07 - Turbidimetric	100	1400 ✓		*	mg/L	100	500	12/12/19 14:07	ttg

** Please refer to Qualifier Reports for details.*

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB30_0.5-3

ACZ Sample ID: ***L56147-08***
Date Sampled: *11/22/19 09:02*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 10:11	mss2
ICP MWMT Prep	M6010D ICP								12/10/19 12:23	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/16/19 12:49	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 13:56	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2	10.3 ✓			mg/L	0.1	0.5	12/11/19 14:32	kja
Antimony (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0008	0.004	12/17/19 12:47	mfm
Arsenic (MWMT)	M6020B ICP-MS	2	0.0038 ✓			mg/L	0.0004	0.002	12/17/19 12:47	mfm
Barium (MWMT)	M6010D ICP	2	0.04	B		mg/L	0.01	0.07	12/11/19 14:32	kja
Beryllium (MWMT)	M6020B ICP-MS	2	0.0034			mg/L	0.0002	0.0005	12/17/19 12:47	mfm
Boron (MWMT)	M6010D ICP	2	0.14 ✓	B	UJ 2	mg/L	0.04	0.2	12/11/19 14:32	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0017			mg/L	0.0001	0.0005	12/17/19 12:47	mfm
Calcium (MWMT)	M6010D ICP	2	512			mg/L	0.2	1	12/11/19 14:32	kja
Chromium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:47	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.123 ✓			mg/L	0.0001	0.0005	12/17/19 12:47	mfm
Copper (MWMT)	M6020B ICP-MS	500	103 ✓		*	mg/L	0.4	1	12/19/19 15:23	bsu
Iron (MWMT)	M6010D ICP	2	0.74			mg/L	0.06	0.2	12/11/19 14:32	kja
Lead (MWMT)	M6020B ICP-MS	2	0.0017			mg/L	0.0002	0.001	12/17/19 12:47	mfm
Lithium (MWMT)	M6010D ICP	2	0.03	B		mg/L	0.02	0.08	12/11/19 14:32	kja
Magnesium (MWMT)	M6010D ICP	2	72.0			mg/L	0.4	2	12/11/19 14:32	kja
Manganese (MWMT)	M6020B ICP-MS	2	3.26		*	mg/L	0.0008	0.004	12/17/19 12:47	mfm
Mercury (MWMT)	M7470 CVAA	1		U	*	mg/L	0.0002	0.001	12/09/19 16:24	slm
Molybdenum (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0004	0.001	12/17/19 12:47	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.132			mg/L	0.0008	0.002	12/17/19 12:47	mfm
Phosphorus (MWMT)	M6010D ICP	2		U		mg/L	0.2	1	12/11/19 14:32	kja
Potassium (MWMT)	M6010D ICP	2	12.3			mg/L	0.4	2	12/11/19 14:32	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0022			mg/L	0.0002	0.0005	12/17/19 12:47	mfm
Silver (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.001	12/17/19 12:47	mfm
Sodium (MWMT)	M6010D ICP	2	19.4			mg/L	0.4	2	12/11/19 14:32	kja
Strontium (MWMT)	M6010D ICP	2	2.23			mg/L	0.02	0.09	12/11/19 14:32	kja
Thallium (MWMT)	M6020B ICP-MS	2	0.001			mg/L	0.0002	0.001	12/17/19 12:47	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/17/19 12:47	mfm
Tin (MWMT)	M6010D ICP	2	0.19	B		mg/L	0.08	0.4	12/11/19 14:32	kja
Titanium (MWMT)	M6010D ICP	2	0.07		*	mg/L	0.01	0.05	12/11/19 14:32	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.024			mg/L	0.0002	0.001	12/17/19 12:47	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:47	mfm
Zinc (MWMT)	M6020B ICP-MS	2	0.168			mg/L	0.008	0.02	12/17/19 12:47	mfm

** Please refer to Qualifier Reports for details.*

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB30_0.5-3

ACZ Sample ID: ***L56147-08***
Date Sampled: *11/22/19 09:02*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	4.1			units	0.1	0.1	12/05/19 0:00	gkh
Temperature		1	20.8			C	0.1	0.1	12/05/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	4.2	J1		units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.1			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/05/19 0:00	gkh
Extraction pH		1	5.95			units			12/05/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/05/19 0:00	gkh
Extraction Time		1	27.66667			hrs			12/05/19 0:00	gkh
Leachate Volume		1	5014.1			mL			12/05/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/05/19 0:00	gkh
Post Filter pH		1	4.35			units			12/05/19 0:00	gkh
Pre Filter pH		1	4.09			units			12/05/19 0:00	gkh
Retained Moisture		1	8.24			%			12/05/19 0:00	gkh
Temperature		1	20.8			C	0.1	0.1	12/05/19 0:00	gkh
Time In		1							12/05/19 0:00	gkh
Time Out		1							12/05/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB30_0.5-3

ACZ Sample ID: ***L56147-08***
Date Sampled: *11/22/19 09:02*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	1.9 ✓	B	*	mg/L	0.5	2	12/13/19 12:53	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/19 15:40	mss2
Fluoride (MWMT)	SM4500F-C	100		U ✓	*	mg/L	10	40	12/12/19 18:14	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.19			mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.19 ✓		*	mg/L	0.02	0.1	12/06/19 22:04	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/06/19 22:04	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	2.4 ✓		*	mg/L	0.1	0.5	12/14/19 1:54	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	2730 ✓		*	mg/L	20	40	12/06/19 14:21	eep
Sulfate (MWMT)	D516-07 - Turbidimetric	100	1590		*	mg/L	100	500	12/12/19 14:07	ttg

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB30_6-15

ACZ Sample ID: ***L56147-09***
Date Sampled: *11/22/19 09:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 10:28	mss2
ICP MWMT Prep	M6010D ICP								12/10/19 12:57	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/16/19 13:06	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 14:15	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2	8.1			mg/L	0.1	0.5	12/11/19 14:36	kja
Antimony (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0008	0.004	12/17/19 12:48	mfm
Arsenic (MWMT)	M6020B ICP-MS	2	0.002			mg/L	0.0004	0.002	12/17/19 12:48	mfm
Barium (MWMT)	M6010D ICP	2	0.03	B		mg/L	0.01	0.07	12/11/19 14:36	kja
Beryllium (MWMT)	M6020B ICP-MS	2	0.0042			mg/L	0.0002	0.0005	12/17/19 12:48	mfm
Boron (MWMT)	M6010D ICP	2	0.17	B	UJ 2	mg/L	0.04	0.2	12/11/19 14:36	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0048			mg/L	0.0001	0.0005	12/17/19 12:48	mfm
Calcium (MWMT)	M6010D ICP	2	574			mg/L	0.2	1	12/11/19 14:36	kja
Chromium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:48	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	0.994			mg/L	0.0001	0.0005	12/17/19 12:48	mfm
Copper (MWMT)	M6020B ICP-MS	100	40.7		*	mg/L	0.08	0.2	12/18/19 15:20	bsu
Iron (MWMT)	M6010D ICP	2		U		mg/L	0.06	0.2	12/11/19 14:36	kja
Lead (MWMT)	M6020B ICP-MS	2	0.001			mg/L	0.0002	0.001	12/17/19 12:48	mfm
Lithium (MWMT)	M6010D ICP	2	0.15			mg/L	0.02	0.08	12/11/19 14:36	kja
Magnesium (MWMT)	M6010D ICP	2	194			mg/L	0.4	2	12/11/19 14:36	kja
Manganese (MWMT)	M6020B ICP-MS	100	17.7		*	mg/L	0.04	0.2	12/18/19 15:20	bsu
Mercury (MWMT)	M7470 CVAA	1		U	*	mg/L	0.0002	0.001	12/09/19 16:25	slm
Molybdenum (MWMT)	M6020B ICP-MS	2	0.0027			mg/L	0.0004	0.001	12/17/19 12:48	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.574			mg/L	0.0008	0.002	12/17/19 12:48	mfm
Phosphorus (MWMT)	M6010D ICP	2		U		mg/L	0.2	1	12/11/19 14:36	kja
Potassium (MWMT)	M6010D ICP	2	48.2			mg/L	0.4	2	12/11/19 14:36	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0852			mg/L	0.0002	0.0005	12/17/19 12:48	mfm
Silver (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.001	12/17/19 12:48	mfm
Sodium (MWMT)	M6010D ICP	2	80.2			mg/L	0.4	2	12/11/19 14:36	kja
Strontium (MWMT)	M6010D ICP	2	3.98			mg/L	0.02	0.09	12/11/19 14:36	kja
Thallium (MWMT)	M6020B ICP-MS	2	0.0003	B		mg/L	0.0002	0.001	12/17/19 12:48	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/17/19 12:48	mfm
Tin (MWMT)	M6010D ICP	2		U		mg/L	0.08	0.4	12/11/19 14:36	kja
Titanium (MWMT)	M6010D ICP	2	0.07		*	mg/L	0.01	0.05	12/11/19 14:36	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0416			mg/L	0.0002	0.001	12/17/19 12:48	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:48	mfm
Zinc (MWMT)	M6020B ICP-MS	2	0.412			mg/L	0.008	0.02	12/17/19 12:48	mfm

** Please refer to Qualifier Reports for details.*

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB30_6-15

ACZ Sample ID: ***L56147-09***
Date Sampled: *11/22/19 09:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	5.9 ✓			units	0.1	0.1	12/05/19 0:00	gkh
Temperature		1	20.6			C	0.1	0.1	12/05/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	6.1 J 1			units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.3			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/05/19 0:00	gkh
Extraction pH		1	5.95			units			12/05/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/05/19 0:00	gkh
Extraction Time		1	29.5			hrs			12/05/19 0:00	gkh
Leachate Volume		1	5006.3			mL			12/05/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/05/19 0:00	gkh
Post Filter pH		1	5.87			units			12/05/19 0:00	gkh
Pre Filter pH		1	5.85			units			12/05/19 0:00	gkh
Retained Moisture		1	21.66			%			12/05/19 0:00	gkh
Temperature		1	20.6			C	0.1	0.1	12/05/19 0:00	gkh
Time In		1							12/05/19 0:00	gkh
Time Out		1							12/05/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB30_6-15

ACZ Sample ID: ***L56147-09***
Date Sampled: *11/22/19 09:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	39.7 ✓		*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1	39.7		*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	17.2		*	mg/L	0.5	2	12/13/19 12:53	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U ✓	*	mg/L	0.003	0.01	12/12/19 15:41	mss2
Fluoride (MWMT)	SM4500F-C	100	20 ✓	B	*	mg/L	10	40	12/12/19 18:26	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.05	B		mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.05	B	*	mg/L	0.02	0.1	12/06/19 22:06	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/06/19 22:06	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	0.4 ✓	B	*	mg/L	0.1	0.5	12/14/19 1:55	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	3670		*	mg/L	20	40	12/06/19 14:23	eep
Sulfate (MWMT)	D516-07 - Turbidimetric	100	2050		*	mg/L	100	500	12/12/19 14:05	ttg

** Please refer to Qualifier Reports for details.*

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB31_0.5-3

ACZ Sample ID: ***L56147-10***
Date Sampled: *11/22/19 12:03*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 10:44	mss2
ICP MWMT Prep	M6010D ICP								12/10/19 13:30	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/16/19 13:23	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 14:33	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	5	40.0 ✓			mg/L	0.3	1	12/11/19 14:40	kja
Antimony (MWMT)	M6020B ICP-MS	5		U		mg/L	0.002	0.01	12/17/19 12:50	mfm
Arsenic (MWMT)	M6020B ICP-MS	5	0.006			mg/L	0.001	0.005	12/17/19 12:50	mfm
Barium (MWMT)	M6010D ICP	5		U		mg/L	0.04	0.2	12/11/19 14:40	kja
Beryllium (MWMT)	M6020B ICP-MS	5	0.0044 ✓			mg/L	0.0004	0.001	12/17/19 12:50	mfm
Boron (MWMT)	M6010D ICP	5	0.1 ✓	B	UJ 2	mg/L	0.1	0.5	12/11/19 14:40	kja
Cadmium (MWMT)	M6020B ICP-MS	5	0.0094			mg/L	0.0003	0.001	12/17/19 12:50	mfm
Calcium (MWMT)	M6010D ICP	5	505			mg/L	0.5	3	12/11/19 14:40	kja
Chromium (MWMT)	M6020B ICP-MS	5		U		mg/L	0.003	0.01	12/17/19 12:50	mfm
Cobalt (MWMT)	M6020B ICP-MS	5	0.596			mg/L	0.0003	0.001	12/17/19 12:50	mfm
Copper (MWMT)	M6020B ICP-MS	2000	548 ✓		*	mg/L	2	4	12/18/19 15:23	bsu
Iron (MWMT)	M6010D ICP	5	1.8			mg/L	0.2	0.4	12/11/19 14:40	kja
Lead (MWMT)	M6020B ICP-MS	5	0.0175			mg/L	0.0005	0.003	12/17/19 12:50	mfm
Lithium (MWMT)	M6010D ICP	5	0.10	B		mg/L	0.04	0.2	12/11/19 14:40	kja
Magnesium (MWMT)	M6010D ICP	5	239			mg/L	1	5	12/11/19 14:40	kja
Manganese (MWMT)	M6020B ICP-MS	5	6.34		*	mg/L	0.002	0.01	12/17/19 12:50	mfm
Mercury (MWMT)	M7470 CVAA	1	0.0004 ✓	B	*	mg/L	0.0002	0.001	12/09/19 16:26	slm
Molybdenum (MWMT)	M6020B ICP-MS	5		U		mg/L	0.001	0.003	12/17/19 12:50	mfm
Nickel (MWMT)	M6020B ICP-MS	5	0.461			mg/L	0.002	0.005	12/17/19 12:50	mfm
Phosphorus (MWMT)	M6010D ICP	5		U		mg/L	0.5	3	12/11/19 14:40	kja
Potassium (MWMT)	M6010D ICP	5	17			mg/L	1	5	12/11/19 14:40	kja
Selenium (MWMT)	M6020B ICP-MS	5	0.0155			mg/L	0.0005	0.001	12/17/19 12:50	mfm
Silver (MWMT)	M6020B ICP-MS	5		U		mg/L	0.0005	0.003	12/17/19 12:50	mfm
Sodium (MWMT)	M6010D ICP	5	38			mg/L	1	5	12/11/19 14:40	kja
Strontium (MWMT)	M6010D ICP	5	0.62			mg/L	0.05	0.2	12/11/19 14:40	kja
Thallium (MWMT)	M6020B ICP-MS	5	0.0025	B		mg/L	0.0005	0.003	12/17/19 12:50	mfm
Thorium (MWMT)	M6020B ICP-MS	5		U	*	mg/L	0.005	0.03	12/17/19 12:50	mfm
Tin (MWMT)	M6010D ICP	5		U		mg/L	0.2	1	12/11/19 14:40	kja
Titanium (MWMT)	M6010D ICP	5	0.11		*	mg/L	0.03	0.1	12/11/19 14:40	kja
Uranium (MWMT)	M6020B ICP-MS	5	0.079			mg/L	0.0005	0.003	12/17/19 12:50	mfm
Vanadium (MWMT)	M6020B ICP-MS	5		U		mg/L	0.003	0.01	12/17/19 12:50	mfm
Zinc (MWMT)	M6020B ICP-MS	5	2.02 ✓			mg/L	0.02	0.05	12/17/19 12:50	mfm

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB31_0.5-3

ACZ Sample ID: ***L56147-10***
Date Sampled: *11/22/19 12:03*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	4.1			units	0.1	0.1	12/05/19 0:00	gkh
Temperature		1	20.5			C	0.1	0.1	12/05/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	4.0	J1		units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	22.0			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/05/19 0:00	gkh
Extraction pH		1	5.95			units			12/05/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/05/19 0:00	gkh
Extraction Time		1	27.58333			hrs			12/05/19 0:00	gkh
Leachate Volume		1	5004.3			mL			12/05/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/05/19 0:00	gkh
Post Filter pH		1	4.04			units			12/05/19 0:00	gkh
Pre Filter pH		1	4.1			units			12/05/19 0:00	gkh
Retained Moisture		1	11.31			%			12/05/19 0:00	gkh
Temperature		1	20.5			C	0.1	0.1	12/05/19 0:00	gkh
Time In		1							12/05/19 0:00	gkh
Time Out		1							12/05/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB31_0.5-3

ACZ Sample ID: ***L56147-10***
Date Sampled: *11/22/19 12:03*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	12.6		*	mg/L	0.5	2	12/13/19 12:53	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	*	mg/L	0.003	0.01	12/12/19 15:42	mss2
Fluoride (MWMT)	SM4500F-C	500		U	*	mg/L	60	200	12/12/19 18:40	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.76			mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.76 ✓		*	mg/L	0.02	0.1	12/06/19 22:07	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/06/19 22:07	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	2.3		*	mg/L	0.1	0.5	12/14/19 1:56	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	2	5130 ✓		*	mg/L	40	80	12/06/19 14:25	eep
Sulfate (MWMT)	D516-07 - Turbidimetric	100	3060 ✓		*	mg/L	100	500	12/12/19 14:05	ttg

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB31_6-15

ACZ Sample ID: ***L56147-11***
Date Sampled: *11/22/19 12:20*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Cyanide, WAD (MWMT) Prep	SM4500-CN I		-						12/11/19 11:01	mss2
ICP MWMT Prep	M6010D ICP								12/10/19 14:03	kja
ICPMS MWMT Prep	M6020B ICP-MS								12/16/19 13:40	mfm
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor								12/09/19 14:51	mss2

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (MWMT)	M6010D ICP	2	6.8			mg/L	0.1	0.5	12/11/19 14:43	kja
Antimony (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0008	0.004	12/17/19 12:52	mfm
Arsenic (MWMT)	M6020B ICP-MS	2	0.0024			mg/L	0.0004	0.002	12/17/19 12:52	mfm
Barium (MWMT)	M6010D ICP	2	0.02	B		mg/L	0.01	0.07	12/11/19 14:43	kja
Beryllium (MWMT)	M6020B ICP-MS	2	0.0021			mg/L	0.0002	0.0005	12/17/19 12:52	mfm
Boron (MWMT)	M6010D ICP	2	0.22	UJ 2		mg/L	0.04	0.2	12/11/19 14:43	kja
Cadmium (MWMT)	M6020B ICP-MS	2	0.0079			mg/L	0.0001	0.0005	12/17/19 12:52	mfm
Calcium (MWMT)	M6010D ICP	2	534			mg/L	0.2	1	12/11/19 14:43	kja
Chromium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:52	mfm
Cobalt (MWMT)	M6020B ICP-MS	2	1.08			mg/L	0.0001	0.0005	12/17/19 12:52	mfm
Copper (MWMT)	M6020B ICP-MS	100	39.0		*	mg/L	0.08	0.2	12/18/19 15:25	bsu
Iron (MWMT)	M6010D ICP	2		U		mg/L	0.06	0.2	12/11/19 14:43	kja
Lead (MWMT)	M6020B ICP-MS	2	0.0006	B		mg/L	0.0002	0.001	12/17/19 12:52	mfm
Lithium (MWMT)	M6010D ICP	2	0.12			mg/L	0.02	0.08	12/11/19 14:43	kja
Magnesium (MWMT)	M6010D ICP	2	246			mg/L	0.4	2	12/11/19 14:43	kja
Manganese (MWMT)	M6020B ICP-MS	200	19.8		*	mg/L	0.08	0.4	12/19/19 15:25	bsu
Mercury (MWMT)	M7470 CVAA	1		U	*	mg/L	0.0002	0.001	12/09/19 16:29	slm
Molybdenum (MWMT)	M6020B ICP-MS	2	0.0014			mg/L	0.0004	0.001	12/17/19 12:52	mfm
Nickel (MWMT)	M6020B ICP-MS	2	0.448			mg/L	0.0008	0.002	12/17/19 12:52	mfm
Phosphorus (MWMT)	M6010D ICP	2		U		mg/L	0.2	1	12/11/19 14:43	kja
Potassium (MWMT)	M6010D ICP	2	37.8			mg/L	0.4	2	12/11/19 14:43	kja
Selenium (MWMT)	M6020B ICP-MS	2	0.0432			mg/L	0.0002	0.0005	12/17/19 12:52	mfm
Silver (MWMT)	M6020B ICP-MS	2		U		mg/L	0.0002	0.001	12/17/19 12:52	mfm
Sodium (MWMT)	M6010D ICP	2	68.1			mg/L	0.4	2	12/11/19 14:43	kja
Strontium (MWMT)	M6010D ICP	2	2.63			mg/L	0.02	0.09	12/11/19 14:43	kja
Thallium (MWMT)	M6020B ICP-MS	2	0.0003	B		mg/L	0.0002	0.001	12/17/19 12:52	mfm
Thorium (MWMT)	M6020B ICP-MS	2		U	*	mg/L	0.002	0.01	12/17/19 12:52	mfm
Tin (MWMT)	M6010D ICP	2		U		mg/L	0.08	0.4	12/11/19 14:43	kja
Titanium (MWMT)	M6010D ICP	2	0.07		*	mg/L	0.01	0.05	12/11/19 14:43	kja
Uranium (MWMT)	M6020B ICP-MS	2	0.0494			mg/L	0.0002	0.001	12/17/19 12:52	mfm
Vanadium (MWMT)	M6020B ICP-MS	2		U		mg/L	0.001	0.004	12/17/19 12:52	mfm
Zinc (MWMT)	M6020B ICP-MS	2	0.595			mg/L	0.008	0.02	12/17/19 12:52	mfm

** Please refer to Qualifier Reports for details.*

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB31_6-15

ACZ Sample ID: ***L56147-11***
Date Sampled: *11/22/19 12:20*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH (MWMT)	M9045D/M9040C									
pH		1	5.7			units	0.1	0.1	12/05/19 0:00	gkh
Temperature		1	20.6			C	0.1	0.1	12/05/19 0:00	gkh
pH, Corrosivity	M9045D/M9040C									
pH		1	5.2	J1		units	0.1	0.1	12/17/19 0:00	ınk/gkh
Temperature		1	21.8			C	0.1	0.1	12/17/19 0:00	ınk/gkh

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Meteoric Water Mobility Extraction	ASTM E2242-13									
Dry Weight		1	5000			g			12/05/19 0:00	gkh
Extraction pH		1	5.95			units			12/05/19 0:00	gkh
Extraction Temperature		1	23.0			C	0.1	0.1	12/05/19 0:00	gkh
Extraction Time		1	29.33333			hrs			12/05/19 0:00	gkh
Leachate Volume		1	5000.7			mL			12/05/19 0:00	gkh
Particle Size over 5 cm		1	0			%			12/05/19 0:00	gkh
Post Filter pH		1	5.71			units			12/05/19 0:00	gkh
Pre Filter pH		1	5.66			units			12/05/19 0:00	gkh
Retained Moisture		1	28.21			%			12/05/19 0:00	gkh
Temperature		1	20.6			C	0.1	0.1	12/05/19 0:00	gkh
Time In		1							12/05/19 0:00	gkh
Time Out		1							12/05/19 0:00	gkh

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB31_6-15

ACZ Sample ID: ***L56147-11***
Date Sampled: *11/22/19 12:20*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (MWMT)	SM2320B - Titration									
Bicarbonate as CaCO3		1	10.1 ✓	B	*	mg/L	2	20	12/09/19 0:00	emk
Carbonate as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Hydroxide as CaCO3		1		U	*	mg/L	2	20	12/09/19 0:00	emk
Total Alkalinity		1	10.1	B	*	mg/L	2	20	12/09/19 0:00	emk
Chloride (MWMT)	SM4500Cl-E	1	7.6 ✓		*	mg/L	0.5	2	12/13/19 12:53	wtc
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation	0.5		U	✓*	mg/L	0.003	0.01	12/12/19 15:43	mss2
Fluoride (MWMT)	SM4500F-C	100		U	*	mg/L	10	40	12/12/19 18:53	enb
Nitrate as N (MWMT)	Calculation: NO3NO2 minus NO2		0.06	B		mg/L	0.02	0.1	01/13/20 0:00	calc
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1	0.06	B	*	mg/L	0.02	0.1	12/06/19 22:08	pjb
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction	1		U	*	mg/L	0.01	0.05	12/06/19 22:08	pjb
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor	1	0.5 ✓		*	mg/L	0.1	0.5	12/14/19 1:57	pjb
Residue, Filterable (TDS) @180C (MWMT)	SM2540C	1	3740		*	mg/L	20	40	12/06/19 14:27	eep
Sulfate (MWMT)	D516-07 - Turbidimetric	100	2300		*	mg/L	100	500	12/12/19 14:52	ttg

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit unless omitted or equal to the PQL (see comment #5). Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit. Synonymous with the EPA term "minimum level".
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste.
(5) Standard Methods for the Examination of Water and Wastewater.

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:
https://acz.com/wp-content/uploads/2019/04/Ext-Qual-List.pdf

Wood - E&I Solutions, Inc. ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487689													
WG487689LCSW1	LCSW	12/09/19 10:44	WC191203-1	820		789	mg/L	96	90	110			
WG487250PBS	PBS	12/09/19 10:50				3.5	mg/L		-20	20			
WG487689PBW2	PBW	12/09/19 11:22				U	mg/L		-20	20			
L56147-10DUP	DUP	12/09/19 11:42			U	U	mg/L				0	20	RA
WG487361PBS	PBS	12/09/19 11:54				U	mg/L		-20	20			
L56147-05DUP2	DUP	12/09/19 12:34			U	U	mg/L				0	20	RA
WG487689LCSW2	LCSW	12/09/19 12:46	WC191203-1	820		799	mg/L	97	90	110			

Aluminum (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	2		2.006	mg/L	100	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.15	0.15			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.2503		.262	mg/L	105	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	250.3		256.1	mg/L	102	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.15	0.15			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	1.0012		1.03	mg/L	103	80	120			
L56147-04SDL	SDL	12/10/19 9:52			U	U	mg/L					10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	1.0012	14.3	15.78	mg/L	148	75	125			M3
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	1.0012	14.3	15.61	mg/L	131	75	125	1	20	M3
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	1		1.024	mg/L	102	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.15	0.15			
L56147-05DUP	DUP	12/10/19 10:14			14.3	14.99	mg/L				5	20	
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	1		1.023	mg/L	102	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.15	0.15			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	2		1.999	mg/L	100	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.15	0.15			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.2503		.262	mg/L	105	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	250.3		251.6	mg/L	101	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.15	0.15			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	1.0012		1.023	mg/L	102	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	1.0012	U	1.07	mg/L	107	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	1.0012	U	1.05	mg/L	105	75	125	2	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	1		1.004	mg/L	100	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.15	0.15			
L56147-11SDL	SDL	12/11/19 14:54			6.8	6.8	mg/L				0	10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	1		1.003	mg/L	100	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.15	0.15			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Antimony (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.02004		.02142	mg/L	107	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0012	0.0012			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.002		.00195	mg/L	98	70	130			
WG487763ICSA	ICSA	12/10/19 10:31				U	mg/L		-0.002	0.002			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.01		.00999	mg/L	100	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0012	0.0012			
L56147-03SDL	SDL	12/10/19 10:45			U	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.01	.0013	.01159	mg/L	103	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.01	.0013	.01174	mg/L	104	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			.0013	.00155	mg/L				18	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.0125		.01239	mg/L	99	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0012	0.0012			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.01		.01006	mg/L	101	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.0125		.01211	mg/L	97	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0012	0.0012			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.02004		.01852	mg/L	92	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0012	0.0012			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.002		.00196	mg/L	98	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.002	0.002			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.01		.01035	mg/L	104	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0012	0.0012			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.01	U	.01054	mg/L	105	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.01	U	.01068	mg/L	107	75	125	1	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.01		.01022	mg/L	102	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.0125		.01211	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0012	0.0012			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0012	0.0012			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.01		.01029	mg/L	103	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.0125		.01147	mg/L	92	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0012	0.0012			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Arsenic (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.05137	mg/L	103	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0006	0.0006			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.001001		.00088	mg/L	88	70	130			
WG487763ICSA	ICSA	12/10/19 10:31		.00024		.00024	mg/L		-0.001	0.001			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02002		.0182	mg/L	91	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0006	0.0006			
L56147-03SDL	SDL	12/10/19 10:45			.0016	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05005	.0013	.04738	mg/L	92	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05005	.0013	.04942	mg/L	96	75	125	4	20	
L56147-05DUP	DUP	12/10/19 10:54			.0013	.00149	mg/L				14	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1001		.10741	mg/L	107	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0006	0.0006			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05005		.04987	mg/L	100	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1001		.10106	mg/L	101	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0006	0.0006			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04859	mg/L	97	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0006	0.0006			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.001001		.00077	mg/L	77	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.001	0.001			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02002		.01836	mg/L	92	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0006	0.0006			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05005	U	.04662	mg/L	93	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05005	U	.04776	mg/L	95	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05005		.05035	mg/L	101	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1001		.09958	mg/L	99	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0006	0.0006			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0006	0.0006			
L56019-04SDL	SDL	12/17/19 13:08			.0008	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05005		.04739	mg/L	95	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1001		.09495	mg/L	95	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0006	0.0006			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Barium (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	2		1.989	mg/L	99	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.021	0.021			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.035035		.0353	mg/L	101	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	.25025		.2458	mg/L	98	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.021	0.021			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	.5005		.4966	mg/L	99	80	120			
L56147-04SDL	SDL	12/10/19 9:52			U	U	mg/L					10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	.5005	U	.513	mg/L	102	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	.5005	U	.508	mg/L	101	75	125	1	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	1		.9949	mg/L	99	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.021	0.021			
L56147-05DUP	DUP	12/10/19 10:14			U	U	mg/L				0	20	RA
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	1		.9965	mg/L	100	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.021	0.021			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	2		2.002	mg/L	100	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.021	0.021			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.035035		.0402	mg/L	115	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	.25025		.2518	mg/L	101	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.021	0.021			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	.5005		.4991	mg/L	100	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	.5005	.03	.526	mg/L	99	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	.5005	.03	.53	mg/L	100	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	1		.9908	mg/L	99	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.021	0.021			
L56147-11SDL	SDL	12/11/19 14:54			.02	U	mg/L					10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	1		.9958	mg/L	100	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.021	0.021			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Beryllium (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.051313	mg/L	103	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.00024	0.00024			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.00025025		.000206	mg/L	82	70	130			
WG487763ICSA	ICSA	12/10/19 10:31		.00012		.00012	mg/L		-0.0003	0.0003			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02002		.018444	mg/L	92	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.00024	0.00024			
L56147-03SDL	SDL	12/10/19 10:45			.0013	.00105	mg/L				19	10	ZG
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05005	.003	.04892	mg/L	92	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05005	.003	.04898	mg/L	92	75	125	0	20	
L56147-05DUP	DUP	12/10/19 10:54			.003	.0027	mg/L				11	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1001		.098971	mg/L	99	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.00024	0.00024			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05005		.045954	mg/L	92	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1001		.09466	mg/L	95	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.00024	0.00024			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.048542	mg/L	97	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.00024	0.00024			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.00025025		.000205	mg/L	82	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.0003	0.0003			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02002		.018406	mg/L	92	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.00024	0.00024			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05005	U	.04377	mg/L	87	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05005	U	.0444	mg/L	89	75	125	1	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05005		.046778	mg/L	93	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1001		.098409	mg/L	98	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.00024	0.00024			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.00024	0.00024			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05005		.0473	mg/L	95	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1001		.09495	mg/L	95	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.00024	0.00024			

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ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Boron (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	2		2.001	mg/L	100	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.06	0.06			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.1001		.129	mg/L	129	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	.5005		.535	mg/L	107	80	120			
WG487361PBS	PBS	12/10/19 9:30				.077	mg/L		-0.06	0.06			B1
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	.5005		.608	mg/L	121	80	120			B1
L56147-04SDL	SDL	12/10/19 9:52			.28	.4	mg/L				43	10	ZG
L56147-05MS2	MS	12/10/19 9:59	II191127-2	.5005	.15	.713	mg/L	112	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	.5005	.15	.704	mg/L	111	75	125	1	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	1		1.062	mg/L	106	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.06	0.06			
L56147-05DUP	DUP	12/10/19 10:14			.15	.17	mg/L				13	20	RA
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	1		1.071	mg/L	107	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.06	0.06			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	2		1.986	mg/L	99	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.06	0.06			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.1001		.104	mg/L	104	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	.5005		.492	mg/L	98	80	120			
WG487250PBS	PBS	12/11/19 14:10				.056	mg/L		-0.06	0.06			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	.5005		.57	mg/L	114	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	.5005	.16	.656	mg/L	99	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	.5005	.16	.661	mg/L	100	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	1		1.008	mg/L	101	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.06	0.06			
L56147-11SDL	SDL	12/11/19 14:54			.22	U	mg/L					10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	1		.985	mg/L	99	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.06	0.06			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Cadmium (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.052661	mg/L	105	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.00015	0.00015			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.00025025		.000221	mg/L	88	70	130			
WG487763ICSA	ICSA	12/10/19 10:31		.000267		.000267	mg/L		-0.0003	0.0003			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02002		.018977	mg/L	95	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.00015	0.00015			
L56147-03SDL	SDL	12/10/19 10:45			.0016	.00155	mg/L				3	10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05005	.0018	.05048	mg/L	97	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05005	.0018	.05003	mg/L	96	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			.0018	.00197	mg/L				9	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1001		.100672	mg/L	101	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.00015	0.00015			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05005		.047359	mg/L	95	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1001		.098835	mg/L	99	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.00015	0.00015			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.048489	mg/L	97	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.00015	0.00015			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.00025025		.000204	mg/L	82	70	130			
WG488303ICSA	ICSA	12/17/19 12:31		.000192		.000192	mg/L		-0.0003	0.0003			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02002		.018832	mg/L	94	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.00015	0.00015			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05005	.0006	.04739	mg/L	93	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05005	.0006	.04848	mg/L	96	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05005		.046935	mg/L	94	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1001		.097875	mg/L	98	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.00015	0.00015			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.00015	0.00015			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05005		.046901	mg/L	94	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1001		.094105	mg/L	94	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.00015	0.00015			

Wood - E&I Solutions, Inc. ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Calcium (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	100		98.8	mg/L	99	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.3	0.3			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.5004		.5	mg/L	100	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	250.3		248.1	mg/L	99	80	120			
WG487361PBS	PBS	12/10/19 9:30				.24	mg/L		-0.3	0.3			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	68.00334		69.62	mg/L	102	80	120			
L56147-04SDL	SDL	12/10/19 9:52			514	512.9	mg/L				0	10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	68.00334	560	636.8	mg/L	113	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	68.00334	560	628.8	mg/L	101	75	125	1	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	50		49.99	mg/L	100	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.3	0.3			
L56147-05DUP	DUP	12/10/19 10:14			560	572.4	mg/L				2	20	
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	50		50.14	mg/L	100	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.3	0.3			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	100		100.5	mg/L	101	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.3	0.3			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.5004		.46	mg/L	92	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	250.3		249.7	mg/L	100	80	120			
WG487250PBS	PBS	12/11/19 14:10				.14	mg/L		-0.3	0.3			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	68.00334		71.28	mg/L	105	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	68.00334	492	573.6	mg/L	120	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	68.00334	492	568.8	mg/L	113	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	50		50.62	mg/L	101	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.3	0.3			
L56147-11SDL	SDL	12/11/19 14:54			534	539.7	mg/L				1	10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	50		50.14	mg/L	100	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.3	0.3			

Chloride (MWMT) SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG488095													
WG488095ICB	ICB	12/13/19 11:30				U	mg/L		-1.5	1.5			
WG488095ICV	ICV	12/13/19 11:30	WI190501-1	54.835		55.19	mg/L	101	90	110			
WG488095CCV1	CCV	12/13/19 12:53	WI190111-5	50.05		49.27	mg/L	98	90	110			
WG488095CCB1	CCB	12/13/19 12:53				U	mg/L		-1.5	1.5			
WG488095LFB	LFB	12/13/19 12:53	WI190812-3	30		31.86	mg/L	106	90	110			
WG487250PBS	PBS	12/13/19 12:53				U	mg/L		-1.5	1.5			
L56147-06AS	AS	12/13/19 12:53	WI190812-3	30	10.2	41.16	mg/L	103	90	110			
L56147-07DUP	DUP	12/13/19 12:53			8.9	9.02	mg/L				1	20	
WG488095CCV2	CCV	12/13/19 12:55	WI190111-5	50.05		51.41	mg/L	103	90	110			
WG488095CCB2	CCB	12/13/19 12:55				U	mg/L		-1.5	1.5			
WG487361PBS	PBS	12/13/19 12:55				U	mg/L		-1.5	1.5			
WG488095CCV3	CCV	12/13/19 12:55	WI190111-5	50.05		51.54	mg/L	103	90	110			
WG488095CCB3	CCB	12/13/19 12:55				U	mg/L		-1.5	1.5			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Chromium (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.05388	mg/L	108	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0015	0.0015			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.002002		.00174	mg/L	87	70	130			
WG487763ICSA	ICSA	12/10/19 10:31				U	mg/L		-0.002	0.002			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02002		.01762	mg/L	88	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0015	0.0015			
L56147-03SDL	SDL	12/10/19 10:45			U	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05005	.001	.0464	mg/L	91	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05005	.001	.0473	mg/L	93	75	125	2	20	
L56147-05DUP	DUP	12/10/19 10:54			.001	.0011	mg/L				10	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1001		.10139	mg/L	101	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0015	0.0015			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05005		.04753	mg/L	95	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1001		.09622	mg/L	96	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0015	0.0015			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04913	mg/L	98	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0015	0.0015			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.002002		.00162	mg/L	81	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.002	0.002			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02002		.01773	mg/L	89	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0015	0.0015			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05005	U	.0438	mg/L	88	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05005	U	.0441	mg/L	88	75	125	1	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05005		.04789	mg/L	96	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1001		.09606	mg/L	96	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0015	0.0015			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0015	0.0015			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05005		.04564	mg/L	91	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1001		.09137	mg/L	91	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0015	0.0015			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Cobalt (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.054953	mg/L	110	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.00015	0.00015			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.00025025		.000221	mg/L	88	70	130			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02002		.017887	mg/L	89	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.00015	0.00015			
L56147-03SDL	SDL	12/10/19 10:45			.1338	.1456	mg/L				9	10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05005	.1653	.21343	mg/L	96	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05005	.1653	.21609	mg/L	101	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			.1653	.1617	mg/L				2	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1001		.102223	mg/L	102	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.00015	0.00015			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05005		.04771	mg/L	95	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1001		.098523	mg/L	98	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.00015	0.00015			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.051296	mg/L	103	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.00015	0.00015			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.00025025		.000208	mg/L	83	70	130			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02002		.018699	mg/L	93	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.00015	0.00015			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05005	.1063	.14501	mg/L	77	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05005	.1063	.14803	mg/L	83	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05005		.045866	mg/L	92	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1001		.096758	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.00015	0.00015			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.00015	0.00015			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05005		.047161	mg/L	94	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1001		.093946	mg/L	94	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.00015	0.00015			

Wood - E&I Solutions, Inc. ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Copper (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.0513	mg/L	103	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0024	0.0024			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.002004		.00172	mg/L	86	70	130			
WG487763ICSA	ICSA	12/10/19 10:31				U	mg/L		-0.002	0.002			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02004		.01674	mg/L	84	80	120			
WG487361PBS	PBS	12/10/19 10:38				.00153	mg/L		-0.0024	0.0024			
L56147-03SDL	SDL	12/10/19 10:45			84.3	76.719	mg/L				9	10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.0501	344	346.1249	mg/L	4241	75	125			M3
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.0501	344	336.929	mg/L	-14114	75	125	3	20	M3
L56147-05DUP	DUP	12/10/19 10:54			344	324.2626	mg/L				6	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.2505		.24287	mg/L	97	90	110			
WG487763CCB1	CCB	12/10/19 10:58				.0053	mg/L		-0.0024	0.0024			BB
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.0501		.0417	mg/L	83	80	120			
WG487763CCB2	CCB	12/10/19 11:03				.00084	mg/L		-0.0024	0.0024			
WG487836													
WG487836ICV	ICV	12/10/19 15:29	MS191014-8	.05		.05329	mg/L	107	90	110			
WG487836ICB	ICB	12/10/19 15:31				U	mg/L		-0.0024	0.0024			
WG487836PQV	PQV	12/10/19 15:33	MS191014-4	.002004		.00182	mg/L	91	70	130			
WG487836ICSA	ICSA	12/10/19 15:35				U	mg/L		-0.002	0.002			
WG487836ICSAB	ICSAB	12/10/19 15:36	MS191119-7	.02004		.01828	mg/L	91	80	120			
WG487836CCV1	CCV	12/10/19 16:09	MS191028-2	.2505		.24567	mg/L	98	90	110			
WG487836CCB1	CCB	12/10/19 16:10				U	mg/L		-0.0024	0.0024			
WG487361PBS	PBS	12/10/19 16:12				.00169	mg/L		-0.0024	0.0024			
WG487361LFB2	LFB	12/10/19 16:14	MS191119-5	.0501		.04979	mg/L	99	80	120			
L56147-04SDL	SDL	12/10/19 16:19			3.16	3.035	mg/L				4	10	
L56147-05MS1	MS	12/10/19 16:23	MS191119-5	.0501	339	348.16	mg/L	18283	75	125			M3
L56147-05MSD1	MSD	12/10/19 16:25	MS191119-5	.0501	339	326.8	mg/L	-24351	75	125	6	20	M3
L56147-05DUP	DUP	12/10/19 16:27			339	372.16	mg/L				9	20	
WG487836CCV2	CCV	12/10/19 16:28	MS191028-2	.2505		.24251	mg/L	97	90	110			
WG487836CCB2	CCB	12/10/19 16:30				U	mg/L		-0.0024	0.0024			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04867	mg/L	97	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0024	0.0024			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.002004		.0016	mg/L	80	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.002	0.002			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02004		.01642	mg/L	82	80	120			
WG487250PBS	PBS	12/17/19 12:38				.00226	mg/L		-0.0024	0.0024			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.0501	.396	.4302	mg/L	68	75	125			M3
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.0501	.396	.4408	mg/L	89	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.0501		.05483	mg/L	109	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.2505		.24403	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0024	0.0024			
WG487687PBS	PBS	12/17/19 12:59				.00149	mg/L		-0.0024	0.0024			
L56019-04SDL	SDL	12/17/19 13:08			.0129	.01435	mg/L				11	10	ZG
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.0501		.04636	mg/L	93	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.2505		.23066	mg/L	92	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0024	0.0024			
WG488444													

Wood - E&I Solutions, Inc. ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

WG488444ICV	ICV	12/18/19 14:25	MS191014-8	.05		.05075	mg/L	102	90	110			
WG488444ICB	ICB	12/18/19 14:27				U	mg/L		-0.0024	0.0024			
WG488444PQV	PQV	12/18/19 14:29	MS191014-4	.002004		.00173	mg/L	86	70	130			
WG488444ICSA	ICSA	12/18/19 14:31				U	mg/L		-0.002	0.002			
WG488444ICSAB	ICSAB	12/18/19 14:32	MS191119-7	.02004		.01828	mg/L	91	80	120			
WG488444CCV1	CCV	12/18/19 15:05	MS191209-4	.2505		.26116	mg/L	104	90	110			
WG488444CCB1	CCB	12/18/19 15:07				U	mg/L		-0.0024	0.0024			
WG487250PBS	PBS	12/18/19 15:09				.00279	mg/L		-0.0024	0.0024			B7
WG487250LFB2	LFB	12/18/19 15:11	MS191119-5	.0501		.05314	mg/L	106	80	120			
L56147-07MS	MS	12/18/19 15:14	MS191119-5	.0501	.5	.536	mg/L	72	75	125			M3
L56147-07MSD	MSD	12/18/19 15:16	MS191119-5	.0501	.5	.535	mg/L	70	75	125	0	20	M3
L56147-09SDL	SDL	12/18/19 15:21			40.7	41.31	mg/L				1	10	
WG488444CCV2	CCV	12/18/19 15:27	MS191209-4	.2505		.25632	mg/L	102	90	110			
WG488444CCB2	CCB	12/18/19 15:29				U	mg/L		-0.0024	0.0024			
WG488531													
WG488531ICV	ICV	12/19/19 15:02	MS191014-8	.05		.05284	mg/L	106	90	110			
WG488531ICB	ICB	12/19/19 15:04				U	mg/L		-0.0024	0.0024			
WG488531PQV	PQV	12/19/19 15:06	MS191014-4	.002004		.0018	mg/L	90	70	130			
WG488531ICSA	ICSA	12/19/19 15:08				U	mg/L		-0.002	0.002			
WG488531ICSAB	ICSAB	12/19/19 15:10	MS191119-7	.02004		.01779	mg/L	89	80	120			
WG487250PBS	PBS	12/19/19 15:13				.00241	mg/L		-0.0024	0.0024			B7
WG487250LFB2	LFB	12/19/19 15:15	MS191119-5	.0501		.05215	mg/L	104	80	120			
L56147-07MS	MS	12/19/19 15:19	MS191119-5	.0501	.48	.539	mg/L	118	75	125			
L56147-07MSD	MSD	12/19/19 15:21	MS191119-5	.0501	.48	.526	mg/L	92	75	125	2	20	
WG488531CCV1	CCV	12/19/19 15:26	MS191209-4	.2505		.26055	mg/L	104	90	110			
WG488531CCB1	CCB	12/19/19 15:28				U	mg/L		-0.0024	0.0024			
L56147-11SDL	SDL	12/19/19 15:30			37.6	35.6	mg/L				5	10	
WG488531CCV2	CCV	12/19/19 15:32	MS191209-4	.2505		.25918	mg/L	103	90	110			
WG488531CCB2	CCB	12/19/19 15:34				U	mg/L		-0.0024	0.0024			

Cyanide, WAD (MWMT) SM4500-CN I,E-Colorimetric w/ distillation

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG488018													
WG488018ICV	ICV	12/12/19 14:55	WI191202-7	.3		.2979	mg/L	99	90	110			
WG488018ICB	ICB	12/12/19 14:56				U	mg/L		-0.003	0.003			
WG488005													
WG488005CCV1	CCV	12/12/19 15:33	WI191202-2	.25		.2512	mg/L	100	90	110			
WG488005CCB1	CCB	12/12/19 15:34				U	mg/L		-0.003	0.003			
WG487912LRB	LRB	12/12/19 15:35				U	mg/L		-0.003	0.003			
WG487912LFB	LFB	12/12/19 15:36	WI191202-4	.2		.2007	mg/L	100	90	110			
WG487250PBS	PBS	12/12/19 15:37				U	mg/L		-0.003	0.003			
L56147-07LFM	LFM	12/12/19 15:39	WI191202-4	.2	U	.1933	mg/L	97	90	110			
WG488005CCV2	CCV	12/12/19 15:44	WI191202-2	.25		.2528	mg/L	101	90	110			
WG488005CCB2	CCB	12/12/19 15:44				U	mg/L		-0.003	0.003			
WG487361PBS	PBS	12/12/19 15:45				U	mg/L		-0.003	0.003			
L56147-05DUP	DUP	12/12/19 15:51			U	U	mg/L				0	20	RA
WG488005CCV3	CCV	12/12/19 15:53	WI191202-2	.25		.2527	mg/L	101	90	110			
WG488005CCB3	CCB	12/12/19 15:54				U	mg/L		-0.003	0.003			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Fluoride (MWMT) SM4500F-C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487959													
WG487959ICV	ICV	12/12/19 11:25	WC191204-2	2.004		1.94	mg/L	97	90	110			
WG487959ICB	ICB	12/12/19 11:33				U	mg/L		-0.3	0.3			
WG487964													
WG487964ICV	ICV	12/12/19 16:40	WC191212-1	2.004		1.9	mg/L	95	90	110			
WG487964ICB	ICB	12/12/19 16:47				U	mg/L		-0.3	0.3			
WG487964PQV	PQV	12/12/19 16:55	WC191202-7	.3507		.32	mg/L	91	70	130			
WG487964LFB	LFB	12/12/19 17:02	WC191014-1	5.01		4.55	mg/L	91	90	110			
WG487250PBS	PBS	12/12/19 17:12				U	mg/L		-0.3	0.3			
L56147-06AS	AS	12/12/19 17:41	WC191014-1	5.01	5.1	9.58	mg/L	89	90	110			M2
L56147-06ASD	ASD	12/12/19 17:54	WC191014-1	5.01	5.1	9.58	mg/L	89	90	110	0	20	M2
WG487361PBS	PBS	12/12/19 19:05				U	mg/L		-0.3	0.3			
WG487964CCV1	CCV	12/12/19 20:05	WC191212-1	2.004		1.92	mg/L	96	90	110			
WG487964CCB1	CCB	12/12/19 20:11				U	mg/L		-0.3	0.3			
L56147-05DUP	DUP	12/12/19 20:31			U	U	mg/L				0	20	RA
WG487687PBS	PBS	12/12/19 20:44				U	mg/L		-0.3	0.3			
L56019-02AS	AS	12/12/19 21:12	WC191014-1	5.01	U	4.64	mg/L	93	90	110			
L56019-02ASD	ASD	12/12/19 21:23	WC191014-1	5.01	U	4.59	mg/L	92	90	110	1	20	
WG487964CCV2	CCV	12/12/19 22:27	WC191212-1	2.004		1.89	mg/L	94	90	110			
WG487964CCB2	CCB	12/12/19 22:34				U	mg/L		-0.3	0.3			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Iron (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	2		1.944	mg/L	97	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.09	0.09			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.075135		.065	mg/L	87	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	100.18		95.36	mg/L	95	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.09	0.09			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	1.0018		1.014	mg/L	101	80	120			
L56147-04SDL	SDL	12/10/19 9:52			U	U	mg/L				0	10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	1.0018	.21	1.251	mg/L	104	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	1.0018	.21	1.236	mg/L	102	75	125	1	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	1		.982	mg/L	98	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.09	0.09			
L56147-05DUP	DUP	12/10/19 10:14			.21	.142	mg/L				39	20	RA
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	1		.981	mg/L	98	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.09	0.09			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	2		1.948	mg/L	97	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.09	0.09			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.075135		.074	mg/L	98	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	100.18		94.48	mg/L	94	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.09	0.09			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	1.0018		1.022	mg/L	102	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	1.0018	U	1.007	mg/L	101	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	1.0018	U	1.014	mg/L	101	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	1		.981	mg/L	98	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.09	0.09			
L56147-11SDL	SDL	12/11/19 14:54			U	U	mg/L				0	10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	1		.972	mg/L	97	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.09	0.09			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Lead (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.05446	mg/L	109	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0003	0.0003			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.0005005		.00045	mg/L	90	70	130			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02002		.01831	mg/L	91	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0003	0.0003			
L56147-03SDL	SDL	12/10/19 10:45			.0004	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05005	.001	.05071	mg/L	99	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05005	.001	.0512	mg/L	100	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			.001	.00117	mg/L				16	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.25025		.24889	mg/L	99	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0003	0.0003			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05005		.04689	mg/L	94	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.25025		.24287	mg/L	97	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0003	0.0003			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04975	mg/L	100	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0003	0.0003			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.0005005		.00042	mg/L	84	70	130			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02002		.01958	mg/L	98	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0003	0.0003			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05005	.0003	.04969	mg/L	99	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05005	.0003	.05085	mg/L	101	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05005		.04695	mg/L	94	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.25025		.24168	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0003	0.0003			
WG487687PBS	PBS	12/17/19 12:59				.00022	mg/L		-0.0003	0.0003			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05005		.04768	mg/L	95	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.25025		.23704	mg/L	95	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0003	0.0003			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Lithium (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	2		2.031	mg/L	102	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.024	0.024			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.04008		.0392	mg/L	98	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	.501		.5498	mg/L	110	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.024	0.024			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	1.002		1.044	mg/L	104	80	120			
L56147-04SDL	SDL	12/10/19 9:52			.12	U	mg/L					10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	1.002	.03	1.137	mg/L	110	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	1.002	.03	1.122	mg/L	109	75	125	1	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	1		1.013	mg/L	101	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.024	0.024			
L56147-05DUP	DUP	12/10/19 10:14			.03	.033	mg/L				10	20	RA
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	1		1.022	mg/L	102	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.024	0.024			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	2		2.027	mg/L	101	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.024	0.024			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.04008		.0418	mg/L	104	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	.501		.539	mg/L	108	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.024	0.024			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	1.002		1.036	mg/L	103	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	1.002	.11	1.176	mg/L	106	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	1.002	.11	1.168	mg/L	106	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	1		.9974	mg/L	100	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.024	0.024			
L56147-11SDL	SDL	12/11/19 14:54			.12	.115	mg/L				4	10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	1		.9878	mg/L	99	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.024	0.024			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Magnesium (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	100		96.85	mg/L	97	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.6	0.6			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	1		.98	mg/L	98	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	250		248.8	mg/L	100	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.6	0.6			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	49.99771		49.49	mg/L	99	80	120			
L56147-04SDL	SDL	12/10/19 9:52			161	158.8	mg/L				1	10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	49.99771	67.7	119.96	mg/L	105	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	49.99771	67.7	118.26	mg/L	101	75	125	1	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	50		49.01	mg/L	98	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.6	0.6			
L56147-05DUP	DUP	12/10/19 10:14			67.7	67.66	mg/L				0	20	
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	50		49.01	mg/L	98	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.6	0.6			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	100		98.58	mg/L	99	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.6	0.6			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	1		.88	mg/L	88	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	250		250.8	mg/L	100	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.6	0.6			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	49.99771		50.25	mg/L	101	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	49.99771	75.3	127.66	mg/L	105	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	49.99771	75.3	126.84	mg/L	103	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	50		49.06	mg/L	98	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.6	0.6			
L56147-11SDL	SDL	12/11/19 14:54			246	245.1	mg/L				0	10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	50		48.83	mg/L	98	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.6	0.6			

Wood - E&I Solutions, Inc. ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Manganese (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.05301	mg/L	106	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0012	0.0012			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.002004		.00177	mg/L	88	70	130			
WG487763ICSA	ICSA	12/10/19 10:31		.00066		.00066	mg/L		-0.002	0.002			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02004		.01819	mg/L	91	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0012	0.0012			
L56147-03SDL	SDL	12/10/19 10:45			1.03	1.13575	mg/L				10	10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.0501	1.4	1.48822	mg/L	176	75	125			M3
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.0501	1.4	1.52318	mg/L	246	75	125	2	20	M3
L56147-05DUP	DUP	12/10/19 10:54			1.4	1.36421	mg/L				3	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1002		.10423	mg/L	104	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0012	0.0012			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.0501		.04839	mg/L	97	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1002		.10011	mg/L	100	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0012	0.0012			
WG487836													
WG487836ICV	ICV	12/10/19 15:29	MS191014-8	.05		.05132	mg/L	103	90	110			
WG487836ICB	ICB	12/10/19 15:31				U	mg/L		-0.0012	0.0012			
WG487836PQV	PQV	12/10/19 15:33	MS191014-4	.002004		.00177	mg/L	88	70	130			
WG487836ICSA	ICSA	12/10/19 15:35		.00056		.00056	mg/L		-0.002	0.002			
WG487836ICSAB	ICSAB	12/10/19 15:36	MS191119-7	.02004		.01904	mg/L	95	80	120			
WG487836CCV1	CCV	12/10/19 16:09	MS191028-2	.1002		.09679	mg/L	97	90	110			
WG487836CCB1	CCB	12/10/19 16:10				U	mg/L		-0.0012	0.0012			
WG487361PBS	PBS	12/10/19 16:12				U	mg/L		-0.0012	0.0012			
WG487361LFB2	LFB	12/10/19 16:14	MS191119-5	.0501		.04784	mg/L	95	80	120			
L56147-04SDL	SDL	12/10/19 16:19			9.41	9.265	mg/L				2	10	
L56147-05MS1	MS	12/10/19 16:23	MS191119-5	.0501	1.6	1.66	mg/L	120	75	125			
L56147-05MSD1	MSD	12/10/19 16:25	MS191119-5	.0501	1.6	1.53	mg/L	-140	75	125	8	20	M3
L56147-05DUP	DUP	12/10/19 16:27			1.6	1.55	mg/L				3	20	RA
WG487836CCV2	CCV	12/10/19 16:28	MS191028-2	.1002		.09669	mg/L	96	90	110			
WG487836CCB2	CCB	12/10/19 16:30				U	mg/L		-0.0012	0.0012			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04955	mg/L	99	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0012	0.0012			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.002004		.00171	mg/L	85	70	130			
WG488303ICSA	ICSA	12/17/19 12:31		.00051		.00051	mg/L		-0.002	0.002			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02004		.01924	mg/L	96	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0012	0.0012			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.0501	4.38	4.30274	mg/L	-154	75	125			M3
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.0501	4.38	4.39029	mg/L	21	75	125	2	20	M3
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.0501		.04713	mg/L	94	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1002		.09614	mg/L	96	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0012	0.0012			
WG487687PBS	PBS	12/17/19 12:59				.00078	mg/L		-0.0012	0.0012			
L56019-04SDL	SDL	12/17/19 13:08			.0025	.00255	mg/L				2	10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.0501		.04712	mg/L	94	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1002		.09354	mg/L	93	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0012	0.0012			

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ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

WG488444

WG488444ICV	ICV	12/18/19 14:25	MS191014-8	.05		.05013	mg/L	100	90	110			
WG488444ICB	ICB	12/18/19 14:27				U	mg/L		-0.0012	0.0012			
WG488444PQV	PQV	12/18/19 14:29	MS191014-4	.002004		.00168	mg/L	84	70	130			
WG488444ICSA	ICSA	12/18/19 14:31		.00046		.00046	mg/L		-0.002	0.002			
WG488444ICSAB	ICSAB	12/18/19 14:32	MS191119-7	.02004		.02031	mg/L	101	80	120			
WG488444CCV1	CCV	12/18/19 15:05	MS191209-4	.1002		.10198	mg/L	102	90	110			
WG488444CCB1	CCB	12/18/19 15:07				U	mg/L		-0.0012	0.0012			
WG487250PBS	PBS	12/18/19 15:09				U	mg/L		-0.0012	0.0012			
WG487250LFB2	LFB	12/18/19 15:11	MS191119-5	.0501		.05031	mg/L	100	80	120			
L56147-07MS	MS	12/18/19 15:14	MS191119-5	.0501	5.22	5.253	mg/L	66	75	125			M3
L56147-07MSD	MSD	12/18/19 15:16	MS191119-5	.0501	5.22	5.25	mg/L	60	75	125	0	20	M3
L56147-09SDL	SDL	12/18/19 15:21			17.7	17.955	mg/L				1	10	
WG488444CCV2	CCV	12/18/19 15:27	MS191209-4	.1002		.10212	mg/L	102	90	110			
WG488444CCB2	CCB	12/18/19 15:29				U	mg/L		-0.0012	0.0012			

WG488531

WG488531ICV	ICV	12/19/19 15:02	MS191014-8	.05		.05002	mg/L	100	90	110			
WG488531ICB	ICB	12/19/19 15:04				U	mg/L		-0.0012	0.0012			
WG488531PQV	PQV	12/19/19 15:06	MS191014-4	.002004		.00177	mg/L	88	70	130			
WG488531ICSA	ICSA	12/19/19 15:08		.00044		.00044	mg/L		-0.002	0.002			
WG488531ICSAB	ICSAB	12/19/19 15:10	MS191119-7	.02004		.01852	mg/L	92	80	120			
WG487250PBS	PBS	12/19/19 15:13				U	mg/L		-0.0012	0.0012			
WG487250LFB2	LFB	12/19/19 15:15	MS191119-5	.0501		.05021	mg/L	100	80	120			
L56147-07MS	MS	12/19/19 15:19	MS191119-5	.0501	5.11	5.139	mg/L	58	75	125			M3
L56147-07MSD	MSD	12/19/19 15:21	MS191119-5	.0501	5.11	5.074	mg/L	-72	75	125	1	20	M3
WG488531CCV1	CCV	12/19/19 15:26	MS191209-4	.1002		.10169	mg/L	101	90	110			
WG488531CCB1	CCB	12/19/19 15:28				U	mg/L		-0.0012	0.0012			
L56147-11SDL	SDL	12/19/19 15:30			19.8	18.695	mg/L				6	10	
WG488531CCV2	CCV	12/19/19 15:32	MS191209-4	.1002		.10194	mg/L	102	90	110			
WG488531CCB2	CCB	12/19/19 15:34				U	mg/L		-0.0012	0.0012			

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ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Mercury (MWMT) M7470 CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487523													
WG487523ICV	ICV	12/06/19 13:23	HG190911-3	.004995		.00503	mg/L	101	95	105			
WG487523ICB	ICB	12/06/19 13:24				U	mg/L		-0.0002	0.0002			
WG487527													
WG487527CCV	CCV	12/06/19 14:58	HG190911-3	.004995		.00495	mg/L	99	90	110			
WG487527CCB	CCB	12/06/19 14:59				U	mg/L		-0.0006	0.0006			
WG487527PQV	PQV	12/06/19 15:00	HG191125-2	.001001		.00106	mg/L	106	70	130			
WG487361PBS	PBS	12/06/19 15:01				U	mg/L		-0.0006	0.0006			
WG487361LFB1	LFB	12/06/19 15:02	HG191125-3	.002002		.00205	mg/L	102	85	115			
L56147-05MS2	MS	12/06/19 15:08	HG191125-3	.002002	.0002	.00219	mg/L	99	85	115			
L56147-05MSD2	MSD	12/06/19 15:09	HG191125-3	.002002	.0002	.00222	mg/L	101	85	115	1	20	
WG487527CCV1	CCV	12/06/19 15:10	HG190911-3	.004995		.0049	mg/L	98	90	110			
WG487527CCB1	CCB	12/06/19 15:11				U	mg/L		-0.0006	0.0006			
L56147-05DUP	DUP	12/06/19 15:12			.0002	.00038	mg/L				62	20	RA
WG487527CCV2	CCV	12/06/19 15:13	HG190911-3	.004995		.00496	mg/L	99	90	110			
WG487527CCB2	CCB	12/06/19 15:13				U	mg/L		-0.0006	0.0006			
WG487682													
WG487682ICV	ICV	12/09/19 15:18	HG190911-3	.004995		.005	mg/L	100	95	105			
WG487682ICB	ICB	12/09/19 15:19				U	mg/L		-0.0002	0.0002			
WG487685													
WG487685CCV	CCV	12/09/19 16:16	HG190911-3	.004995		.00489	mg/L	98	90	110			
WG487685CCB	CCB	12/09/19 16:17				U	mg/L		-0.0006	0.0006			
WG487685PQV	PQV	12/09/19 16:18	HG191206-2	.001001		.00089	mg/L	89	70	130			
WG487250PBS	PBS	12/09/19 16:19				U	mg/L		-0.0006	0.0006			
WG487250LFB1	LFB	12/09/19 16:20	HG191206-3	.002002		.00188	mg/L	94	85	115			
L56147-06MS	MS	12/09/19 16:22	HG191206-3	.002002	U	.0019	mg/L	95	85	115			
L56147-06MSD	MSD	12/09/19 16:22	HG191206-3	.002002	U	.00187	mg/L	93	85	115	2	20	
WG487685CCV1	CCV	12/09/19 16:27	HG190911-3	.004995		.00488	mg/L	98	90	110			
WG487685CCB1	CCB	12/09/19 16:28				U	mg/L		-0.0006	0.0006			
WG487685CCV2	CCV	12/09/19 16:30	HG190911-3	.004995		.00483	mg/L	97	90	110			
WG487685CCB2	CCB	12/09/19 16:31				U	mg/L		-0.0006	0.0006			

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ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Molybdenum (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.0199		.01999	mg/L	100	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0006	0.0006			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.000501		.00043	mg/L	86	70	130			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	1.02004		.97877	mg/L	96	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0006	0.0006			
L56147-03SDL	SDL	12/10/19 10:45			U	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.0501	U	.05008	mg/L	100	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.0501	U	.04884	mg/L	97	75	125	3	20	
L56147-05DUP	DUP	12/10/19 10:54			U	U	mg/L				0	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1002		.09181	mg/L	92	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0006	0.0006			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.0501		.04371	mg/L	87	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1002		.09202	mg/L	92	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0006	0.0006			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.0199		.01976	mg/L	99	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0006	0.0006			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.000501		.00042	mg/L	84	70	130			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	1.02004		.98028	mg/L	96	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0006	0.0006			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.0501	.0167	.06714	mg/L	101	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.0501	.0167	.06801	mg/L	102	75	125	1	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.0501		.04733	mg/L	94	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1002		.10016	mg/L	100	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0006	0.0006			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0006	0.0006			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.0501		.04742	mg/L	95	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1002		.09649	mg/L	96	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0006	0.0006			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Nickel (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.0527	mg/L	105	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0012	0.0012			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.001		.00087	mg/L	87	70	130			
WG487763ICSA	ICSA	12/10/19 10:31		.00051		.00051	mg/L		-0.001	0.001			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02		.01663	mg/L	83	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0012	0.0012			
L56147-03SDL	SDL	12/10/19 10:45			.103	.1076	mg/L				4	10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05	.128	.17888	mg/L	102	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05	.128	.18114	mg/L	106	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			.128	.12265	mg/L				4	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.25		.25606	mg/L	102	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0012	0.0012			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05		.0475	mg/L	95	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.25		.24099	mg/L	96	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0012	0.0012			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04918	mg/L	98	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0012	0.0012			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.001		.00084	mg/L	84	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.001	0.001			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02		.01693	mg/L	85	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0012	0.0012			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05	.0406	.08193	mg/L	83	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05	.0406	.08375	mg/L	86	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05		.04892	mg/L	98	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.25		.24351	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0012	0.0012			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0012	0.0012			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05		.04578	mg/L	92	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.25		.23087	mg/L	92	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0012	0.0012			

Wood - E&I Solutions, Inc. ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Nitrate/Nitrite as N (MWMT) M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487529													
WG487529ICV	ICV	12/05/19 21:17	WI191112-1	2.416		2.378	mg/L	98	90	110			
WG487529ICB	ICB	12/05/19 21:18				U	mg/L		-0.02	0.02			
WG487531													
WG487531CCV1	CCV	12/05/19 22:44	WI191203-3	2		2.06	mg/L	103	90	110			
WG487531CCB1	CCB	12/05/19 22:47				U	mg/L		-0.02	0.02			
WG487531LFB	LFB	12/05/19 22:48	WI191004-3	2		1.95	mg/L	98	90	110			
WG487361PBS	PBS	12/05/19 22:49				U	mg/L		-0.02	0.02			
L56147-05DUP	DUP	12/05/19 22:58			.16	.159	mg/L				1	20	RA
WG487531CCV2	CCV	12/05/19 23:01	WI191203-3	2		2.059	mg/L	103	90	110			
WG487531CCB2	CCB	12/05/19 23:04				U	mg/L		-0.02	0.02			
WG487641													
WG487641ICV	ICV	12/06/19 20:39	WI191112-1	2.416		2.405	mg/L	100	90	110			
WG487641ICB	ICB	12/06/19 20:41				U	mg/L		-0.02	0.02			
WG487643													
WG487643CCV1	CCV	12/06/19 21:52	WI191203-3	2		2.012	mg/L	101	90	110			
WG487643CCB1	CCB	12/06/19 21:55				U	mg/L		-0.02	0.02			
WG487643LFB	LFB	12/06/19 21:57	WI191004-3	2		2.029	mg/L	101	90	110			
WG487250PBS	PBS	12/06/19 21:58				U	mg/L		-0.02	0.02			
WG487643CCV2	CCV	12/06/19 22:11	WI191203-3	2		2.021	mg/L	101	90	110			
WG487643CCB2	CCB	12/06/19 22:14				U	mg/L		-0.02	0.02			

Nitrite as N (MWMT) M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487529													
WG487529ICV	ICV	12/05/19 21:17	WI191112-1	.609		.591	mg/L	97	90	110			
WG487529ICB	ICB	12/05/19 21:18				U	mg/L		-0.01	0.01			
WG487531													
WG487531CCV1	CCV	12/05/19 22:44	WI191203-3	1		.998	mg/L	100	90	110			
WG487531CCB1	CCB	12/05/19 22:47				U	mg/L		-0.01	0.01			
WG487531LFB	LFB	12/05/19 22:48	WI191004-3	1		.942	mg/L	94	90	110			
WG487361PBS	PBS	12/05/19 22:49				U	mg/L		-0.01	0.01			
L56147-05DUP	DUP	12/05/19 22:58			U	U	mg/L				0	20	RA
WG487531CCV2	CCV	12/05/19 23:01	WI191203-3	1		1.003	mg/L	100	90	110			
WG487531CCB2	CCB	12/05/19 23:04				U	mg/L		-0.01	0.01			
WG487641													
WG487641ICV	ICV	12/06/19 20:39	WI191112-1	.609		.592	mg/L	97	90	110			
WG487641ICB	ICB	12/06/19 20:41				U	mg/L		-0.01	0.01			
WG487643													
WG487643CCV1	CCV	12/06/19 21:52	WI191203-3	1		.992	mg/L	99	90	110			
WG487643CCB1	CCB	12/06/19 21:55				U	mg/L		-0.01	0.01			
WG487643LFB	LFB	12/06/19 21:57	WI191004-3	1		1.007	mg/L	101	90	110			
WG487250PBS	PBS	12/06/19 21:58				U	mg/L		-0.01	0.01			
WG487643CCV2	CCV	12/06/19 22:11	WI191203-3	1		.995	mg/L	100	90	110			
WG487643CCB2	CCB	12/06/19 22:14				U	mg/L		-0.01	0.01			

Wood - E&I Solutions, Inc. ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Nitrogen, total Kjeldahl (MWMT) M351.2 - Block Digestor

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG488144													
WG488144ICV	ICV	12/14/19 0:05	WI191122-6	4		3.77	mg/L	94	90	110			
WG488144ICB	ICB	12/14/19 0:06				U	mg/L		-0.1	0.1			
WG488147													
WG488147CCV1	CCV	12/14/19 1:45	WI191122-4	2.5		2.33	mg/L	93	90	110			
WG488147CCB1	CCB	12/14/19 1:46				U	mg/L		-0.1	0.1			
WG487708PBS	PBS	12/14/19 1:47				U	mg/Kg		-0.1	0.1			
WG487708LFB	LFB	12/14/19 1:48	WI191023-2	2.5		2.46	mg/Kg	98	85	115			
WG487250PBS	PBS	12/14/19 1:49				U	mg/Kg		-0.1	0.1			
L56147-06MS	MS	12/14/19 1:52	WI191023-2	2.5	.2	2.55	mg/Kg	94	75	125			
WG488147CCV2	CCV	12/14/19 1:58	WI191122-4	2.5		2.43	mg/L	97	90	110			
WG488147CCB2	CCB	12/14/19 1:59				U	mg/L		-0.1	0.1			
WG487361PBS	PBS	12/14/19 2:01				U	mg/Kg		-0.1	0.1			
WG488147CCV3	CCV	12/14/19 2:10	WI191122-4	2.5		2.42	mg/L	97	90	110			
WG488147CCB3	CCB	12/14/19 2:11				U	mg/L		-0.1	0.1			

Ph M9045D/M9040C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG488745													
WG488745ICV	ICV	12/04/19 11:10	PCN58503	4		4	units	100	3.9	4.1			
WG487361PBS	PBS	12/04/19 11:54				5.9	units						
WG488745CCV	CCV	12/04/19 16:59	PCN58503	4		4	units	100	3.9	4.1			
WG488758													
WG488758ICV	ICV	12/05/19 11:10	PCN58503	4		4	units	100	3.9	4.1			
WG487250PBS	PBS	12/05/19 11:54				6.4	units						
WG488758CCV	CCV	12/05/19 16:59	PCN58503	4		4.1	units	103	3.9	4.1			
WG488325													
WG488325ICV	ICV	12/17/19 13:24	PCN58503	4		4	units	100	3.9	4.1			
L56147-05DUP	DUP	12/17/19 14:52			4.1	4.2	units				2	20	
WG488325CCV1	CCV	12/17/19 16:05	PCN58503	4		4	units	100	3.9	4.1			
WG488325CCV2	CCV	12/17/19 16:49	PCN58503	4		4	units	100	3.9	4.1			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Phosphorus (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	5.0075		4.91	mg/L	98	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.3	0.3			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.502		.55	mg/L	110	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	5.02		4.87	mg/L	97	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.3	0.3			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	1.004		1.09	mg/L	109	80	120			
L56147-04SDL	SDL	12/10/19 9:52			U	U	mg/L					10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	1.004	U	.97	mg/L	97	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	1.004	U	.97	mg/L	97	75	125	0	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	2.50375		2.48	mg/L	99	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.3	0.3			
L56147-05DUP	DUP	12/10/19 10:14			U	U	mg/L				0	20	RA
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	2.50375		2.5	mg/L	100	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.3	0.3			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	5.0075		5.04	mg/L	101	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.3	0.3			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.502		.55	mg/L	110	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	5.02		4.87	mg/L	97	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.3	0.3			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	1.004		1.04	mg/L	104	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	1.004	U	1.03	mg/L	103	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	1.004	U	1.04	mg/L	104	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	2.50375		2.57	mg/L	103	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.3	0.3			
L56147-11SDL	SDL	12/11/19 14:54			U	U	mg/L					10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	2.50375		2.54	mg/L	101	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.3	0.3			

Wood - E&I Solutions, Inc. ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Potassium (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	20		19.99	mg/L	100	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.6	0.6			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	1		1.03	mg/L	103	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	25		25.92	mg/L	104	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.6	0.6			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	99.95798		101.4	mg/L	101	80	120			
L56147-04SDL	SDL	12/10/19 9:52			37.4	36.2	mg/L				3	10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	99.95798	9.1	114.8	mg/L	106	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	99.95798	9.1	112.98	mg/L	104	75	125	2	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	10		9.99	mg/L	100	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.6	0.6			
L56147-05DUP	DUP	12/10/19 10:14			9.1	7.82	mg/L				15	20	
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	10		10.05	mg/L	101	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.6	0.6			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	20		20.27	mg/L	101	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.6	0.6			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	1		.94	mg/L	94	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	25		26.15	mg/L	105	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.6	0.6			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	99.95798		103.9	mg/L	104	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	99.95798	41.3	148.22	mg/L	107	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	99.95798	41.3	147.7	mg/L	106	75	125	0	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	10		10.12	mg/L	101	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.6	0.6			
L56147-11SDL	SDL	12/11/19 14:54			37.8	36.3	mg/L				4	10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	10		9.99	mg/L	100	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.6	0.6			

Residue, Filterable (TDS) @180C (MWMT) SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487514													
WG487514PBW	PBW	12/05/19 16:25				U	mg/L		-40	40			
WG487514LCSW	LCSW	12/05/19 16:27	PCN59816	1000		990	mg/L	99	80	120			
WG487361PBS	PBS	12/05/19 16:30				U	mg/L		-60	60			
L56147-05DUP	DUP	12/05/19 16:45			3540	3640	mg/L				3	10	
WG487618													
WG487618PBW	PBW	12/06/19 14:10				U	mg/L		-40	40			
WG487618LCSW	LCSW	12/06/19 14:12	PCN59816	1000		952	mg/L	95	80	120			
WG487250PBS	PBS	12/06/19 14:14				U	mg/L		-60	60			
L56147-11DUP	DUP	12/06/19 14:29			3740	3720	mg/L				1	10	

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Selenium (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.05191	mg/L	104	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0003	0.0003			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.00025025		.00022	mg/L	88	70	130			
WG487763ICSA	ICSA	12/10/19 10:31		.00015		.00015	mg/L		-0.0003	0.0003			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02002		.01731	mg/L	86	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0003	0.0003			
L56147-03SDL	SDL	12/10/19 10:45			.0028	.0027	mg/L				4	10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05005	.0162	.07198	mg/L	111	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05005	.0162	.07131	mg/L	110	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			.0162	.01667	mg/L				3	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.25		.25048	mg/L	100	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0003	0.0003			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05005		.0469	mg/L	94	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.25		.2353	mg/L	94	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0003	0.0003			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04852	mg/L	97	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0003	0.0003			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.00025025		.00023	mg/L	92	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.0003	0.0003			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02002		.01831	mg/L	91	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0003	0.0003			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05005	.0935	.13697	mg/L	87	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05005	.0935	.14627	mg/L	105	75	125	7	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05005		.04752	mg/L	95	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.25		.2498	mg/L	100	90	110			
WG488303CCB1	CCB	12/17/19 12:57				.00013	mg/L		-0.0003	0.0003			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0003	0.0003			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05005		.04809	mg/L	96	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.25		.23062	mg/L	92	90	110			
WG488303CCB2	CCB	12/17/19 13:19				.00013	mg/L		-0.0003	0.0003			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Silver (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.02004		.02175	mg/L	109	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0003	0.0003			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.000501		.00043	mg/L	86	70	130			
WG487763ICSA	ICSA	12/10/19 10:31				U	mg/L		-0.0005	0.0005			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.01002		.00919	mg/L	92	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0003	0.0003			
L56147-03SDL	SDL	12/10/19 10:45			U	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.01002	U	.00932	mg/L	93	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.01002	U	.00924	mg/L	92	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			U	U	mg/L				0	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.02505		.02461	mg/L	98	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0003	0.0003			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.01002		.00972	mg/L	97	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.02505		.02403	mg/L	96	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0003	0.0003			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.02004		.01989	mg/L	99	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0003	0.0003			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.000501		.00044	mg/L	88	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.0005	0.0005			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.01002		.00892	mg/L	89	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0003	0.0003			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.01002	U	.00897	mg/L	90	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.01002	U	.00914	mg/L	91	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.01002		.00979	mg/L	98	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.02505		.02434	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0003	0.0003			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0003	0.0003			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.01002		.00982	mg/L	98	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.02505		.02324	mg/L	93	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0003	0.0003			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Sodium (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	100		99.04	mg/L	99	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.6	0.6			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.999		1.07	mg/L	107	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	24.975		26.25	mg/L	105	80	120			
WG487361PBS	PBS	12/10/19 9:30				.36	mg/L		-0.6	0.6			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	100.0046		101	mg/L	101	80	120			
L56147-04SDL	SDL	12/10/19 9:52			92.3	90.25	mg/L				2	10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	100.0046	19.6	125.42	mg/L	106	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	100.0046	19.6	123.42	mg/L	104	75	125	2	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	50		49.61	mg/L	99	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.6	0.6			
L56147-05DUP	DUP	12/10/19 10:14			19.6	19.98	mg/L				2	20	
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	50		49.94	mg/L	100	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.6	0.6			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	100		100.9	mg/L	101	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.6	0.6			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.999		1.04	mg/L	104	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	24.975		26.38	mg/L	106	80	120			
WG487250PBS	PBS	12/11/19 14:10				.28	mg/L		-0.6	0.6			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	100.0046		102.7	mg/L	103	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	100.0046	59.3	165.14	mg/L	106	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	100.0046	59.3	164.66	mg/L	105	75	125	0	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	50		50.05	mg/L	100	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.6	0.6			
L56147-11SDL	SDL	12/11/19 14:54			68.1	66.9	mg/L				2	10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	50		49.67	mg/L	99	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.6	0.6			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Strontium (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	2		1.963	mg/L	98	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.027	0.027			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.045135		.0463	mg/L	103	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	.5015		.4945	mg/L	99	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.027	0.027			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	.5015		.508	mg/L	101	80	120			
L56147-04SDL	SDL	12/10/19 9:52			3.07	3.04	mg/L				1	10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	.5015	.9	1.436	mg/L	107	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	.5015	.9	1.414	mg/L	102	75	125	2	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	1		.9914	mg/L	99	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.027	0.027			
L56147-05DUP	DUP	12/10/19 10:14			.9	.83	mg/L				8	20	
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	1		.9973	mg/L	100	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.027	0.027			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	2		1.964	mg/L	98	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.027	0.027			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.045135		.0488	mg/L	108	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	.5015		.4896	mg/L	98	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.027	0.027			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	.5015		.5111	mg/L	102	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	.5015	2.89	3.482	mg/L	118	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	.5015	2.89	3.452	mg/L	112	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	1		.989	mg/L	99	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.027	0.027			
L56147-11SDL	SDL	12/11/19 14:54			2.63	2.65	mg/L				1	10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	1		.9779	mg/L	98	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.027	0.027			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Sulfate (MWMT) D516-07 - Turbidimetric

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487938													
WG487938ICB	ICB	12/12/19 12:55				U	mg/L		-3	3			
WG487938ICV	ICV	12/12/19 12:55	WI191204-6	20		20.6	mg/L	103	90	110			
WG487938CCV1	CCV	12/12/19 14:39	WI191204-5	25.025		25.4	mg/L	101	90	110			
WG487938CCB1	CCB	12/12/19 14:39				U	mg/L		-3	3			
WG487938LFB	LFB	12/12/19 14:39	WI190801-3	10.01		9.6	mg/L	96	90	110			
WG487250PBS	PBS	12/12/19 14:39				U	mg/L		-3	3			
WG487938CCV2	CCV	12/12/19 14:46	WI191204-5	25.025		26.5	mg/L	106	90	110			
WG487938CCB2	CCB	12/12/19 14:46				U	mg/L		-3	3			
L56147-11AS	AS	12/12/19 14:52	SO4TURB	10	2300	2350	mg/L	500	90	110			M3
L56147-11DUP	DUP	12/12/19 14:52			2300	2080	mg/L				10	20	
WG487938CCV3	CCV	12/12/19 14:53	WI191204-5	25.025		25.2	mg/L	101	90	110			
WG487938CCB3	CCB	12/12/19 14:53				U	mg/L		-3	3			
WG487929													
WG487929ICB	ICB	12/12/19 12:55				U	mg/L		-3	3			
WG487929ICV	ICV	12/12/19 12:55	WI191204-6	20		20.6	mg/L	103	90	110			
WG487929CCV1	CCV	12/12/19 13:06	WI191204-5	25.025		25.7	mg/L	103	90	110			
WG487929CCB1	CCB	12/12/19 13:06				U	mg/L		-3	3			
WG487929CCV2	CCV	12/12/19 13:10	WI191204-5	25.025		26.4	mg/L	105	90	110			
WG487929CCB2	CCB	12/12/19 13:10				U	mg/L		-3	3			
WG487929CCV3	CCV	12/12/19 13:11	WI191204-5	25.025		26.7	mg/L	107	90	110			
WG487929CCB3	CCB	12/12/19 13:11				U	mg/L		-3	3			
WG487929CCV4	CCV	12/12/19 13:14	WI191204-5	25.025		26.5	mg/L	106	90	110			
WG487929CCB4	CCB	12/12/19 13:14				U	mg/L		-3	3			
WG487929CCV5	CCV	12/12/19 13:53	WI191204-5	25.025		26.9	mg/L	107	90	110			
WG487929CCB5	CCB	12/12/19 13:53				U	mg/L		-3	3			
WG487929LFB	LFB	12/12/19 13:57	WI190801-3	10.01		9.6	mg/L	96	90	110			
WG486679PBS	PBS	12/12/19 13:57				U	mg/L		-3	3			
WG486802PBS	PBS	12/12/19 13:57				U	mg/L		-3	3			
L55827-03DUP	DUP	12/12/19 13:57			11.3	12.8	mg/L				12	20	
WG487250PBS	PBS	12/12/19 13:57				U	mg/L		-3	3			
WG487361PBS	PBS	12/12/19 13:57				U	mg/L		-3	3			
WG487687PBS	PBS	12/12/19 13:57				U	mg/L		-3	3			
WG487929CCV6	CCV	12/12/19 13:59	WI191204-5	25.025		27.4	mg/L	109	90	110			
WG487929CCB6	CCB	12/12/19 13:59				U	mg/L		-3	3			
WG487929CCV7	CCV	12/12/19 14:04	WI191204-5	25.025		26.5	mg/L	106	90	110			
WG487929CCB7	CCB	12/12/19 14:04				U	mg/L		-3	3			
WG487929CCV8	CCV	12/12/19 14:06	WI191204-5	25.025		25.2	mg/L	101	90	110			
WG487929CCB8	CCB	12/12/19 14:06				U	mg/L		-3	3			
WG487929CCV9	CCV	12/12/19 14:09	WI191204-5	25.025		25	mg/L	100	90	110			
WG487929CCB9	CCB	12/12/19 14:09				U	mg/L		-3	3			
WG487929CCV10	CCV	12/12/19 14:29	WI191204-5	25.025		26.6	mg/L	106	90	110			
WG487929CCB10	CCB	12/12/19 14:29				U	mg/L		-3	3			
L56147-05DUP	DUP	12/12/19 14:30			1960	2130	mg/L				8	20	
WG487929CCV11	CCV	12/12/19 14:31	WI191204-5	25.025		25.1	mg/L	100	90	110			
WG487929CCB11	CCB	12/12/19 14:31				U	mg/L		-3	3			
WG487929CCV12	CCV	12/12/19 17:20	WI191204-5	25.025		26.6	mg/L	106	90	110			
WG487929CCB12	CCB	12/12/19 17:20				1.8	mg/L		-3	3			BA
WG487929CCV13	CCV	12/12/19 17:26	WI191204-5	25.025		25.7	mg/L	103	90	110			
WG487929CCB13	CCB	12/12/19 17:26				1.7	mg/L		-3	3			BA

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ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Thallium (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.05446	mg/L	109	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0003	0.0003			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.000501		.00044	mg/L	88	70	130			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02004		.01831	mg/L	91	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0003	0.0003			
L56147-03SDL	SDL	12/10/19 10:45			.0003	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.0501	.0002	.05223	mg/L	104	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.0501	.0002	.05175	mg/L	103	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			.0002	.00021	mg/L				5	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1002		.09847	mg/L	98	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0003	0.0003			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.0501		.046	mg/L	92	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1002		.09581	mg/L	96	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0003	0.0003			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.05046	mg/L	101	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0003	0.0003			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.000501		.00042	mg/L	84	70	130			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02004		.0199	mg/L	99	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0003	0.0003			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.0501	U	.05119	mg/L	102	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.0501	U	.05247	mg/L	105	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.0501		.04588	mg/L	92	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1002		.09719	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0003	0.0003			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0003	0.0003			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.0501		.04739	mg/L	95	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1002		.09556	mg/L	95	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0003	0.0003			

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ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Thorium (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.0551	mg/L	110	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.003	0.003			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.005		.0048	mg/L	96	70	130			
WG487763ICSA	ICSA	12/10/19 10:31				U	mg/L		-0.005	0.005			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.05		.0466	mg/L	93	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.003	0.003			
L56147-03SDL	SDL	12/10/19 10:45			U	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05	U	.0515	mg/L	103	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05	U	.0534	mg/L	107	75	125	4	20	
L56147-05DUP	DUP	12/10/19 10:54			U	U	mg/L				0	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1		.1046	mg/L	105	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.003	0.003			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05		.0489	mg/L	98	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1		.1021	mg/L	102	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.003	0.003			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.0491	mg/L	98	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.003	0.003			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.005		.0041	mg/L	82	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.005	0.005			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.05		.0482	mg/L	96	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.003	0.003			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05	U	.0518	mg/L	104	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05	U	.0536	mg/L	107	75	125	3	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05		.0457	mg/L	91	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1		.0966	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.003	0.003			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.003	0.003			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05		.0475	mg/L	95	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1		.0948	mg/L	95	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.003	0.003			

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ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Tin (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	2		2.069	mg/L	103	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.12	0.12			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.2004		.236	mg/L	118	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	2.505		2.519	mg/L	101	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.12	0.12			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	1.002		1.053	mg/L	105	80	120			
L56147-04SDL	SDL	12/10/19 9:52			U	U	mg/L					10	
L56147-05MS2	MS	12/10/19 9:59	II191127-2	1.002	U	1.067	mg/L	106	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	1.002	U	1.042	mg/L	104	75	125	2	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	1		1.071	mg/L	107	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.12	0.12			
L56147-05DUP	DUP	12/10/19 10:14			U	U	mg/L				0	20	RA
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	1		1.065	mg/L	107	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.12	0.12			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	2		1.953	mg/L	98	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.12	0.12			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.2004		.214	mg/L	107	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	2.505		2.352	mg/L	94	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.12	0.12			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	1.002		1.032	mg/L	103	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	1.002	U	.977	mg/L	98	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	1.002	U	1.006	mg/L	100	75	125	3	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	1		1.054	mg/L	105	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.12	0.12			
L56147-11SDL	SDL	12/11/19 14:54			U	U	mg/L					10	
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	1		1.012	mg/L	101	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.12	0.12			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Titanium (MWMT) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487738													
WG487738ICV	ICV	12/10/19 9:03	II191122-1	2		2.02	mg/L	101	90	110			
WG487738ICB	ICB	12/10/19 9:07				U	mg/L		-0.015	0.015			
WG487738PQV	PQV	12/10/19 9:10	II191202-2	.024925		.024	mg/L	96	70	130			
WG487738ICSAB	ICSAB	12/10/19 9:14	II191127-4	.4985		.5204	mg/L	104	80	120			
WG487361PBS	PBS	12/10/19 9:30				U	mg/L		-0.015	0.015			
WG487361LFB1	LFB	12/10/19 9:33	II191127-2	1		1.037	mg/L	104	80	120			
L56147-04SDL	SDL	12/10/19 9:52			.07	.095	mg/L				36	10	ZG
L56147-05MS2	MS	12/10/19 9:59	II191127-2	1	.08	1.12	mg/L	104	75	125			
L56147-05MSD2	MSD	12/10/19 10:03	II191127-2	1	.08	1.106	mg/L	103	75	125	1	20	
WG487738CCV1	CCV	12/10/19 10:07	II191204-1	1		1.028	mg/L	103	90	110			
WG487738CCB1	CCB	12/10/19 10:10				U	mg/L		-0.015	0.015			
L56147-05DUP	DUP	12/10/19 10:14			.08	.078	mg/L				3	20	RA
WG487738CCV2	CCV	12/10/19 10:18	II191204-1	1		1.029	mg/L	103	90	110			
WG487738CCB2	CCB	12/10/19 10:21				U	mg/L		-0.015	0.015			
WG487888													
WG487888ICV	ICV	12/11/19 13:43	II191209-2	2		1.984	mg/L	99	90	110			
WG487888ICB	ICB	12/11/19 13:47				U	mg/L		-0.015	0.015			
WG487888PQV	PQV	12/11/19 13:51	II191202-2	.024925		.0267	mg/L	107	70	130			
WG487888ICSAB	ICSAB	12/11/19 13:55	II191127-4	.4985		.5181	mg/L	104	80	120			
WG487250PBS	PBS	12/11/19 14:10				U	mg/L		-0.015	0.015			
WG487250LFB1	LFB	12/11/19 14:14	II191127-2	1		1.032	mg/L	103	80	120			
L56147-06MS	MS	12/11/19 14:21	II191127-2	1	.07	1.092	mg/L	102	75	125			
L56147-06MSD	MSD	12/11/19 14:25	II191127-2	1	.07	1.098	mg/L	103	75	125	1	20	
WG487888CCV1	CCV	12/11/19 14:47	II191204-1	1		1.012	mg/L	101	90	110			
WG487888CCB1	CCB	12/11/19 14:51				U	mg/L		-0.015	0.015			
L56147-11SDL	SDL	12/11/19 14:54			.07	.12	mg/L				71	10	ZG
WG487888CCV2	CCV	12/11/19 14:58	II191204-1	1		1.015	mg/L	102	90	110			
WG487888CCB2	CCB	12/11/19 15:02				U	mg/L		-0.015	0.015			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Uranium (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.0541	mg/L	108	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0003	0.0003			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.0005		.00045	mg/L	90	70	130			
WG487763ICSA	ICSA	12/10/19 10:31				U	mg/L		-0.0005	0.0005			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02		.01837	mg/L	92	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0003	0.0003			
L56147-03SDL	SDL	12/10/19 10:45			.0167	.016	mg/L				4	10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05	.0193	.07106	mg/L	104	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05	.0193	.07134	mg/L	104	75	125	0	20	
L56147-05DUP	DUP	12/10/19 10:54			.0193	.01854	mg/L				4	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1		.10421	mg/L	104	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0003	0.0003			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05		.0486	mg/L	97	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1		.10127	mg/L	101	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0003	0.0003			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04973	mg/L	99	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0003	0.0003			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.0005		.00042	mg/L	84	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.0005	0.0005			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02		.02098	mg/L	105	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0003	0.0003			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05	.0236	.0731	mg/L	99	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05	.0236	.07425	mg/L	101	75	125	2	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05		.04587	mg/L	92	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1		.09653	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0003	0.0003			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0003	0.0003			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05		.04732	mg/L	95	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1		.095	mg/L	95	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0003	0.0003			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Vanadium (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.05186	mg/L	104	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.0015	0.0015			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.002		.00179	mg/L	90	70	130			
WG487763ICSA	ICSA	12/10/19 10:31				U	mg/L		-0.002	0.002			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02		.01807	mg/L	90	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.0015	0.0015			
L56147-03SDL	SDL	12/10/19 10:45			U	U	mg/L					10	
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.05	U	.0476	mg/L	95	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.05	U	.0481	mg/L	96	75	125	1	20	
L56147-05DUP	DUP	12/10/19 10:54			U	U	mg/L				0	20	RA
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.1		.09949	mg/L	99	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.0015	0.0015			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.05		.04679	mg/L	94	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.1		.0944	mg/L	94	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.0015	0.0015			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.04759	mg/L	95	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.0015	0.0015			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.002		.00164	mg/L	82	70	130			
WG488303ICSA	ICSA	12/17/19 12:31				U	mg/L		-0.002	0.002			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02		.01841	mg/L	92	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.0015	0.0015			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.05	U	.046	mg/L	92	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.05	U	.0476	mg/L	95	75	125	3	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.05		.04851	mg/L	97	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.1		.09654	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.0015	0.0015			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.0015	0.0015			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.05		.04661	mg/L	93	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.1		.0924	mg/L	92	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.0015	0.0015			

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Zinc (MWMT) M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG487763													
WG487763ICV	ICV	12/10/19 10:26	MS191014-8	.05		.0522	mg/L	104	90	110			
WG487763ICB	ICB	12/10/19 10:27				U	mg/L		-0.012	0.012			
WG487763PQV	PQV	12/10/19 10:29	MS191014-4	.010015		.009	mg/L	90	70	130			
WG487763ICSAB	ICSAB	12/10/19 10:33	MS191119-7	.02003		.0203	mg/L	101	80	120			
WG487361PBS	PBS	12/10/19 10:38				U	mg/L		-0.012	0.012			
L56147-03SDL	SDL	12/10/19 10:45			.157	.1815	mg/L				16	10	ZG
L56147-05MS1	MS	12/10/19 10:50	MS191119-5	.050075	.214	.267	mg/L	106	75	125			
L56147-05MSD1	MSD	12/10/19 10:52	MS191119-5	.050075	.214	.2746	mg/L	121	75	125	3	20	
L56147-05DUP	DUP	12/10/19 10:54			.214	.2188	mg/L				2	20	
WG487763CCV1	CCV	12/10/19 10:56	MS191209-4	.50075		.5352	mg/L	107	90	110			
WG487763CCB1	CCB	12/10/19 10:58				U	mg/L		-0.012	0.012			
WG487361LFB2	LFB	12/10/19 10:59	MS191119-5	.050075		.0513	mg/L	102	80	120			
WG487763CCV2	CCV	12/10/19 11:01	MS191209-4	.50075		.5121	mg/L	102	90	110			
WG487763CCB2	CCB	12/10/19 11:03				U	mg/L		-0.012	0.012			
WG488303													
WG488303ICV	ICV	12/17/19 12:25	MS191014-8	.05		.0504	mg/L	101	90	110			
WG488303ICB	ICB	12/17/19 12:27				U	mg/L		-0.012	0.012			
WG488303PQV	PQV	12/17/19 12:29	MS191014-4	.010015		.0086	mg/L	86	70	130			
WG488303ICSAB	ICSAB	12/17/19 12:32	MS191119-7	.02003		.0207	mg/L	103	80	120			
WG487250PBS	PBS	12/17/19 12:38				U	mg/L		-0.012	0.012			
L56147-07MS	MS	12/17/19 12:43	MS191119-5	.050075	.017	.0581	mg/L	82	75	125			
L56147-07MSD	MSD	12/17/19 12:45	MS191119-5	.050075	.017	.06	mg/L	86	75	125	3	20	
WG487250LFB2	LFB	12/17/19 12:54	MS191119-5	.050075		.0491	mg/L	98	80	120			
WG488303CCV1	CCV	12/17/19 12:56	MS191209-4	.50075		.4848	mg/L	97	90	110			
WG488303CCB1	CCB	12/17/19 12:57				U	mg/L		-0.012	0.012			
WG487687PBS	PBS	12/17/19 12:59				U	mg/L		-0.012	0.012			
L56019-04SDL	SDL	12/17/19 13:08			U	U	mg/L					10	
WG487687LFB2	LFB	12/17/19 13:15	MS191119-5	.050075		.0498	mg/L	99	80	120			
WG488303CCV2	CCV	12/17/19 13:17	MS191209-4	.50075		.4704	mg/L	94	90	110			
WG488303CCB2	CCB	12/17/19 13:19				U	mg/L		-0.012	0.012			

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB27_0.5-3
Locator:

ACZ Sample ID: ***L56147-01***
Date Sampled: *11/21/19 9:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:02	J D	1.3	0.32	0.4	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/13/19 16:29		✓ 3.8 U 9	2.7 ✓	7.1	pCi/L	*	in

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RadioChemistry Analytical Results

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB27_6-15
Locator:

ACZ Sample ID: ***L56147-02***
Date Sampled: *11/21/19 9:55*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:05	J D	1.3 ✓	0.33 ✓	0.24	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/13/19 16:29		0.99 U 9	2.4	5.6	pCi/L	*	in

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB28_0.5-3
Locator:

ACZ Sample ID: ***L56147-03***
Date Sampled: *11/21/19 11:55*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:07	J D	0.87	0.37	0.55	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/13/19 16:29		-0.64 U 9	2.5	6.1	pCi/L	*	in

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB28_6-15
Locator:

ACZ Sample ID: ***L56147-04***
Date Sampled: *11/21/19 12:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:08	J D	0.96 ✓	0.33 ✓	0.43	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/13/19 16:29		2.1 U 9	2.7	6	pCi/L	*	in

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29_0.5-3
Locator:

ACZ Sample ID: ***L56147-05***
Date Sampled: *11/21/19 15:10*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:10	J D	1.3	0.36	0.23	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/13/19 16:29	U 9	2.8 ✓	2.5 ✓	6	pCi/L	*	in

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29_6-15
Locator:

ACZ Sample ID: ***L56147-06***
Date Sampled: *11/21/19 15:45*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:02		1 UJ 2	0.25	0.26	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/18/19 13:57		5.9 U 9	3.1	7.3	pCi/L	*	amk

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RadioChemistry Analytical Results

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB29-FD_6-15
Locator:

ACZ Sample ID: ***L56147-07***
Date Sampled: *11/21/19 15:50*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date		Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:04		UJ 2	0.99 ✓	0.25 ✓	0.43	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/18/19 13:57		4.2	1.9	4.1	pCi/L	*	amk

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB30_0.5-3
Locator:

ACZ Sample ID: ***L56147-08***
Date Sampled: *11/22/19 9:02*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:05		UJ 2 1	0.26	0.38	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/18/19 13:57		U 9 0.91 ✓	1.7 ✓	4.2	pCi/L	*	amk

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB30_6-15
Locator:

ACZ Sample ID: ***L56147-09***
Date Sampled: *11/22/19 9:25*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:08		1.4 ✓	0.31 ✓	0.27	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/18/19 13:57		3.4 U 9	1.8	4.1	pCi/L	*	amk

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB31_0.5-3
Locator:

ACZ Sample ID: ***L56147-10***
Date Sampled: *11/22/19 12:03*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date		Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:11		UJ 2	0.64	0.27	0.27	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date		Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/18/19 13:57		U 9	3.4 ✓	2 ✓	4.5	pCi/L	*	amk

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RadioChemistry Analytical Results

Wood - E&I Solutions, Inc.
Project ID:
Sample ID: STSB31_6-15
Locator:

ACZ Sample ID: ***L56147-11***
Date Sampled: *11/22/19 12:20*
Date Received: *11/26/19*
Sample Matrix: *Soil*

Radium 226 (MWMT) Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226 (MWMT)	12/19/19 0:12		6.9 ✓	0.58 ✓	0.52	pCi/L	*	jlg

Radium 228 (MWMT) Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228 (MWMT)	12/18/19 13:57		2	U 9 2.2	4.9	pCi/L	*	amk

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Error(+/-)	Calculated sample specific uncertainty
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
LCL	Lower Control Limit, in % (except for LCSS, mg/Kg)
LLD	Calculated sample specific Lower Limit of Detection
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RER	Relative Error Ratio, calculation used for Dup. QC taking into account the error factor.
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
UCL	Upper Control Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

DUP	Sample Duplicate	*MS/MSD*	Matrix Spike/Matrix Spike Duplicate
LCSS	Laboratory Control Sample - Soil	*PBS*	Prep Blank - Soil
LCSW	Laboratory Control Sample - Water	*PBW*	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Matrix Spikes	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

H	Analysis exceeded method hold time.

Method Prefix Reference

M	EPA methodology, including those under SDWA, CWA, and RCRA
SM	Standard Methods for the Examination of Water and Wastewater.
D	ASTM
RP	DOE
ESM	DOE/ESM

Comments

(1) Solid matrices are reported on a dry weight basis.

(2) Preparation method: "Method" indicates preparation defined in analytical method.

(3) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.

(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click:

https://acz.com/wp-content/uploads/2019/04/Ext-Qual-List.pdf

Wood - E&I Solutions, Inc.

ACZ Project ID: ***L56147***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Radium 226 (MWMT) M903.1 **Units:** pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec%	Lower	Upper	RPD/RER	Limit	Qual
WG487795																
WG487361PBW	PBW	12/19/19						.24	0.28	0.67			1.34			
WG487361LCSW	LCSW	12/19/19	PCN57864	66.67				71	2.1	0.44	107	43	148			
L56147-01DUP	DUP-RPD	12/19/19			1.3	0.32	0.4	.73	0.3	0.5				56	20	RG
L56147-01DUP	DUP-RER	12/19/19			1.3	0.32	0.4	.73	0.3	0.5				1.3	2	
L56147-05MS	MS	12/19/19	PCN57864	66.67	1.3	0.36	0.23	84	1.9	0.29	124	43	148			
WG487796																
WG487250PBW	PBW	12/19/19						.65	0.3	0.34			0.68			
WG487250LCSW	LCSW	12/19/19	PCN57864	66.67				62	2	0.57	93	43	148			
L56147-08DUP	DUP-RPD	12/19/19			1	0.26	0.38	1.3	0.31	0.2				26	20	RG
L56147-08DUP	DUP-RER	12/19/19			1	0.26	0.38	1.3	0.31	0.2				0.74	2	
L56147-09MS	MS	12/19/19	PCN57864	66.67	1.4	0.31	0.27	62	1.7	0.33	91	43	148			

Radium 228 (MWMT) M9320 **Units:** pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec%	Lower	Upper	RPD/RER	Limit	Qual
WG488103																
WG487361LCSW	LCSW	12/13/19	PCN57186	28.44				27	3.6	6	95	47	123			
L56147-05DUP	DUP-RER	12/13/19			2.8	2.5	6	1.6	2.5	5.8				0.34	2	
WG487361PBW	PBW	12/13/19						-.14	2.7	6.5			13			
L56147-05DUP	DUP-RPD	12/13/19			2.8	2.5	6	1.6	2.5	5.8				55	20	RG
L56147-01MS	MS	12/13/19	PCN57186	28.44	3.8	2.7	7.1	31	4	6.8	96	47	123			
WG488110																
L56147-09DUP	DUP-RPD	12/18/19			3.4	1.8	4.1	4.4	1.9	4.3				26	20	RG
L56147-08MS	MS	12/18/19	PCN57186	21.84	0.91	1.7	4.2	21	2.5	4.1	92	47	123			
L56147-09DUP	DUP-RER	12/18/19			3.4	1.8	4.1	4.4	1.9	4.3				0.38	2	
WG487250LCSW	LCSW	12/18/19	PCN57186	21.3				20	2.4	4.1	94	47	123			
WG487250PBW	PBW	12/18/19						.8	2.3	5.5			11			

Metals Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Thorium (MWMT)	M6020B ICP-MS

Radiochemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Radium 226 (MWMT)	M903.1
Radium 228 (MWMT)	M9320

Wet Chemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Bicarbonate as CaCO3	SM2320B - Titration
Carbonate as CaCO3	SM2320B - Titration
Chloride (MWMT)	SM4500Cl-E
Cyanide, WAD (MWMT)	SM4500-CN I,E-Colorimetric w/ distillation
Fluoride (MWMT)	SM4500F-C
Hydroxide as CaCO3	SM2320B - Titration
Nitrate/Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction
Nitrite as N (MWMT)	M353.2 - Automated Cadmium Reduction
Nitrogen, total Kjeldahl (MWMT)	M351.2 - Block Digestor
Residue, Filterable (TDS) @180C (MWMT)	SM2540C
Sulfate (MWMT)	D516-07 - Turbidimetric
Total Alkalinity	SM2320B - Titration

L56147-2001131042

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG487763

ACZ Laboratories, Inc

Instrument ID: ICPMS7
Analyst: MFM
ACZ Dept: 33
Create Date: 12/10/2019 9:23
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	AG MS MW MT	AS MS MW MT	BE MS MW MT	CD MS MW MT	CO MS MW MT	CR MS MW MT	CU MS MW MT	MN MS MW MT	MO MS MW MT	NI MS MW MT	PB MS MW MT	SB MS MW MT	SE MS MW MT	TH MS MW MT	TL MS MW MT	U MS MW MT	V MS MW MT	ZN MS MW MT	Dilution
1	WG487763ICV	MS191014-8			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
2	WG487763ICB	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
3	WG487763PQV	MS191014-4			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
4	WG487763ICSA	MS191119-6			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
5	WG487763ICSAB	MS191119-7			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
6	WG487763ULRV	MS191209-5			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
7	WG487763WASH	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
8	WG487361PBS	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
9	L56147-01	STSB27_0.5-3			1		2940	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
10	L56147-02	STSB27_6-15			1		2760	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
11	L56147-03	STSB28_0.5-3			1		2750	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
12	L56147-03SDL	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
13	L56147-04	STSB28_6-15			1		3040	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
14	WG487763CCV1	MS191209-4			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
15	WG487763CCB1	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
16	L56147-05	STSB29_0.5-3			1		3540	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
17	L56147-05MS1	MS191119-5			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
18	L56147-05MSD1	MS191119-5			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
19	L56147-05DUP	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
20	WG487361LFB2	MS191119-5			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
21	WG487763CCV2	MS191209-4			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
22	WG487763CCB2	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1

Report Comments: Be, Co, Mn, Zn → 245 Cu → 115

Internal Comments

AREV: MFM 12/10/19
Initials, Date

SREV: 12-11-19
Initials, Date

12/10/2019 9:24:09 AM 121719

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG487763

ACZ Laboratories, Inc

Instrument ID: ICPMS7
Analyst:
ACZ Dept: 33
Create Date: 12/10/2019 9:23
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MSD1	ICPMS Spike
WG487361LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/10/2019 9:24:09 AM 121719

ACZ Laboratories, Inc.

ICPMS DATA REVIEW CHECKLIST

AREV:	MFM
Date:	12/10/2019
SREV:	[illegible]
Date:	12-11-19

Workgroup:	487763
Sample Type:	MWMT
Analysis Date:	12/10/2019
Analyst:	MFM

	Yes	No	N /A
1) Is the instrument ID on the bench sheet correct?	✓		
2) Has a passing method tune been performed within 24 hours?	✓		
3) Was the low calibration point dropped? If yes, notify PM of change to PQLs.		✓	
4) Is the linear regression ≥ 0.995 for the analytes of interest?	✓		
5) Was the PQV standard analyzed & evaluated for DW samples ? (Fail in LIMS if no DW sxs in WG.)			✓
6) Do the dilution factors on the benchsheet match the sequence in the raw data?	✓		
7) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal, EC, TDS)?			✓
8) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?			✓
9) Are the % Recoveries of the internal standards within the method limits?	✓		
10) Are all of the QC critera listed in LIMS within specified limits?		✓	
11) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?	✓		
12) Are all errors properly crossed out (i.e. single-line, dated & initialed)?	✓		
13) Is a current standard/reagent form attached to the workgroup?	✓		
14) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
147-03	Cu 84300	Redo 200x
147-04	Mn 8700	Redo 50x
147-05	Cu 344000	Redo 1000x
SDL	Be, Zn	ZG ZH
MS/D	Cu ↑/↓ Mn ↑	M3
CCB1	Cu ↑	BB / Redo
CCV2	Cu ↓	No sxs
ULRV	Ag ↓ Cu ↑	Redo sxs >L5

FRMII012.02.08.10

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487763

Date Reported: 12-Dec-19
Run ID: R1763800
Date Analyzed: 10-Dec-19
ICAL Workgroup:
Instrument ID: ICPMS7

WG487763ICV

Tag:

Measured: 12/10/2019 10:26:12 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.02142	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	107	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.05137	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	103	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.051313	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	103	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.052661	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	105	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.05388	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	108	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.054953	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	110	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.0513	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	103	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.05446	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	109	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.05301	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	106	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.01999	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	100	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.0527	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	105	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.05191	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	104	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.02175	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	109	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.05446	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	109	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0551	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	110	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.0541	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	108	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.05186	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	104	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0522	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	104	1		%	++	0.004	0.01			

WG487763ICB

Tag:

Measured: 12/10/2019 10:27:58 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

WG487763PQV

Tag:

Measured: 12/10/2019 10:29:43 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.00195	1	B	mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	98	1	B	%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.00088	1	B	mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	88	1	B	%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.000206	1	B	mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	82	1	B	%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.000221	1	B	mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	88	1	B	%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.00174	1	B	mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	87	1	B	%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.000221	1	B	mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	88	1	B	%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.00172	1	B	mg/L	++	0.0008	0.002			
SREV	COPPER	REC	86	1	B	%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.00045	1	B	mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	90	1	B	%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.00177	1	B	mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	88	1	B	%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.00043	1	B	mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	86	1	B	%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.00087	1	B	mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	87	1	B	%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.00022	1	B	mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	88	1	B	%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.00043	1	B	mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	86	1	B	%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.00044	1	B	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	88	1	B	%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0048	1	B	mg/L	++	0.001	0.005			
SREV	THORIUM	REC	96	1	B	%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.00045	1	B	mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	90	1	B	%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.00179	1	B	mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	90	1	B	%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.009	1	B	mg/L	++	0.004	0.01			
SREV	ZINC	REC	90	1	B	%	++	0.004	0.01			

WG487763ICSA

Tag:

Measured: 12/10/2019 10:31:29 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.00024	1	B	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.00012	1	B	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.000267	1	B	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.00066	1	B	mg/L	++	0.0004	0.002			
SREV	NICKEL	FOUND	0.00051	1	B	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.00015	1	B	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			

WG487763ICSAB

Tag:

Measured: 12/10/2019 10:33:15 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.00999	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	100	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.0182	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	91	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.018444	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	92	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.018977	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	95	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.01762	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	88	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.017887	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	89	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.01674	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	84	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.01831	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	91	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.01819	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	91	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.97877	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	96	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.01663	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	83	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.01731	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	86	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.00919	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	92	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.01831	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	91	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0466	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	93	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.01837	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	92	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.01807	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	90	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0203	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	101	1		%	++	0.004	0.01			

WG487361PBS

Tag:

Measured: 12/10/2019 10:38:34 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.00153 ✓	1	B	mg/L	++	0.0008	0.002	5x = 0.00765		
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

L56147-01

Tag:

Measured: 12/10/2019 10:40:21 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT	.0029	2	B	mg/L	++	0.0008	0.004		RA	
SREV	ARSENIC	IS-MWMT	.0031	2		mg/L	++	0.0004	0.002		RA	
SREV	BERYLLIUM	IS-MWMT		2	U	mg/L	++	0.0002	0.0005		ZG	
SREV	CADMIUM	IS-MWMT		2	U	mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004		RA	
SREV	COBALT	IS-MWMT	.0043	2		mg/L	++	0.0001	0.0005			
SREV	COPPER	IS-MWMT	.166	2		mg/L	++	0.002	0.004		BB M3	
SREV	LEAD	IS-MWMT		2	U	mg/L	++	0.0002	0.001		RA	
SREV	MANGANESE	IS-MWMT	.553	2		mg/L	++	0.0008	0.004		M3	
SREV	MOLYBDENUM	IS-MWMT	.0323	2		mg/L	++	0.0004	0.001		RA	
SREV	NICKEL	IS-MWMT	.0066	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	IS-MWMT	.0031	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	IS-MWMT		2	U	mg/L	++	0.0002	0.001		RA	
SREV	THALLIUM	IS-MWMT		2	U	mg/L	++	0.0002	0.001		RA	
SREV	THORIUM	IS-MWMT		2	U	mg/L	++	0.002	0.01		RA TB	
SREV	URANIUM	IS-MWMT	.0172	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004		RA	
SREV	ZINC	IS-MWMT		2	U	mg/L	++	0.008	0.02		ZG	

Samples evaluated in the front

L56147-03SDL Tag: **Measured: 12/10/2019 10:45:39 AM**

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	D		2	U	%	++	0.0008	0.004			
SREV	ANTIMONY	FOUND		2	U	mg/L	++	0.0008	0.004			
SREV	ANTIMONY	REG	0	2	U	mg/L	++	0.0008	0.004			
SREV	ARSENIC	D		2	U	%	++	0.0004	0.002			
SREV	ARSENIC	FOUND		2	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	REG	0	2	U	mg/L	++	0.0004	0.002			
SREV	BERYLLIUM	D	19	2	B	%	ALRT	0.0002	0.0005		ZG	
SREV	BERYLLIUM	FOUND	0.00021	2	B	mg/L	++	0.0002	0.0005			
SREV	BERYLLIUM	REG	0.00105	2	B	mg/L	++	0.0002	0.0005			
SREV	CADMIUM	D	3	2		%	++	0.0001	0.0005			
SREV	CADMIUM	FOUND	0.00031	2	B	mg/L	++	0.0001	0.0005			
SREV	CADMIUM	REG	0.00155	2	B	mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	D		2	U	%	++	0.001	0.004			
SREV	CHROMIUM	FOUND		2	U	mg/L	++	0.001	0.004	All high % differences, the original result is not 50x MDL; No qualification		
SREV	CHROMIUM	REG	0	2	U	mg/L	++	0.001	0.004			
SREV	COBALT	D	9	2		%	++	0.0001	0.0005			
SREV	COBALT	FOUND	0.02912	2		mg/L	++	0.0001	0.0005			
SREV	COBALT	REG	0.1456	2		mg/L	++	0.0001	0.0005			
SREV	COPPER	D	9	2		%	++	0.002	0.004			
SREV	COPPER	FOUND	15.3438	2		mg/L	++	0.002	0.004			
SREV	COPPER	REG	76.719	2		mg/L	++	0.002	0.004			
SREV	LEAD	D		2	U	%	++	0.0002	0.001			
SREV	LEAD	FOUND		2	U	mg/L	++	0.0002	0.001			
SREV	LEAD	REG	0	2	U	mg/L	++	0.0002	0.001			
SREV	MANGANESE	D	10	2		%	++	0.0008	0.004			
SREV	MANGANESE	FOUND	0.22715	2		mg/L	++	0.0008	0.004			
SREV	MANGANESE	REG	1.13575	2		mg/L	++	0.0008	0.004			
SREV	MOLYBDENUM	D		2	U	%	++	0.0004	0.001			
SREV	MOLYBDENUM	FOUND		2	U	mg/L	++	0.0004	0.001			
SREV	MOLYBDENUM	REG	0	2	U	mg/L	++	0.0004	0.001			
SREV	NICKEL	D	4	2		%	++	0.0008	0.002			
SREV	NICKEL	FOUND	0.02152	2		mg/L	++	0.0008	0.002			
SREV	NICKEL	REG	0.1076	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	D	4	2		%	++	0.0002	0.0005			
SREV	SELENIUM	FOUND	0.00054	2		mg/L	++	0.0002	0.0005			
SREV	SELENIUM	REG	0.0027	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	D		2	U	%	++	0.0002	0.001			
SREV	SILVER	FOUND		2	U	mg/L	++	0.0002	0.001			
SREV	SILVER	REG	0	2	U	mg/L	++	0.0002	0.001			
SREV	THALLIUM	D		2	U	%	++	0.0002	0.001			
SREV	THALLIUM	FOUND		2	U	mg/L	++	0.0002	0.001			
SREV	THALLIUM	REG	0	2	U	mg/L	++	0.0002	0.001			
SREV	THORIUM	D		2	U	%	++	0.002	0.01			
SREV	THORIUM	FOUND		2	U	mg/L	++	0.002	0.01			
SREV	THORIUM	REG	0	2	U	mg/L	++	0.002	0.01			
SREV	URANIUM	D	4	2		%	++	0.0002	0.001			
SREV	URANIUM	FOUND	0.0032	2		mg/L	++	0.0002	0.001			
SREV	URANIUM	REG	0.016	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	D		2	U	%	++	0.001	0.004			
SREV	VANADIUM	FOUND		2	U	mg/L	++	0.001	0.004			
SREV	VANADIUM	REG	0	2	U	mg/L	++	0.001	0.004			
SREV	ZINC	D	16	2		%	ALRT	0.008	0.02		ZG	
SREV	ZINC	FOUND	0.0363	2		mg/L	++	0.008	0.02			

SREV	ZINC	REG	0.1815	2		mg/L	++	0.008	0.02			

L56147-04

Tag: Measured: 12/10/2019 10:47:25 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		2	U	mg/L	++	0.0008	0.004		RA	
SREV	ARSENIC	IS-MWMT	.0009	2	B	mg/L	++	0.0004	0.002		RA	
SREV	BERYLLIUM	IS-MWMT	.0005	2		mg/L	++	0.0002	0.0005		ZG	
SREV	CADMIUM	IS-MWMT	.0021	2		mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004		RA	
SREV	COBALT	IS-MWMT	.317	2		mg/L	++	0.0001	0.0005			
REDO	COPPER	REG	3.26	2		mg/L	++	0.002	0.004			
SREV	LEAD	IS-MWMT		2	U	mg/L	++	0.0002	0.001		RA	
REDO	MANGANESE	REG	8.7	2	O	mg/L	OCAL	0.0008	0.004			
SREV	MOLYBDENUM	IS-MWMT	.0103	2		mg/L	++	0.0004	0.001		RA	
SREV	NICKEL	IS-MWMT	.167	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	IS-MWMT	.0578	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	IS-MWMT		2	U	mg/L	++	0.0002	0.001		RA	
SREV	THALLIUM	IS-MWMT		2	U	mg/L	++	0.0002	0.001		RA	
SREV	THORIUM	IS-MWMT		2	U	mg/L	++	0.002	0.01		RA TB	
SREV	URANIUM	IS-MWMT	.0401	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004		RA	
SREV	ZINC	IS-MWMT	.101	2		mg/L	++	0.008	0.02		ZG	

L56147-05

Tag: Measured: 12/10/2019 10:49:11 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT	.0013	2	B	mg/L	++	0.0008	0.004		RA	
SREV	ARSENIC	IS-MWMT	.0013	2	B	mg/L	++	0.0004	0.002		RA	
SREV	BERYLLIUM	IS-MWMT	.003	2		mg/L	++	0.0002	0.0005		ZG	
SREV	CADMIUM	IS-MWMT	.0018	2		mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	IS-MWMT	.001	2	B	mg/L	++	0.001	0.004		RA	
SREV	COBALT	IS-MWMT	.165	2		mg/L	++	0.0001	0.0005			
REDO	COPPER	REG	344	2	O	mg/L	OCAL	0.002	0.004			
SREV	LEAD	IS-MWMT	.001	2		mg/L	++	0.0002	0.001		RA	
SREV	MANGANESE	IS-MWMT	1.4	2		mg/L	++	0.0008	0.004		M3	
SREV	MOLYBDENUM	IS-MWMT		2	U	mg/L	++	0.0004	0.001		RA	
SREV	NICKEL	IS-MWMT	.128	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	IS-MWMT	.0162	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	IS-MWMT		2	U	mg/L	++	0.0002	0.001		RA	
SREV	THALLIUM	IS-MWMT	.0002	2	B	mg/L	++	0.0002	0.001		RA	
SREV	THORIUM	IS-MWMT		2	U	mg/L	++	0.002	0.01		RA TB	
SREV	URANIUM	IS-MWMT	.0193	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004		RA	
SREV	ZINC	IS-MWMT	.214	2		mg/L	++	0.008	0.02		ZG	

L56147-05MS1 Tag: Measured: 12/10/2019 10:50:58 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01159	2		mg/L	++	0.0008	0.004			
SREV	ANTIMONY	REC	103	2		%	++	0.0008	0.004			
SREV	ARSENIC	FOUND	0.04738	2		mg/L	++	0.0004	0.002			
SREV	ARSENIC	REC	92	2		%	++	0.0004	0.002			
SREV	BERYLLIUM	FOUND	0.04892	2		mg/L	++	0.0002	0.0005			
SREV	BERYLLIUM	REC	92	2		%	++	0.0002	0.0005			
SREV	CADMIUM	FOUND	0.05048	2		mg/L	++	0.0001	0.0005			
SREV	CADMIUM	REC	97	2		%	++	0.0001	0.0005			
SREV	CHROMIUM	FOUND	0.0464	2		mg/L	++	0.001	0.004			
SREV	CHROMIUM	REC	91	2		%	++	0.001	0.004			
SREV	COBALT	FOUND	0.21343	2		mg/L	++	0.0001	0.0005			
SREV	COBALT	REC	96	2		%	++	0.0001	0.0005			
SREV	COPPER	FOUND	346.1249	2		mg/L	++	0.002	0.004			
SREV	COPPER	REC	4241	2		%	ALRT	0.002	0.004		M3 4x	
SREV	LEAD	FOUND	0.05071	2		mg/L	++	0.0002	0.001			
SREV	LEAD	REC	99	2		%	++	0.0002	0.001			
SREV	MANGANESE	FOUND	1.48822	2		mg/L	++	0.0008	0.004			
SREV	MANGANESE	REC	176	2		%	ALRT	0.0008	0.004		M3 4x	
SREV	MOLYBDENUM	FOUND	0.05008	2		mg/L	++	0.0004	0.001			
SREV	MOLYBDENUM	REC	100	2		%	++	0.0004	0.001			
SREV	NICKEL	FOUND	0.17888	2		mg/L	++	0.0008	0.002			
SREV	NICKEL	REC	102	2		%	++	0.0008	0.002			
SREV	SELENIUM	FOUND	0.07198	2		mg/L	++	0.0002	0.0005			
SREV	SELENIUM	REC	111	2		%	++	0.0002	0.0005			
SREV	SILVER	FOUND	0.00932	2		mg/L	++	0.0002	0.001			
SREV	SILVER	REC	93	2		%	++	0.0002	0.001			
SREV	THALLIUM	FOUND	0.05223	2		mg/L	++	0.0002	0.001			
SREV	THALLIUM	REC	104	2		%	++	0.0002	0.001			
SREV	THORIUM	FOUND	0.0515	2		mg/L	++	0.002	0.01			
SREV	THORIUM	REC	103	2		%	++	0.002	0.01			
SREV	URANIUM	FOUND	0.07106	2		mg/L	++	0.0002	0.001			
SREV	URANIUM	REC	104	2		%	++	0.0002	0.001			
SREV	VANADIUM	FOUND	0.0476	2		mg/L	++	0.001	0.004			
SREV	VANADIUM	REC	95	2		%	++	0.001	0.004			
SREV	ZINC	FOUND	0.267	2		mg/L	++	0.008	0.02			
SREV	ZINC	REC	106	2		%	++	0.008	0.02			

L56147-05MSD1 Tag: **Measured:** 12/10/2019 10:52:44 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01174	2		mg/L	++	0.0008	0.004			
SREV	ANTIMONY	REC	104	2		%	++	0.0008	0.004			
SREV	ANTIMONY	RPD	1	2		%	++	0.0008	0.004			
SREV	ARSENIC	FOUND	0.04942	2		mg/L	++	0.0004	0.002			
SREV	ARSENIC	REC	96	2		%	++	0.0004	0.002			
SREV	ARSENIC	RPD	4	2		%	++	0.0004	0.002			
SREV	BERYLLIUM	FOUND	0.04898	2		mg/L	++	0.0002	0.0005			
SREV	BERYLLIUM	REC	92	2		%	++	0.0002	0.0005			
SREV	BERYLLIUM	RPD	0	2		%	++	0.0002	0.0005			
SREV	CADMIUM	FOUND	0.05003	2		mg/L	++	0.0001	0.0005			
SREV	CADMIUM	REC	96	2		%	++	0.0001	0.0005			
SREV	CADMIUM	RPD	1	2		%	++	0.0001	0.0005			
SREV	CHROMIUM	FOUND	0.0473	2		mg/L	++	0.001	0.004			
SREV	CHROMIUM	REC	93	2		%	++	0.001	0.004			
SREV	CHROMIUM	RPD	2	2		%	++	0.001	0.004			
SREV	COBALT	FOUND	0.21609	2		mg/L	++	0.0001	0.0005			
SREV	COBALT	REC	101	2		%	++	0.0001	0.0005			
SREV	COBALT	RPD	1	2		%	++	0.0001	0.0005			
SREV	COPPER	FOUND	336.929	2		mg/L	++	0.002	0.004			
SREV	COPPER	REC	-14114	2		%	ALRT	0.002	0.004		M3 4x	
SREV	COPPER	RPD	3	2		%	++	0.002	0.004			
SREV	LEAD	FOUND	0.0512	2		mg/L	++	0.0002	0.001			
SREV	LEAD	REC	100	2		%	++	0.0002	0.001			
SREV	LEAD	RPD	1	2		%	++	0.0002	0.001			
SREV	MANGANESE	FOUND	1.52318	2		mg/L	++	0.0008	0.004			
SREV	MANGANESE	REC	246	2		%	ALRT	0.0008	0.004		M3 4x	
SREV	MANGANESE	RPD	2	2		%	++	0.0008	0.004			
SREV	MOLYBDENUM	FOUND	0.04884	2		mg/L	++	0.0004	0.001			
SREV	MOLYBDENUM	REC	97	2		%	++	0.0004	0.001			
SREV	MOLYBDENUM	RPD	3	2		%	++	0.0004	0.001			
SREV	NICKEL	FOUND	0.18114	2		mg/L	++	0.0008	0.002			
SREV	NICKEL	REC	106	2		%	++	0.0008	0.002			
SREV	NICKEL	RPD	1	2		%	++	0.0008	0.002			
SREV	SELENIUM	FOUND	0.07131	2		mg/L	++	0.0002	0.0005			
SREV	SELENIUM	REC	110	2		%	++	0.0002	0.0005			
SREV	SELENIUM	RPD	1	2		%	++	0.0002	0.0005			
SREV	SILVER	FOUND	0.00924	2		mg/L	++	0.0002	0.001			
SREV	SILVER	REC	92	2		%	++	0.0002	0.001			
SREV	SILVER	RPD	1	2		%	++	0.0002	0.001			
SREV	THALLIUM	FOUND	0.05175	2		mg/L	++	0.0002	0.001			
SREV	THALLIUM	REC	103	2		%	++	0.0002	0.001			
SREV	THALLIUM	RPD	1	2		%	++	0.0002	0.001			
SREV	THORIUM	FOUND	0.0534	2		mg/L	++	0.002	0.01			
SREV	THORIUM	REC	107	2		%	++	0.002	0.01			
SREV	THORIUM	RPD	4	2		%	++	0.002	0.01			
SREV	URANIUM	FOUND	0.07134	2		mg/L	++	0.0002	0.001			
SREV	URANIUM	REC	104	2		%	++	0.0002	0.001			
SREV	URANIUM	RPD	0	2		%	++	0.0002	0.001			
SREV	VANADIUM	FOUND	0.0481	2		mg/L	++	0.001	0.004			
SREV	VANADIUM	REC	96	2		%	++	0.001	0.004			
SREV	VANADIUM	RPD	1	2		%	++	0.001	0.004			
SREV	ZINC	FOUND	0.2746	2		mg/L	++	0.008	0.02			
SREV	ZINC	REC	121	2		%	++	0.008	0.02			

SREV	ZINC	RPD	3	2		%	++	0.008	0.02

L56147-05DUP

Tag: **Measured:** 12/10/2019 10:54:30 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.00155	2	B	mg/L	++	0.0008	0.004			
SREV	ANTIMONY	RPD	18	2		%	++	0.0008	0.004		RA	
SREV	ARSENIC	FOUND	0.00149	2	B	mg/L	++	0.0004	0.002			
SREV	ARSENIC	RPD	14	2		%	++	0.0004	0.002		RA	
SREV	BERYLLIUM	FOUND	0.0027	2		mg/L	++	0.0002	0.0005			
SREV	BERYLLIUM	RPD	11	2		%	++	0.0002	0.0005			
SREV	CADMIUM	FOUND	0.00197	2		mg/L	++	0.0001	0.0005			
SREV	CADMIUM	RPD	9	2		%	++	0.0001	0.0005			
SREV	CHROMIUM	FOUND	0.0011	2	B	mg/L	++	0.001	0.004			
SREV	CHROMIUM	RPD	10	2		%	++	0.001	0.004		RA	
SREV	COBALT	FOUND	0.1617	2		mg/L	++	0.0001	0.0005			
SREV	COBALT	RPD	2	2		%	++	0.0001	0.0005			
SREV	COPPER	FOUND	324.2626	2		mg/L	++	0.002	0.004			
SREV	COPPER	RPD	6	2		%	++	0.002	0.004			
SREV	LEAD	FOUND	0.00117	2		mg/L	++	0.0002	0.001			
SREV	LEAD	RPD	16	2		%	++	0.0002	0.001		RA	
SREV	MANGANESE	FOUND	1.36421	2		mg/L	++	0.0008	0.004			
SREV	MANGANESE	RPD	3	2		%	++	0.0008	0.004			
SREV	MOLYBDENUM	FOUND		2	U	mg/L	++	0.0004	0.001			
SREV	MOLYBDENUM	RPD	0	2		%	++	0.0004	0.001		RA	
SREV	NICKEL	FOUND	0.12265	2		mg/L	++	0.0008	0.002			
SREV	NICKEL	RPD	4	2		%	++	0.0008	0.002			
SREV	SELENIUM	FOUND	0.01667	2		mg/L	++	0.0002	0.0005			
SREV	SELENIUM	RPD	3	2		%	++	0.0002	0.0005			
SREV	SILVER	FOUND		2	U	mg/L	++	0.0002	0.001			
SREV	SILVER	RPD	0	2		%	++	0.0002	0.001		RA	
SREV	THALLIUM	FOUND	0.00021	2	B	mg/L	++	0.0002	0.001			
SREV	THALLIUM	RPD	5	2		%	++	0.0002	0.001		RA	
SREV	THORIUM	FOUND		2	U	mg/L	++	0.002	0.01			
SREV	THORIUM	RPD	0	2		%	++	0.002	0.01		RA	
SREV	URANIUM	FOUND	0.01854	2		mg/L	++	0.0002	0.001			
SREV	URANIUM	RPD	4	2		%	++	0.0002	0.001			
SREV	VANADIUM	FOUND		2	U	mg/L	++	0.001	0.004			
SREV	VANADIUM	RPD	0	2		%	++	0.001	0.004		RA	
SREV	ZINC	FOUND	0.2188	2		mg/L	++	0.008	0.02			
SREV	ZINC	RPD	2	2		%	++	0.008	0.02			

WG487763CCV1

Tag:

Measured: 12/10/2019 10:56:17 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01239	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	99	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.10741	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	107	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.098971	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	99	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.100672	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	101	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.10139	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	101	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.102223	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	102	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.24287	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	97	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.24889	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	99	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.10423	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	104	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.09181	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	92	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.25606	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	102	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.25048	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	100	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.02461	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	98	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.09847	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	98	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.1046	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	105	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.10421	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	104	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.09949	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	99	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.5352	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	107	1		%	++	0.004	0.01			

WG487763CCB1

Tag:

Measured: 12/10/2019 10:58:03 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.0053	1		mg/L	ALRT	0.0008	0.002		BB	5x = 0.0265
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

All sample are above the 5x blank contamination limit; no qualification

WG487361LFB2 **Tag:** **Measured:** **12/10/2019 10:59:49 AM**

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01006	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	101	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.04987	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	100	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.045954	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	92	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.047359	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	95	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.04753	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	95	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.04771	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	95	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.0417	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	83	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.04689	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	94	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.04839	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	97	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.04371	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	87	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.0475	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	95	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.0469	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	94	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.00972	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	97	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.046	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	92	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0489	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	98	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.0486	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	97	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.04679	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	94	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0513	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	102	1		%	++	0.004	0.01			

WG487763CCV2

Tag:

Measured: 12/10/2019 11:01:35 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01211	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	97	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.10106	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	101	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.09466	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	95	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.098835	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	99	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.09622	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	96	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.098523	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	98	1		%	++	0.00005	0.0003			
FAIL	COPPER	FOUND	0.20668	1		mg/L	++	0.0008	0.002			
FAIL	COPPER	REC	83	1		%	ALRT	0.0008	0.002	Does not bracket samples		
SREV	LEAD	FOUND	0.24287	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	97	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.10011	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	100	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.09202	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	92	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.24099	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	96	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.2353	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	94	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.02403	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	96	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.09581	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	96	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.1021	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	102	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.10127	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	101	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.0944	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	94	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.5121	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	102	1		%	++	0.004	0.01			

WG487763CCB2

Tag:

Measured: 12/10/2019 11:03:22 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.00084	1	B	mg/L	++	0.0008	0.002			
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

Does not bracket samples; also all samples are well above 5x

WG487763ULRV

Tag:

Measured: 12/10/2019 11:05:07 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.25721	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	103	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	1.99272	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	100	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	1.920876 ✓	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	96	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	2.029673	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	101	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	1.90729	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	95	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	1.855465	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	93	1		%	++	0.00005	0.0003			
FAIL	COPPER	FOUND	5.67421	1		mg/L	++	0.0008	0.002			
FAIL	COPPER	REC	113	1		%	ALRT	0.0008	0.002			
SREV	LEAD	FOUND	4.5839	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	92	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	1.8907	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	94	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	1.90677 ✓	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	95	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	4.79535	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	96	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	5.11987	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	102	1		%	++	0.0001	0.0003			
FAIL	SILVER	FOUND	0.42308	1		mg/L	++	0.0001	0.0005			
FAIL	SILVER	REC	84	1		%	ALRT	0.0001	0.0005			
SREV	THALLIUM	FOUND	1.83492	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	92	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	1.991	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	100	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	1.89727	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	95	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	1.92549	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	96	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	10.1898	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	102	1		%	++	0.004	0.01			

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Sample Summary

Index	15
Label	WG487361PBS
Start Time	12/10/2019 10:38:34 AM
Dilution Factor	1
Rack	2
Vial	13

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	-0.021 ppb	21.8 %	786 cps
11B (STD)	46.470 ppb	0.8 %	644,350 cps
27Al (STD)	2.715 ppb	1.6 %	267,555 cps
51V (KED)	0.004 ppb	246.7 %	853 cps
52Cr (KED)	0.137 ppb	3.9 %	1,289 cps
55Mn (STD)	0.130 ppb	0.5 %	44,068 cps
56Fe (KEDH)	2.500 ppb	0.9 %	146,437 cps
59Co (STD)	0.003 ppb	5.9 %	1,279 cps
60Ni (KED)	0.102 ppb	7.5 %	559 cps
63Cu (KED)	1.533 ppb	1.7 %	17,363 cps
66Zn (STD)	1.648 ppb	1.0 %	31,046 cps
75As (KED)	0.007 ppb	153.6 %	18 cps
78Se (KEDH)	-0.019 ppb	31.1 %	11 cps
98Mo (STD)	0.020 ppb	5.5 %	2,130 cps
107Ag (STD)	-0.038 ppb	0.8 %	976 cps
111Cd (STD)	-0.003 ppb	0.6 %	47 cps
118Sn (STD)	-0.032 ppb	16.2 %	12,134 cps
121Sb (STD)	-0.066 ppb	4.0 %	2,194 cps
125Te (STD)	-0.011 ppb	5.3 %	49 cps
133Cs (STD)	-0.006 ppb	2.5 %	1,316 cps
137Ba (STD)	0.571 ppb	2.4 %	20,387 cps
205Tl (STD)	-0.006 ppb	0.3 %	913 cps
208Pb (STD)	0.019 ppb	4.8 %	8,058 cps
232Th (STD)	-0.024 ppb	7.4 %	4,271 cps
238U (STD)	-0.002 ppb	8.6 %	501 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	96.859 %	0.7 %	516,936 cps
45Sc (STD)	98.414 %	0.8 %	**3,115,654 cps**
45Sc (KED)	98.336 %	2.0 %	21,775 cps
45Sc (KEDH)	97.772 %	3.1 %	569,112 cps
72Ge (STD)	97.327 %	0.9 %	567,320 cps
72Ge (KED)	99.796 %	1.2 %	21,279 cps
72Ge (KEDH)	98.164 %	4.2 %	263,930 cps
115In (STD)	98.592 %	0.5 %	2,583,469 cps
115In (KED)	101.083 %	1.2 %	177,658 cps
115In (KEDH)	98.894 %	5.5 %	1,816,302 cps
159Tb (STD)	98.017 %	1.8 %	**3,230,969 cps**
209Bi (STD)	102.387 %	1.5 %	**3,781,683 cps**

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Sample Summary

Index	16
Label	L56147-01
Start Time	12/10/2019 10:40:21 AM
Dilution Factor	2
Rack	2
Vial	14

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	-0.078 ppb	3.6 %	641 cps
11B (STD)	85.349 ppb	2.0 %	1,133,182 cps
27Al (STD)	4.115 ppb	0.9 %	189,946 cps
51V (KED)	0.557 ppb	3.4 %	1,980 cps
52Cr (KED)	0.272 ppb	9.7 %	1,240 cps
55Mn (STD)	552.500 ppb	0.9 %	**55,743,514 cps**
56Fe (KEDH)	6.150 ppb	1.6 %	162,070 cps
59Co (STD)	4.299 ppb	1.2 %	307,631 cps
60Ni (KED)	6.606 ppb	2.3 %	12,137 cps
63Cu (KED)	166.140 ppb	3.0 %	699,014 cps
66Zn (STD)	3.066 ppb	2.1 %	31,777 cps
75As (KED)	3.107 ppb	9.3 %	963 cps
78Se (KEDH)	3.123 ppb	6.4 %	2,552 cps
98Mo (STD)	32.336 ppb	1.6 %	703,626 cps
107Ag (STD)	-0.084 ppb	0.9 %	434 cps
111Cd (STD)	0.062 ppb	28.5 %	557 cps
118Sn (STD)	-0.046 ppb	34.1 %	9,672 cps
121Sb (STD)	2.902 ppb	2.2 %	74,641 cps
125Te (STD)	0.089 ppb	14.5 %	180 cps
133Cs (STD)	0.103 ppb	2.8 %	12,408 cps
137Ba (STD)	28.343 ppb	2.5 %	355,447 cps
205Tl (STD)	0.038 ppb	4.3 %	3,019 cps
208Pb (STD)	0.066 ppb	7.4 %	6,377 cps
232Th (STD)	-0.041 ppb	15.9 %	2,899 cps
238U (STD)	17.195 ppb	0.6 %	1,214,711 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	185.294 %	1.7 %	**988,914 cps**
45Sc (STD)	107.284 %	0.6 %	**3,396,456 cps**
45Sc (KED)	94.898 %	1.3 %	21,013 cps
45Sc (KEDH)	126.966 %	1.0 %	739,042 cps
72Ge (STD)	87.573 %	0.2 %	510,466 cps
72Ge (KED)	83.372 %	0.6 %	17,777 cps
72Ge (KEDH)	91.113 %	1.0 %	244,971 cps
115In (STD)	75.085 %	1.5 %	1,967,508 cps
115In (KED)	76.384 %	2.0 %	134,249 cps
115In (KEDH)	84.502 %	1.4 %	1,551,978 cps
159Tb (STD)	71.980 %	1.4 %	2,372,716 cps
209Bi (STD)	57.902 %	1.3 %	2,138,626 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	17
Label	L56147-02
Start Time	12/10/2019 10:42:07 AM
Dilution Factor	2
Rack	2
Vial	15

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	-0.070 ppb	4.4 %	643 cps
11B (STD)	158.231 ppb	0.9 %	1,193,607 cps
27Al (STD)	11.255 ppb	8.1 %	**473,095 cps**
51V (KED)	0.055 ppb	11.3 %	917 cps
52Cr (KED)	0.272 ppb	3.7 %	1,235 cps
55Mn (STD)	3,011.578 ppb	1.5 %	**283,433,983 cps**
56Fe (KEDH)	9.705 ppb	2.1 %	242,859 cps
59Co (STD)	33.753 ppb	1.6 %	2,247,900 cps
60Ni (KED)	21.076 ppb	1.4 %	38,140 cps
63Cu (KED)	148.288 ppb	0.4 %	628,500 cps
66Zn (STD)	7.899 ppb	0.7 %	70,285 cps
75As (KED)	0.832 ppb	11.8 %	266 cps
78Se (KEDH)	28.206 ppb	0.4 %	22,723 cps
98Mo (STD)	32.037 ppb	1.3 %	720,075 cps
107Ag (STD)	-0.080 ppb	1.1 %	626 cps
111Cd (STD)	0.314 ppb	2.1 %	2,586 cps
118Sn (STD)	-0.048 ppb	6.9 %	9,948 cps
121Sb (STD)	0.568 ppb	0.8 %	19,106 cps
125Te (STD)	0.206 ppb	21.1 %	341 cps
133Cs (STD)	0.661 ppb	0.1 %	70,448 cps
137Ba (STD)	17.337 ppb	1.2 %	225,061 cps
205Tl (STD)	0.110 ppb	3.9 %	6,910 cps
208Pb (STD)	0.049 ppb	6.3 %	5,485 cps
232Th (STD)	-0.040 ppb	14.6 %	3,067 cps
238U (STD)	28.528 ppb	1.5 %	2,096,399 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	106.021 %	1.0 %	565,832 cps
45Sc (STD)	100.121 %	1.0 %	**3,169,711 cps**
45Sc (KED)	94.380 %	1.1 %	20,899 cps
45Sc (KEDH)	123.648 %	1.2 %	719,726 cps
72Ge (STD)	88.938 %	1.0 %	518,420 cps
72Ge (KED)	83.774 %	2.6 %	17,863 cps
72Ge (KEDH)	91.099 %	2.4 %	244,932 cps
115In (STD)	77.555 %	1.4 %	2,032,235 cps
115In (KED)	76.914 %	0.2 %	135,181 cps
115In (KEDH)	86.902 %	1.0 %	1,596,058 cps
159Tb (STD)	74.946 %	2.5 %	2,470,481 cps
209Bi (STD)	60.247 %	1.2 %	2,225,239 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	18
Label	L56147-03
Start Time	12/10/2019 10:43:53 AM
Dilution Factor	2
Rack	2
Vial	16

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	1.257 ppb	2.6 %	8,077 cps
11B (STD)	111.054 ppb	1.3 %	777,876 cps
27Al (STD)	5,687.091 ppb	1.2 %	**224,054,815 cps**
51V (KED)	0.084 ppb	5.6 %	953 cps
52Cr (KED)	0.573 ppb	2.2 %	2,064 cps
55Mn (STD)	1,030.237 ppb	0.6 %	**98,471,148 cps**
56Fe (KEDH)	56.797 ppb	1.6 %	1,295,251 cps
59Co (STD)	133.783 ppb	0.8 %	**9,044,977 cps**
60Ni (KED)	103.030 ppb	1.6 %	181,156 cps
63Cu (KED)	84,315.474 ppb	2.0 %	**355,511,658 cps**
66Zn (STD)	156.543 ppb	0.5 %	1,340,049 cps
75As (KED)	1.551 ppb	6.9 %	472 cps
78Se (KEDH)	2.829 ppb	6.7 %	2,284 cps
98Mo (STD)	0.180 ppb	4.5 %	4,981 cps
107Ag (STD)	-0.073 ppb	0.3 %	919 cps
111Cd (STD)	1.575 ppb	1.8 %	13,058 cps
118Sn (STD)	-0.033 ppb	25.8 %	10,652 cps
121Sb (STD)	0.691 ppb	1.9 %	22,835 cps
125Te (STD)	0.072 ppb	9.4 %	168 cps
133Cs (STD)	1.208 ppb	1.0 %	130,791 cps
137Ba (STD)	14.688 ppb	2.6 %	196,663 cps
205Tl (STD)	0.316 ppb	1.5 %	19,355 cps
208Pb (STD)	0.382 ppb	0.8 %	31,032 cps
232Th (STD)	-0.045 ppb	6.0 %	2,948 cps
238U (STD)	16.674 ppb	0.2 %	1,340,839 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	98.090 %	0.4 %	523,506 cps
45Sc (STD)	101.659 %	0.6 %	**3,218,382 cps**
45Sc (KED)	92.023 %	0.9 %	20,377 cps
45Sc (KEDH)	120.287 %	1.1 %	700,167 cps
72Ge (STD)	89.216 %	0.7 %	520,043 cps
72Ge (KED)	86.874 %	1.4 %	18,524 cps
72Ge (KEDH)	89.774 %	1.5 %	241,370 cps
115In (STD)	79.900 %	0.7 %	2,093,668 cps
115In (KED)	76.556 %	1.2 %	134,552 cps
115In (KEDH)	86.101 %	0.7 %	1,581,335 cps
159Tb (STD)	82.479 %	1.4 %	2,718,779 cps
209Bi (STD)	65.907 %	1.5 %	2,434,282 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	19
Label	L56147-03SDL
Start Time	12/10/2019 10:45:39 AM
Dilution Factor	2
Rack	2
Vial	17

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	0.206 ppb	3.2 %	2,142 cps
11B (STD)	22.216 ppb	1.1 %	166,097 cps
27Al (STD)	1,150.439 ppb	2.0 %	**48,839,653 cps**
51V (KED)	-0.117 ppb	11.1 %	567 cps
52Cr (KED)	0.133 ppb	8.8 %	842 cps
55Mn (STD)	227.147 ppb	1.6 %	**21,207,736 cps**
56Fe (KEDH)	10.566 ppb	1.0 %	278,976 cps
59Co (STD)	29.120 ppb	0.8 %	1,922,385 cps
60Ni (KED)	21.518 ppb	1.5 %	39,771 cps
63Cu (KED)	15,343.784 ppb	2.6 %	**80,223,788 cps**
66Zn (STD)	36.264 ppb	0.9 %	305,980 cps
75As (KED)	0.333 ppb	12.2 %	117 cps
78Se (KEDH)	0.543 ppb	11.6 %	508 cps
98Mo (STD)	0.029 ppb	11.9 %	1,754 cps
107Ag (STD)	-0.088 ppb	0.3 %	368 cps
111Cd (STD)	0.308 ppb	3.6 %	3,090 cps
118Sn (STD)	-0.080 ppb	14.8 %	11,107 cps
121Sb (STD)	-0.004 ppb	304.5 %	5,956 cps
125Te (STD)	-0.020 ppb	61.4 %	50 cps
133Cs (STD)	0.224 ppb	4.1 %	30,766 cps
137Ba (STD)	2.889 ppb	5.6 %	46,826 cps
205Tl (STD)	0.049 ppb	2.6 %	5,661 cps
208Pb (STD)	0.059 ppb	5.3 %	9,410 cps
232Th (STD)	-0.062 ppb	2.3 %	2,224 cps
238U (STD)	3.198 ppb	0.5 %	358,421 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	99.906 %	0.3 %	533,196 cps
45Sc (STD)	99.233 %	0.6 %	**3,141,598 cps**
45Sc (KED)	96.391 %	2.3 %	21,344 cps
45Sc (KEDH)	102.221 %	2.3 %	595,005 cps
72Ge (STD)	96.089 %	0.9 %	560,107 cps
72Ge (KED)	97.270 %	1.7 %	20,741 cps
72Ge (KEDH)	96.827 %	3.6 %	260,334 cps
115In (STD)	94.155 %	2.0 %	2,467,213 cps
115In (KED)	94.950 %	2.2 %	166,879 cps
115In (KEDH)	97.925 %	3.9 %	1,798,508 cps
159Tb (STD)	95.861 %	1.1 %	**3,159,906 cps**
209Bi (STD)	91.665 %	1.6 %	**3,385,643 cps**

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Sample Summary

Index	20
Label	L56147-04
Start Time	12/10/2019 10:47:25 AM
Dilution Factor	2
Rack	2
Vial	18

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	0.548 ppb	2.4 %	3,929 cps
11B (STD)	159.846 ppb	0.8 %	1,390,428 cps
27Al (STD)	8.840 ppb	1.3 %	**378,524 cps**
51V (KED)	-0.067 ppb	23.2 %	642 cps
52Cr (KED)	0.558 ppb	7.3 %	2,021 cps
55Mn (STD)	8,698.147 ppb	2.1 %	**794,607,169 cps**
56Fe (KEDH)	15.323 ppb	0.9 %	356,401 cps
59Co (STD)	316.854 ppb	1.8 %	**20,476,732 cps**
60Ni (KED)	167.023 ppb	3.0 %	293,547 cps
63Cu (KED)	3,257.148 ppb	2.2 %	**13,477,874 cps**
66Zn (STD)	100.764 ppb	1.1 %	825,953 cps
75As (KED)	0.859 ppb	14.1 %	267 cps
78Se (KEDH)	57.792 ppb	1.4 %	44,717 cps
98Mo (STD)	10.265 ppb	1.6 %	231,987 cps
107Ag (STD)	-0.052 ppb	2.3 %	1,709 cps
111Cd (STD)	2.091 ppb	2.8 %	16,844 cps
118Sn (STD)	-0.044 ppb	24.2 %	10,086 cps
121Sb (STD)	0.440 ppb	2.6 %	15,990 cps
125Te (STD)	0.163 ppb	14.3 %	286 cps
133Cs (STD)	0.579 ppb	2.0 %	62,201 cps
137Ba (STD)	10.973 ppb	3.9 %	143,360 cps
205Tl (STD)	0.175 ppb	3.1 %	10,776 cps
208Pb (STD)	0.157 ppb	22.5 %	13,468 cps
232Th (STD)	-0.054 ppb	4.7 %	2,169 cps
238U (STD)	40.072 ppb	0.9 %	**3,078,654 cps**

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	122.266 %	1.1 %	652,533 cps
45Sc (STD)	97.190 %	1.0 %	**3,076,920 cps**
45Sc (KED)	92.043 %	2.1 %	20,381 cps
45Sc (KEDH)	117.007 %	1.4 %	681,069 cps
72Ge (STD)	88.960 %	0.6 %	518,548 cps
72Ge (KED)	83.288 %	1.5 %	17,759 cps
72Ge (KEDH)	87.563 %	2.1 %	235,427 cps
115In (STD)	77.793 %	0.7 %	2,038,467 cps
115In (KED)	75.128 %	1.3 %	132,042 cps
115In (KEDH)	85.331 %	1.5 %	1,567,207 cps
159Tb (STD)	77.092 %	1.3 %	2,541,217 cps
209Bi (STD)	62.995 %	2.7 %	2,326,744 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	21
Label	L56147-05
Start Time	12/10/2019 10:49:11 AM
Dilution Factor	2
Rack	2
Vial	19

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	3.028 ppb	1.5 %	16,338 cps
11B (STD)	119.221 ppb	2.0 %	809,359 cps
27Al (STD)	11,410.193 ppb	1.2 %	**434,605,406 cps**
51V (KED)	-0.078 ppb	26.7 %	580 cps
52Cr (KED)	1.043 ppb	0.4 %	3,193 cps
55Mn (STD)	1,398.274 ppb	1.3 %	**121,370,584 cps**
56Fe (KEDH)	221.812 ppb	1.3 %	**4,761,642 cps**
59Co (STD)	165.265 ppb	1.1 %	**10,147,203 cps**
60Ni (KED)	128.006 ppb	2.5 %	210,802 cps
63Cu (KED)	343,949.121 ppb	1.5 %	**1,350,116,210 cps**
66Zn (STD)	214.036 ppb	1.2 %	1,662,677 cps
75As (KED)	1.323 ppb	11.1 %	379 cps
78Se (KEDH)	16.182 ppb	1.4 %	12,265 cps
98Mo (STD)	0.160 ppb	8.5 %	4,271 cps
107Ag (STD)	-0.073 ppb	1.8 %	877 cps
111Cd (STD)	1.821 ppb	4.3 %	14,284 cps
118Sn (STD)	0.003 ppb	504.6 %	10,979 cps
121Sb (STD)	1.295 ppb	3.3 %	36,280 cps
125Te (STD)	0.069 ppb	12.0 %	156 cps
133Cs (STD)	0.625 ppb	3.9 %	65,136 cps
137Ba (STD)	8.968 ppb	2.6 %	114,233 cps
205Tl (STD)	0.208 ppb	5.2 %	12,340 cps
208Pb (STD)	0.989 ppb	1.5 %	71,917 cps
232Th (STD)	0.012 ppb	9.6 %	7,005 cps
238U (STD)	19.319 ppb	3.6 %	1,458,404 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	95.166 %	1.8 %	507,902 cps
45Sc (STD)	92.332 %	1.1 %	**2,923,098 cps**
45Sc (KED)	86.218 %	1.6 %	19,091 cps
45Sc (KEDH)	111.681 %	0.5 %	650,070 cps
72Ge (STD)	86.256 %	0.4 %	502,792 cps
72Ge (KED)	81.749 %	2.5 %	17,431 cps
72Ge (KEDH)	85.587 %	1.2 %	230,115 cps
115In (STD)	75.703 %	1.7 %	1,983,695 cps
115In (KED)	71.270 %	1.5 %	125,260 cps
115In (KEDH)	81.378 %	1.5 %	1,494,607 cps
159Tb (STD)	78.933 %	1.2 %	2,601,891 cps
209Bi (STD)	61.878 %	2.1 %	2,285,479 cps

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Sample Summary

Index	22
Label	L56147-05MS1
Start Time	12/10/2019 10:50:58 AM
Dilution Factor	2
Rack	2
Vial	20

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	48.917 ppb	0.5 %	238,166 cps
11B (STD)	130.951 ppb	1.6 %	832,961 cps
27Al (STD)	11,364.919 ppb	0.8 %	**422,861,943 cps**
51V (KED)	47.600 ppb	1.5 %	87,232 cps
52Cr (KED)	46.414 ppb	1.8 %	118,144 cps
55Mn (STD)	1,488.225 ppb	1.3 %	**123,260,953 cps**
56Fe (KEDH)	290.468 ppb	1.3 %	**5,902,733 cps**
59Co (STD)	213.432 ppb	1.6 %	**12,503,507 cps**
60Ni (KED)	178.879 ppb	1.6 %	279,142 cps
63Cu (KED)	346,124.896 ppb	3.3 %	**1,354,033,623 cps**
66Zn (STD)	267.049 ppb	1.3 %	1,978,595 cps
75As (KED)	47.385 ppb	2.0 %	12,489 cps
78Se (KEDH)	71.980 ppb	2.0 %	51,580 cps
98Mo (STD)	50.085 ppb	0.4 %	1,102,386 cps
107Ag (STD)	9.320 ppb	0.7 %	363,419 cps
111Cd (STD)	50.484 ppb	0.4 %	395,478 cps
118Sn (STD)	46.780 ppb	1.0 %	1,168,809 cps
121Sb (STD)	11.589 ppb	0.2 %	286,926 cps
125Te (STD)	47.812 ppb	0.8 %	62,348 cps
133Cs (STD)	48.073 ppb	0.3 %	**4,866,178 cps**
137Ba (STD)	57.333 ppb	0.6 %	726,211 cps
205Tl (STD)	52.229 ppb	1.4 %	3,029,249 cps
208Pb (STD)	50.709 ppb	1.4 %	3,850,913 cps
232Th (STD)	51.476 ppb	1.6 %	**4,096,826 cps**
238U (STD)	71.062 ppb	1.3 %	**5,768,511 cps**

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	89.251 %	1.6 %	476,333 cps
45Sc (STD)	88.102 %	1.1 %	**2,789,199 cps**
45Sc (KED)	81.700 %	1.2 %	18,091 cps
45Sc (KEDH)	106.439 %	2.0 %	619,555 cps
72Ge (STD)	84.259 %	0.3 %	491,147 cps
72Ge (KED)	78.660 %	0.6 %	16,772 cps
72Ge (KEDH)	81.116 %	2.5 %	218,094 cps
115In (STD)	75.970 %	0.5 %	1,990,694 cps
115In (KED)	71.053 %	2.4 %	124,880 cps
115In (KEDH)	79.932 %	3.2 %	1,468,042 cps
159Tb (STD)	81.588 %	2.0 %	2,689,406 cps
209Bi (STD)	66.551 %	1.1 %	2,458,085 cps

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Sample Summary

Index	23
Label	L56147-05MSD1
Start Time	12/10/2019 10:52:44 AM
Dilution Factor	2
Rack	2
Vial	21

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	48.979 ppb	0.8 %	228,836 cps
11B (STD)	129.251 ppb	1.2 %	791,308 cps
27Al (STD)	11,132.207 ppb	0.6 %	**405,225,083 cps**
51V (KED)	48.094 ppb	2.5 %	84,415 cps
52Cr (KED)	47.288 ppb	3.6 %	115,274 cps
55Mn (STD)	1,523.180 ppb	0.6 %	**121,067,970 cps**
56Fe (KEDH)	283.447 ppb	1.5 %	**5,598,730 cps**
59Co (STD)	216.088 ppb	0.7 %	**12,149,187 cps**
60Ni (KED)	181.141 ppb	2.5 %	270,747 cps
63Cu (KED)	336,929.002 ppb	1.5 %	**1,312,681,400 cps**
66Zn (STD)	274.644 ppb	0.1 %	1,952,765 cps
75As (KED)	49.420 ppb	3.0 %	12,475 cps
78Se (KEDH)	71.310 ppb	1.1 %	49,644 cps
98Mo (STD)	48.836 ppb	1.6 %	1,090,000 cps
107Ag (STD)	9.239 ppb	1.0 %	365,381 cps
111Cd (STD)	50.031 ppb	1.0 %	397,427 cps
118Sn (STD)	46.696 ppb	1.3 %	1,183,088 cps
121Sb (STD)	11.743 ppb	1.3 %	294,763 cps
125Te (STD)	49.044 ppb	1.6 %	64,850 cps
133Cs (STD)	48.292 ppb	1.2 %	**4,957,473 cps**
137Ba (STD)	57.438 ppb	1.8 %	737,702 cps
205Tl (STD)	51.749 ppb	1.3 %	3,144,937 cps
208Pb (STD)	51.202 ppb	2.0 %	4,073,994 cps
232Th (STD)	53.376 ppb	2.8 %	**4,449,624 cps**
238U (STD)	71.339 ppb	1.7 %	**6,066,932 cps**

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	85.886 %	1.3 %	458,373 cps
45Sc (STD)	84.543 %	0.6 %	**2,676,523 cps**
45Sc (KED)	78.278 %	2.3 %	17,333 cps
45Sc (KEDH)	101.535 %	0.9 %	591,012 cps
72Ge (STD)	82.433 %	0.8 %	480,503 cps
72Ge (KED)	76.755 %	1.8 %	16,366 cps
72Ge (KEDH)	78.813 %	2.5 %	211,901 cps
115In (STD)	77.040 %	0.8 %	2,018,735 cps
115In (KED)	70.734 %	1.0 %	124,320 cps
115In (KEDH)	79.502 %	2.6 %	1,460,144 cps
159Tb (STD)	85.337 %	0.9 %	2,813,008 cps
209Bi (STD)	69.735 %	1.0 %	2,575,675 cps

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Sample Summary

Index	24
Label	L56147-05DUP
Start Time	12/10/2019 10:54:30 AM
Dilution Factor	2
Rack	2
Vial	22

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	2.702 ppb	0.9 %	13,238 cps
11B (STD)	119.893 ppb	0.7 %	709,594 cps
27Al (STD)	10,893.301 ppb	0.8 %	**392,402,914 cps**
51V (KED)	-0.066 ppb	30.9 %	546 cps
52Cr (KED)	1.101 ppb	5.2 %	3,021 cps
55Mn (STD)	1,364.212 ppb	0.8 %	**106,766,942 cps**
56Fe (KEDH)	149.106 ppb	1.8 %	**2,906,915 cps**
59Co (STD)	161.702 ppb	0.7 %	**8,951,602 cps**
60Ni (KED)	122.646 ppb	4.7 %	182,430 cps
63Cu (KED)	324,262.552 ppb	1.6 %	**1,279,251,127 cps**
66Zn (STD)	218.783 ppb	1.3 %	1,532,252 cps
75As (KED)	1.487 ppb	8.0 %	384 cps
78Se (KEDH)	16.671 ppb	1.7 %	11,453 cps
98Mo (STD)	0.092 ppb	2.7 %	2,806 cps
107Ag (STD)	-0.079 ppb	1.1 %	631 cps
111Cd (STD)	1.973 ppb	2.5 %	15,534 cps
118Sn (STD)	0.076 ppb	12.9 %	12,828 cps
121Sb (STD)	1.546 ppb	2.1 %	42,548 cps
125Te (STD)	0.144 ppb	8.1 %	253 cps
133Cs (STD)	0.649 ppb	1.7 %	67,915 cps
137Ba (STD)	9.223 ppb	1.8 %	117,937 cps
205Tl (STD)	0.208 ppb	2.3 %	14,118 cps
208Pb (STD)	1.166 ppb	2.3 %	96,455 cps
232Th (STD)	0.418 ppb	4.9 %	42,262 cps
238U (STD)	18.540 ppb	2.3 %	1,598,730 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	82.956 %	0.5 %	442,737 cps
45Sc (STD)	83.244 %	0.7 %	**2,635,405 cps**
45Sc (KED)	77.942 %	3.8 %	17,259 cps
45Sc (KEDH)	97.391 %	1.4 %	566,892 cps
72Ge (STD)	81.576 %	0.3 %	475,509 cps
72Ge (KED)	75.754 %	0.7 %	16,153 cps
72Ge (KEDH)	77.562 %	2.7 %	208,538 cps
115In (STD)	76.000 %	0.4 %	1,991,478 cps
115In (KED)	71.623 %	0.7 %	125,882 cps
115In (KEDH)	79.113 %	3.0 %	1,453,002 cps
159Tb (STD)	87.168 %	2.4 %	2,873,352 cps
209Bi (STD)	70.696 %	2.2 %	2,611,154 cps

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Sample Summary

Index	27
Label	WG487361LFB2
Start Time	12/10/2019 10:59:49 AM
Dilution Factor	1
Rack	2
Vial	23

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	45.954 ppb	2.4 %	393,929 cps
11B (STD)	54.800 ppb	0.5 %	592,979 cps
27Al (STD)	46.810 ppb	1.8 %	**3,412,818 cps**
51V (KED)	46.789 ppb	0.7 %	167,231 cps
52Cr (KED)	47.528 ppb	1.1 %	236,480 cps
55Mn (STD)	48.392 ppb	2.6 %	**7,084,376 cps**
56Fe (KEDH)	47.157 ppb	0.4 %	1,913,069 cps
59Co (STD)	47.710 ppb	3.1 %	**4,930,158 cps**
60Ni (KED)	47.505 ppb	0.8 %	145,197 cps
63Cu (KED)	41.698 ppb	1.6 %	436,679 cps
66Zn (STD)	51.313 ppb	1.8 %	672,517 cps
75As (KED)	49.874 ppb	0.7 %	25,726 cps
78Se (KEDH)	46.904 ppb	1.1 %	66,645 cps
98Mo (STD)	43.710 ppb	1.1 %	2,262,130 cps
107Ag (STD)	9.717 ppb	1.3 %	886,509 cps
111Cd (STD)	47.359 ppb	1.6 %	872,472 cps
118Sn (STD)	47.030 ppb	1.6 %	2,750,643 cps
121Sb (STD)	10.057 ppb	1.2 %	581,384 cps
125Te (STD)	46.124 ppb	0.9 %	141,399 cps
133Cs (STD)	46.356 ppb	1.6 %	**11,033,743 cps**
137Ba (STD)	47.883 ppb	1.5 %	1,425,440 cps
205Tl (STD)	45.998 ppb	1.7 %	**8,237,738 cps**
208Pb (STD)	46.887 ppb	1.2 %	**10,995,343 cps**
232Th (STD)	48.940 ppb	1.6 %	**12,018,904 cps**
238U (STD)	48.596 ppb	1.7 %	**12,183,899 cps**

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	75.752 %	0.6 %	404,287 cps
45Sc (STD)	77.715 %	1.6 %	**2,460,341 cps**
45Sc (KED)	79.972 %	0.8 %	17,708 cps
45Sc (KEDH)	76.629 %	4.0 %	446,039 cps
72Ge (STD)	81.865 %	0.4 %	477,194 cps
72Ge (KED)	85.939 %	2.4 %	18,325 cps
72Ge (KEDH)	80.401 %	5.0 %	216,171 cps
115In (STD)	89.345 %	0.8 %	2,341,175 cps
115In (KED)	95.000 %	0.4 %	166,967 cps
115In (KEDH)	84.883 %	5.4 %	1,558,977 cps
159Tb (STD)	95.093 %	2.1 %	**3,134,598 cps**
209Bi (STD)	102.795 %	2.2 %	**3,796,760 cps**

Performance Report

QTEGRA

System

Start time:	12/10/2019 8:47:32 AM
Instrument:	iCAP RQ
Operator:	LAB\clean
Template:	Daily AMU2
Instrument Serial Number:	RQ00998
Last Autotune:	Autotune-!CaliTune STDS-20191205-100709546.imatdat
Solution:	Custom ACZ 1ppb tune solution

Sensitivity & Stability Test

Result	Runs	Sweeps
Passed	3	60

Sensitivity

Analyte	Result	Value	Condition	Limit
Bkg4.5	Passed	3.8 CPS	Less than	15.0 CPS
Bkg220.7	Passed	2.2 CPS	Less than	15.0 CPS
9Be	Passed	26,911.0 CPS	Greater than	10,000.0 CPS
7Li	Passed	107,779.0 CPS	Greater than	50,000.0 CPS
59Co	Passed	295,560.0 CPS	Greater than	100,000.0 CPS
24Mg	Passed	166,048.0 CPS	Greater than	10,000.0 CPS
238U	Passed	470,326.0 CPS	Greater than	330,000.0 CPS
209Bi	Passed	380,798.0 CPS	Greater than	165,000.0 CPS
208Pb	Passed	243,539.0 CPS	Greater than	10,000.0 CPS
205Tl	Passed	340,052.0 CPS	Greater than	10,000.0 CPS
140Ce.16O/140Ce	Passed	0.0293	Less than	0.03
137Ba++/137Ba	Passed	0.0369	Less than	0.05
115In	Passed	532,329.0 CPS	Greater than	220,000.0 CPS

Stability

Analyte	Value	Limit
9Be	0.2 %	5
7Li	0.3 %	5
59Co	0.5 %	5
24Mg	0.3 %	5
208Pb	0.5 %	5
205Tl	1.1 %	5
115In	0.5 %	5

Mass Calibration Test

Result	Channels	Dwell	MeasureWidth	PointSpacing	Sweeps
Passed	75	0.04	1.5	0.02	5

Analyte	Result	Centroid Mass [u]	Offset	Peak width [u]	Peak width min [u]	Peak width max [u]
7Li	Passed	7.0032	0.0128	0.710	0.650	0.850
9Be	Passed	8.9862	0.0260	0.717	0.650	0.850
24Mg	Passed	23.9649	0.0201	0.713	0.650	0.850
59Co	Passed	58.9185	0.0147	0.710	0.650	0.850
115In	Passed	114.8905	0.0133	0.728	0.650	0.850
205Tl	Passed	204.9694	0.0050	0.745	0.650	0.850
208Pb	Passed	207.9710	0.0057	0.757	0.650	0.850

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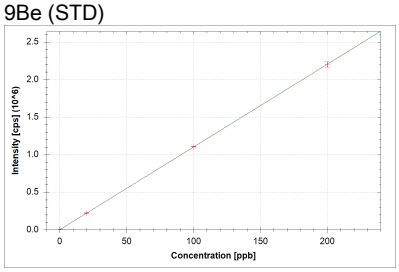
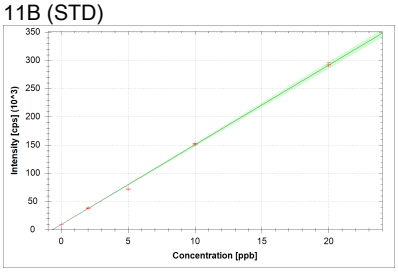
Calibration Curves:

9Be (STD)



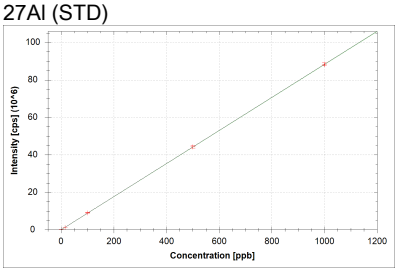
f(x) = 11011.0450*x + 1025.1192
R^2 = 1.0000
BEC = 0.093 ppb
LoD = 0.0105 ppb

11B (STD)



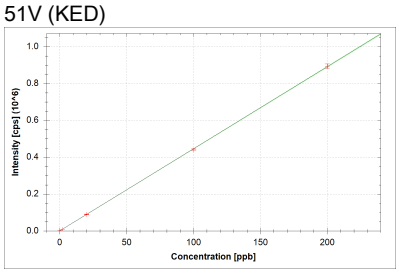
f(x) = 14110.6627*x + 9516.1113
R^2 = 0.9987
BEC = 0.674 ppb
LoD = 0.0142 ppb

27Al (STD)



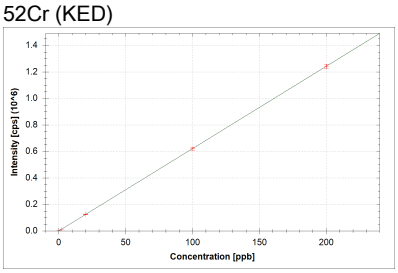
f(x) = 88310.7619*x + 35197.3056
R^2 = 1.0000
BEC = 0.399 ppb
LoD = 0.0030 ppb

51V (KED)



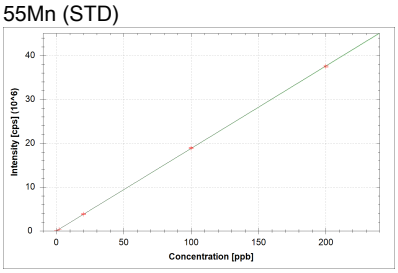
f(x) = 4450.9702*x + 847.9886
R^2 = 0.9999
BEC = 0.191 ppb
LoD = 0.0089 ppb

52Cr (KED)



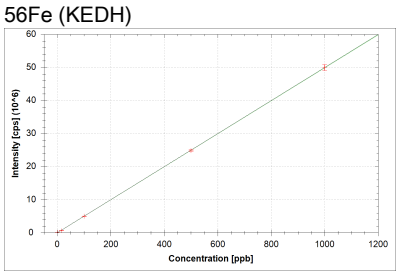
f(x) = 6212.1446*x + 462.1087
R^2 = 1.0000
BEC = 0.074 ppb
LoD = 0.0204 ppb

55Mn (STD)



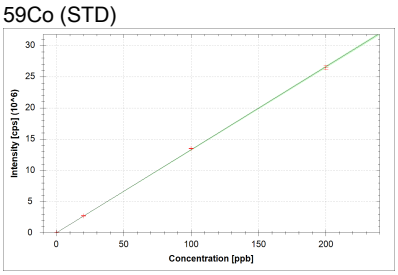
f(x) = 188007.7569*x + 20361.0608
R^2 = 1.0000
BEC = 0.108 ppb
LoD = 0.0049 ppb

56Fe (KEDH)



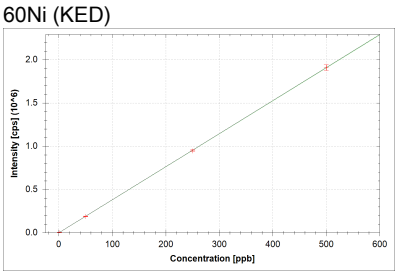
f(x) = 49942.6401*x + 24325.9402
R^2 = 1.0000
BEC = 0.487 ppb
LoD = 0.0382 ppb

59Co (STD)



f(x) = 132995.7606*x + 893.5687
R^2 = 0.9999
BEC = 0.007 ppb
LoD = 0.0009 ppb

60Ni (KED)



f(x) = 3818.3218*x + 177.8252
R^2 = 1.0000
BEC = 0.047 ppb
LoD = 0.0493 ppb

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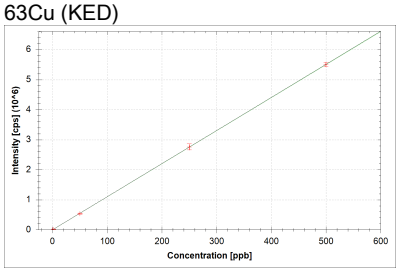
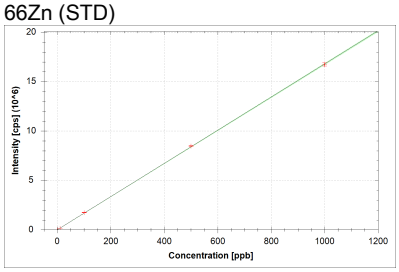
63Cu (KED)



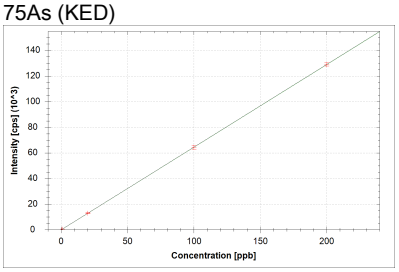
f(x) = 11017.0675*x + 287.9249
R^2 = 1.0000
BEC = 0.026 ppb
LoD = 0.0087 ppb

66Zn (STD)



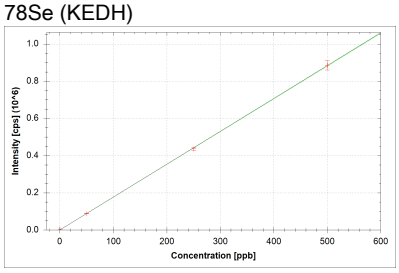
f(x) = 16791.9476*x + 3879.3020
R^2 = 0.9999
BEC = 0.231 ppb
LoD = 0.0196 ppb

75As (KED)



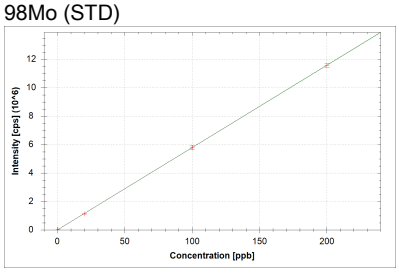
f(x) = 644.7087*x + 13.3906
R^2 = 1.0000
BEC = 0.021 ppb
LoD = 0.0279 ppb

78Se (KEDH)



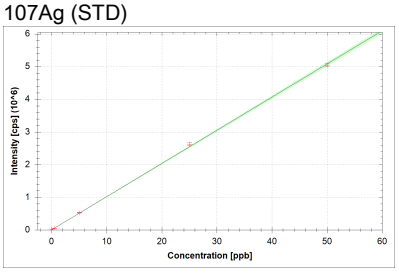
f(x) = 1765.6652*x + 44.7690
R^2 = 0.9999
BEC = 0.025 ppb
LoD = 0.0263 ppb

98Mo (STD)



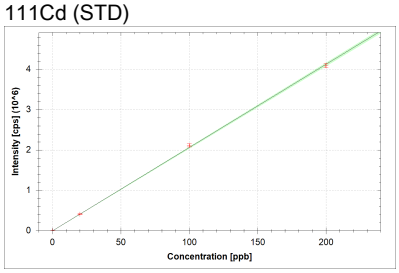
f(x) = 57904.7767*x + 1023.8283
R^2 = 1.0000
BEC = 0.018 ppb
LoD = 0.0042 ppb

107Ag (STD)



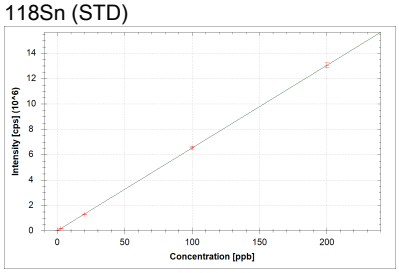
f(x) = 101616.7649*x + 4863.5786
R^2 = 0.9996
BEC = 0.048 ppb
LoD = 0.0074 ppb

111Cd (STD)



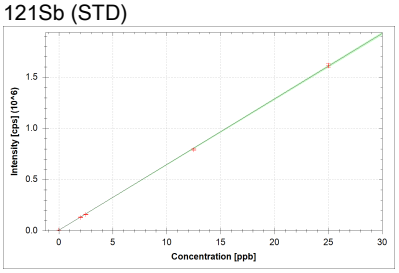
f(x) = 20619.1516*x + 100.8680
R^2 = 0.9997
BEC = 0.005 ppb
LoD = 0.0013 ppb

118Sn (STD)



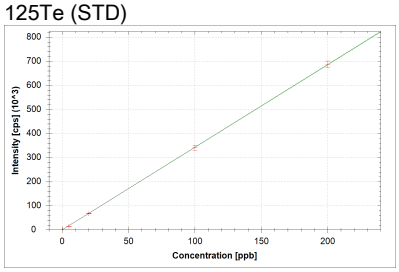
f(x) = 65160.6578*x + 14396.1403
R^2 = 1.0000
BEC = 0.221 ppb
LoD = 0.0057 ppb

121Sb (STD)



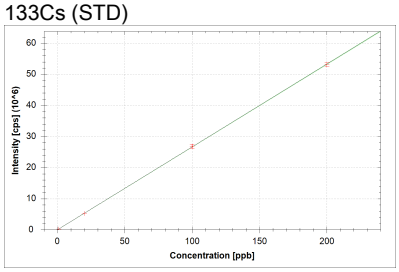
f(x) = 64065.4369*x + 6453.4247
R^2 = 0.9998
BEC = 0.101 ppb
LoD = 0.0330 ppb

125Te (STD)



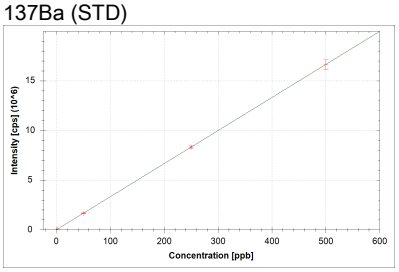
f(x) = 3429.4460*x + 86.9128
R^2 = 1.0000
BEC = 0.025 ppb
LoD = 0.0214 ppb

133Cs (STD)



f(x) = 266364.5946*x + 2859.2156
R^2 = 1.0000
BEC = 0.011 ppb
LoD = 0.0016 ppb

137Ba (STD)



f(x) = 33287.0215*x + 1683.7046
R^2 = 1.0000
BEC = 0.051 ppb
LoD = 0.0114 ppb

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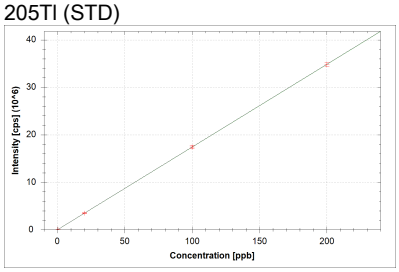
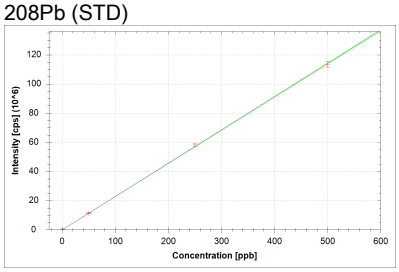
205Tl (STD)



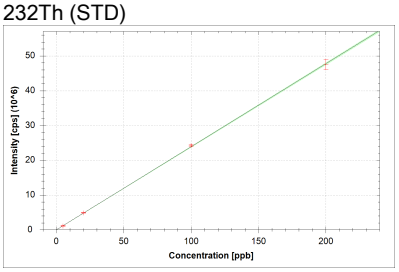
f(x) = 174210.2632*x + 1866.4875
R^2 = 1.0000
BEC = 0.011 ppb
LoD = 0.0019 ppb

208Pb (STD)



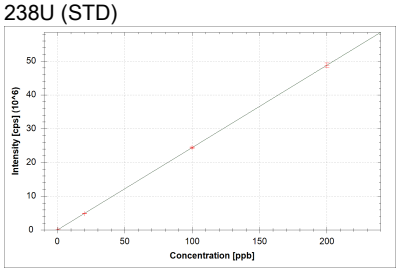
f(x) = 228090.5002*x + 3494.0127
R^2 = 0.9998
BEC = 0.015 ppb
LoD = 0.0014 ppb

232Th (STD)



f(x) = 238760.7786*x + 9881.4131
R^2 = 0.9999
BEC = 0.041 ppb
LoD = 0.0107 ppb

238U (STD)



f(x) = 243902.1180*x + 1008.9850
R^2 = 1.0000
BEC = 0.004 ppb
LoD = 0.0002 ppb

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2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG487763 **ICPMS MWMT**

Sample	Date	SCN	Ag	Al	As	B	Ba	Be	Cd	Co	Cr	Cs	Cu	Fe	Mn	Mo	Ni	Pb	Sb	Se	Sn	Te	Th	Tl	U	V	Zn
WG487763ICV	12/10/19 10:26	MS191014-8	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487763ICB	12/10/19 10:27		X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487763PQV	12/10/19 10:29	MS191014-4	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487763ICSA	12/10/19 10:31		X		X			X	X		X		X		X		X		X	X			X		X	X	
WG487763ICSAB	12/10/19 10:33	MS191119-7	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487361PBS	12/10/19 10:38		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L56147-01	12/10/19 10:40		X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56147-02	12/10/19 10:42		X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56147-03	12/10/19 10:43		X		X			X	X	X	X				X	X	X	X	X	X			X	X	X	X	X
L56147-03SDL	12/10/19 10:45		X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56147-04	12/10/19 10:47		X		X			X	X	X	X					X	X	X	X	X			X	X	X	X	X
L56147-05	12/10/19 10:49		X		X			X	X	X	X				X	X	X	X	X	X			X	X	X	X	X
L56147-05MS1	12/10/19 10:50	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56147-05MSD1	12/10/19 10:52	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56147-05DUP	12/10/19 10:54		X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487763CCV1	12/10/19 10:56	MS191209-4	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487763CCB1	12/10/19 10:58		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487361LFB2	12/10/19 10:59	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487763CCV2	12/10/19 11:01	MS191209-4	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487763CCB2	12/10/19 11:03		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487763ULRV	12/10/19 11:05	MS191209-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X

L56147-2001131042

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG487836

ACZ Laboratories, Inc

Instrument ID: ICPMS6
Analyst: BJ
ACZ Dept: 33
Create Date: 12/10/2019 15:45
Start Date/Time: 12/10/19 3:45PM
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	CU MS MW MT	MN MS MW MT	Dilution
1	WG487836ICV	MS191014-8			1			☑	☑	1
2	WG487836ICB	NONE			1			☑	☑	1
3	WG487836PQV	MS191014-4			1			☑	☑	1
4	WG487836ICSA	MS191119-6			1			☑	☑	1
5	WG487836ICSAB	MS191119-7			1			☑	☑	1
6	WG487836ULRV	MS191028-3			1			☑	☑	1
7	WG487836WASH	NONE			1			☑	☑	1
8	WG487361PBS	NONE			1			☑	☑	1
9	L56147-03	STSB28_0.5-3			1		2750	☑	☐	200
10	L56147-04	STSB28_6-15			1		3040	☑	☑	50
11	L56147-04SDL	NONE			1			☑	☑	50
12	L56147-05	STSB29_0.5-3			1		3540	☑	☐	1000
13	L56147-05MS1	MS191119-5			1			☑	☑	1000
14	WG487836CCV1	MS191028-2			1			☑	☑	1
15	WG487836CCB1	NONE			1			☑	☑	1
16	L56147-05MSD1	MS191119-5			1			☑	☑	1000
17	L56147-05DUP	NONE			1			☑	☑	1000
18	WG487361LFB2	MS191119-5			1			☑	☑	1
19	WG487836CCV2	MS191028-2			1			☑	☑	1
20	WG487836CCB2	NONE			1			☑	☑	1

moved up in template BJ 12/10/19

Report Comments: No ULRV BJ 12/10/19
Run together with ~~WG487~~ WG487812

Internal Comments as "WG487812" BJ 12/10/19

AREV: BJ 12/10/19
Initials, Date

SREV: 12.12.19
Initials, Date

12/10/2019 3:45:54 PM 121719

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG487836

ACZ Laboratories, Inc

Instrument ID: ICPMS6
Analyst:
ACZ Dept: 33
Create Date: 12/10/2019 15:45
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MSD1	ICPMS Spike
WG487361LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/10/2019 3:45:54 PM 121719

ACZ Laboratories, Inc.
ICPMS DATA REVIEW CHECKLIST

AREV:	Bzu
Date:	12/10/19
SREV:	[illegible]
Date:	12-12-19

Workgroup:	487836
Sample Type:	MWMT
Analysis Date:	12/10/19
Analyst:	Bzu

	Yes	No	N /A
1) Is the instrument ID on the bench sheet correct?	✓		
2) Has a passing method tune been performed within 24 hours?	✓		
3) Was the low calibration point dropped? If yes, notify PM of change to PQLs.			✓
4) Is the linear regression ≥ 0.995 for the analytes of interest?	✓		
5) Was the PQV standard analyzed & evaluated for DW samples ? (Fail in LIMS if no DW sxs in WG.)	✓		
6) Do the dilution factors on the benchsheet match the sequence in the raw data?	✓		
7) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal, EC, TDS)?			✓
8) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?			✓
9) Are the % Recoveries of the internal standards within the method limits?	✓		
10) Are all of the QC critera listed in LIMS within specified limits?		✓	
11) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?			✓
12) Are all errors properly crossed out (i.e. single-line, dated & initialed)?	✓		
13) Is a current standard/reagent form attached to the workgroup?	✓		
14) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
147-05/ms/msD	↑/↓ Cu = 18283 %, -2435 %	M3 flagged assoc. sxs
147-05/msD	↓ Cu = -140%	M3 flagged assoc. sxs

FRMII012.02.08.10

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487836

Date Reported: 12-Dec-19
Run ID: R1763842
Date Analyzed: 10-Dec-19
ICAL Workgroup:
Instrument ID: ICPMS6

WG487836ICV

Tag: **Measured:** 12/10/2019 3:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.05329	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	107	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.05132	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	103	1		%	++	0.0004	0.002			

WG487836ICB

Tag: **Measured:** 12/10/2019 3:31:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

WG487836PQV

Tag: **Measured:** 12/10/2019 3:33:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.00182	1	B	mg/L	++	0.0008	0.002			
SREV	COPPER	REC	91	1	B	%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.00177	1	B	mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	88	1	B	%	++	0.0004	0.002			

WG487836ICSA

Tag: **Measured:** 12/10/2019 3:35:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.00056	1	B	mg/L	++	0.0004	0.002			

WG487836ICSAB

Tag: **Measured:** 12/10/2019 3:36:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.01828	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	91	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.01904	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	95	1		%	++	0.0004	0.002			

WG487836CCV1

Tag: **Measured:** 12/10/2019 4:09:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.24567	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	98	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.09679	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	97	1		%	++	0.0004	0.002			

WG487836CCB1

Tag: **Measured:** 12/10/2019 4:10:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

WG487361PBS

Tag: 1 Measured: 12/10/2019 4:12:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.00169	1	B	mg/L	++	0.0008	0.002	5x = 0.00845		
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

WG487361LFB2

Tag: 1 Measured: 12/10/2019 4:14:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.04979	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	99	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.04784	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	95	1		%	++	0.0004	0.002			

L56147-03

Tag: 1 Measured: 12/10/2019 4:16:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	IS-MWMT	83.0	200		mg/L	++	0.2	0.4		M3	

L56147-04

Tag: 1 Measured: 12/10/2019 4:18:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	IS-MWMT	3.16	50		mg/L	++	0.04	0.1		M3	
SREV	MANGANESE	IS-MWMT	9.41	50		mg/L	++	0.02	0.1		M3 RA	

L56147-04SDL

Tag: Measured: 12/10/2019 4:19:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	D	4	50		%	++	0.04	0.1			
SREV	COPPER	FOUND	0.607	50		mg/L	++	0.04	0.1			
SREV	COPPER	REG	3.035	50		mg/L	++	0.04	0.1			
SREV	MANGANESE	D	2	50		%	++	0.02	0.1			
SREV	MANGANESE	FOUND	1.853	50		mg/L	++	0.02	0.1			
SREV	MANGANESE	REG	9.265	50		mg/L	++	0.02	0.1			

L56147-05

Tag: 1 Measured: 12/10/2019 4:21:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	IS-MWMT	339	1000		mg/L	++	0.8	2		M3	
NEED	MANGANESE	REG	1.6	1000	B	mg/L	++	0.4	2		RA	

L56147-05MS1

Tag: 1 Measured: 12/10/2019 4:23:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	348.16	1000		mg/L	++	0.8	2			
SREV	COPPER	REC	18283	1000		%	ALRT	0.8	2		M3 4x	
SREV	MANGANESE	FOUND	1.66	1000	B	mg/L	++	0.4	2			
SREV	MANGANESE	REC	120	1000	B	%	++	0.4	2			

L56147-05MSD1

Tag: 1 Measured: 12/10/2019 4:25:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	326.8	1000		mg/L	++	0.8	2			
SREV	COPPER	REC	-24351	1000		%	ALRT	0.8	2		M3 4x	
SREV	COPPER	RPD	6	1000		%	++	0.8	2			
SREV	MANGANESE	FOUND	1.53	1000	B	mg/L	++	0.4	2			
SREV	MANGANESE	REC	-140	1000	B	%	ALRT	0.4	2		M3 4x	
SREV	MANGANESE	RPD	8	1000		%	++	0.4	2			

L56147-05DUP

Tag: 1 Measured: 12/10/2019 4:27:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	372.16	1000		mg/L	++	0.8	2			
SREV	COPPER	RPD	9	1000		%	++	0.8	2			
SREV	MANGANESE	FOUND	1.55	1000	B	mg/L	++	0.4	2			
SREV	MANGANESE	RPD	3	1000		%	++	0.4	2		RA	

WG487836CCV2

Tag: Measured: 12/10/2019 4:28:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.24251	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	97	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.09669	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	96	1		%	++	0.0004	0.002			

WG487836CCB2

Tag: Measured: 12/10/2019 4:30:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

Sample Name	WG487361PBS
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:12:40 PM
Sample Type	Sample
Total Dilution	1.0000
Vial Location	2301

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	0.010	0.01	ppb	19.7	200	
11	B	6	NoGas	40.493	40.49	ppb	1.5	20	OCAL
27	Al	72	NoGas	2.481	2.48	ppb	0.5	1000	
51	V	45	He	0.553	0.55	ppb	2.9	200	
52	Cr	45	He	0.174	0.17	ppb	4.7	200	
55	Mn	72	NoGas	0.077	0.08	ppb	1.3	200	
56	Fe	45	H2	2.094	2.09	ppb	5.4	1000	
59	Co	72	NoGas	-0.014	-0.01	ppb	3.9	200	
60	Ni	45	He	0.107	0.11	ppb	21.1	500	
63	Cu	45	He	1.687	1.69	ppb	2.0	500	
66	Zn	72	NoGas	1.083	1.08	ppb	1.9	1000	
75	As	45	He	0.003	0	ppb	12.4	200	
78	Se	45	H2	-0.049	-0.05	ppb	6.6	500	
98	Mo	115	NoGas	-0.003	0	ppb	31.9	200	
107	Ag	115	NoGas	0.004	0	ppb	4.9	50	
111	Cd	115	NoGas	-0.004	0	ppb	45.3	200	
118	Sn	115	NoGas	-0.019	-0.02	ppb	6.6	200	
121	Sb	115	NoGas	0.012	0.01	ppb	9.4	25	
125	Te	115	NoGas	0.009	0.01	ppb	66.1	200	
133	Cs	115	NoGas	-0.011	-0.01	ppb	8.2	200	
137	Ba	115	NoGas	0.549	0.55	ppb	2.4	500	
205	Tl	209	NoGas	-0.039	-0.04	ppb	3.1	200	
208	Pb	209	NoGas	0.081	0.08	ppb	0.9	500	
232	Th	209	NoGas	0.000	0	ppb	2.0	200	
238	U	209	NoGas	-0.007	-0.01	ppb	24.9	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	469709.55	0.5	101.42	60	120	
45	Sc	NoGas	2955959.81	3070360.85	0.6	103.87	60	120	
45	Sc	H2	1241210.75	1237004.78	6.1	99.66	60	120	
45	Sc	He	172614.5	174331.84	2.8	100.99	60	120	
72	Ge	NoGas	695614.22	721971.78	1.3	103.79	60	120	
72	Ge	H2	404365.96	398112.03	7.0	98.45	60	120	
72	Ge	He	121212.8	121583.24	2.3	100.31	60	120	
115	In	NoGas	2080659.74	2156022.54	0.4	103.62	60	120	
115	In	H2	1892159.79	1870099.86	6.5	98.83	60	120	
115	In	He	487207.98	489881.72	3.6	100.55	60	120	
159	Tb	NoGas	2072554.64	2146870.61	0.5	103.59	60	120	
209	Bi	NoGas	2233177.13	2330488.73	0.5	104.36	60	120	

Sample Name	WG487361LFB2
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:14:28 PM
Sample Type	Sample
Total Dilution	1.0000
Vial Location	2302

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	47.968	47.97	ppb	0.3	200	
11	B	6	NoGas	51.717	51.72	ppb	0.8	20	OCAL
27	Al	72	NoGas	50.984	50.98	ppb	0.5	1000	
51	V	45	He	48.362	48.36	ppb	4.2	200	
52	Cr	45	He	48.387	48.39	ppb	4.4	200	
55	Mn	72	NoGas	47.841	47.84	ppb	1.0	200	
56	Fe	45	H2	52.137	52.14	ppb	5.3	1000	
59	Co	72	NoGas	47.600	47.6	ppb	0.2	200	
60	Ni	45	He	47.999	48	ppb	4.3	500	
63	Cu	45	He	49.793	49.79	ppb	4.2	500	
66	Zn	72	NoGas	48.512	48.51	ppb	0.1	1000	
75	As	45	He	48.626	48.63	ppb	4.8	200	
78	Se	45	H2	47.033	47.03	ppb	7.1	500	
98	Mo	115	NoGas	47.023	47.02	ppb	0.2	200	
107	Ag	115	NoGas	9.803	9.8	ppb	0.4	50	
111	Cd	115	NoGas	47.127	47.13	ppb	0.5	200	
118	Sn	115	NoGas	46.963	46.96	ppb	0.1	200	
121	Sb	115	NoGas	9.865	9.86	ppb	0.6	25	
125	Te	115	NoGas	46.508	46.51	ppb	0.6	200	
133	Cs	115	NoGas	47.990	47.99	ppb	0.6	200	
137	Ba	115	NoGas	47.136	47.14	ppb	0.3	500	
205	Tl	209	NoGas	47.419	47.42	ppb	0.1	200	
208	Pb	209	NoGas	47.882	47.88	ppb	0.2	500	
232	Th	209	NoGas	46.933	46.93	ppb	0.2	200	
238	U	209	NoGas	47.407	47.41	ppb	0.1	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	476433.61	1.4	102.87	60	120	
45	Sc	NoGas	2955959.81	3057435.43	0.9	103.43	60	120	
45	Sc	H2	1241210.75	1243349.01	5.7	100.17	60	120	
45	Sc	He	172614.5	171889.87	4.5	99.58	60	120	
72	Ge	NoGas	695614.22	721774.12	0.8	103.76	60	120	
72	Ge	H2	404365.96	400167.70	5.8	98.96	60	120	
72	Ge	He	121212.8	121326.59	3.9	100.09	60	120	
115	In	NoGas	2080659.74	2161353.07	1.0	103.88	60	120	
115	In	H2	1892159.79	1864622.84	6.7	98.54	60	120	
115	In	He	487207.98	491371.21	3.6	100.85	60	120	
159	Tb	NoGas	2072554.64	2136710.61	0.4	103.1	60	120	
209	Bi	NoGas	2233177.13	2324021.16	0.3	104.07	60	120	

Sample Name	L56147-03
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:16:17 PM
Sample Type	Sample
Total Dilution	200.0000
Vial Location	2303

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	4.891	0.02	ppb	7.5	200	
11	B	6	NoGas	-1584.272	-7.92	ppb	3.1	20	
27	Al	72	NoGas	5903.428	29.52	ppb	1.2	1000	
51	V	45	He	-32.971	-0.16	ppb	4.8	200	
52	Cr	45	He	-1.883	-0.01	ppb	6.3	200	
55	Mn	72	NoGas	1202.339	6.01	ppb	0.8	200	
56	Fe	45	H2	42.988	0.22	ppb	5.2	1000	
59	Co	72	NoGas	157.799	0.79	ppb	0.8	200	
60	Ni	45	He	118.030	0.59	ppb	3.6	500	
63	Cu	45	He	83013.619	415.07	ppb	5.3	500	
66	Zn	72	NoGas	51.007	0.26	ppb	4.0	1000	
75	As	45	He	-7.104	-0.04	ppb	7.5	200	
78	Se	45	H2	-10.002	-0.05	ppb	9.8	500	
98	Mo	115	NoGas	0.593	0	ppb	29.1	200	
107	Ag	115	NoGas	-0.338	0	ppb	11.3	50	
111	Cd	115	NoGas	0.834	0	ppb	32.9	200	
118	Sn	115	NoGas	6.069	0.03	ppb	2.7	200	
121	Sb	115	NoGas	0.859	0	ppb	1.4	25	
125	Te	115	NoGas	3.745	0.02	ppb	34.7	200	
133	Cs	115	NoGas	-0.041	0	ppb	12.3	200	
137	Ba	115	NoGas	11.847	0.06	ppb	4.6	500	
205	Tl	209	NoGas	8.937	0.04	ppb	16.2	200	
208	Pb	209	NoGas	29.616	0.15	ppb	12.2	500	
232	Th	209	NoGas	5.559	0.03	ppb	7.9	200	
238	U	209	NoGas	14.916	0.08	ppb	5.7	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	482676.01	1.1	104.22	60	120	
45	Sc	NoGas	2955959.81	3032391.61	0.7	102.59	60	120	
45	Sc	H2	1241210.75	1269116.44	6.1	102.25	60	120	
45	Sc	He	172614.5	176056.83	4.5	101.99	60	120	
72	Ge	NoGas	695614.22	715031.57	0.3	102.79	60	120	
72	Ge	H2	404365.96	411093.74	7.1	101.66	60	120	
72	Ge	He	121212.8	123234.66	4.5	101.67	60	120	
115	In	NoGas	2080659.74	2145416.51	0.3	103.11	60	120	
115	In	H2	1892159.79	1899968.67	6.7	100.41	60	120	
115	In	He	487207.98	499098.77	4.5	102.44	60	120	
159	Tb	NoGas	2072554.64	2111078.04	0.7	101.86	60	120	
209	Bi	NoGas	2233177.13	2289702.41	0.1	102.53	60	120	

Sample Name	L56147-04
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:18:05 PM
Sample Type	Sample
Total Dilution	50.0000
Vial Location	2304

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	0.553	0.01	ppb	10.8	200	
11	B	6	NoGas	-280.284	-5.61	ppb	0.4	20	
27	Al	72	NoGas	19.871	0.4	ppb	1.1	1000	
51	V	45	He	-14.289	-0.29	ppb	4.4	200	
52	Cr	45	He	-0.397	-0.01	ppb	13.6	200	
55	Mn	72	NoGas	9405.441	188.11	ppb	1.3	200	
56	Fe	45	H2	3.020	0.06	ppb	3.7	1000	
59	Co	72	NoGas	339.846	6.8	ppb	0.4	200	
60	Ni	45	He	186.205	3.72	ppb	5.7	500	
63	Cu	45	He	3159.394	63.19	ppb	2.5	500	
66	Zn	72	NoGas	80.853	1.62	ppb	1.3	1000	
75	As	45	He	-1.949	-0.04	ppb	11.8	200	
78	Se	45	H2	46.101	0.92	ppb	9.9	500	
98	Mo	115	NoGas	9.288	0.19	ppb	2.9	200	
107	Ag	115	NoGas	-0.109	0	ppb	14.7	50	
111	Cd	115	NoGas	1.465	0.03	ppb	15.6	200	
118	Sn	115	NoGas	1.242	0.02	ppb	3.9	200	
121	Sb	115	NoGas	0.356	0.01	ppb	4.3	25	
125	Te	115	NoGas	-0.006	0	ppb	69.3	200	
133	Cs	115	NoGas	-0.028	0	ppb	5.1	200	
137	Ba	115	NoGas	9.482	0.19	ppb	6.2	500	
205	Tl	209	NoGas	7.754	0.16	ppb	8.8	200	
208	Pb	209	NoGas	5.632	0.11	ppb	9.2	500	
232	Th	209	NoGas	-0.101	0	ppb	6.0	200	
238	U	209	NoGas	35.696	0.71	ppb	0.5	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	489562.60	0.8	105.71	60	120	
45	Sc	NoGas	2955959.81	3083962.58	0.4	104.33	60	120	
45	Sc	H2	1241210.75	1283526.51	4.7	103.41	60	120	
45	Sc	He	172614.5	179813.04	3.7	104.17	60	120	
72	Ge	NoGas	695614.22	719302.54	0.1	103.41	60	120	
72	Ge	H2	404365.96	415792.63	4.5	102.83	60	120	
72	Ge	He	121212.8	126355.92	5.3	104.24	60	120	
115	In	NoGas	2080659.74	2143984.29	0.7	103.04	60	120	
115	In	H2	1892159.79	1898841.66	5.3	100.35	60	120	
115	In	He	487207.98	507608.51	3.2	104.19	60	120	
159	Tb	NoGas	2072554.64	2104879.78	0.6	101.56	60	120	
209	Bi	NoGas	2233177.13	2264081.30	0.5	101.38	60	120	

Sample Name	L56147-04SDL
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:19:54 PM
Sample Type	Sample
Total Dilution	50.0000
Vial Location	2305

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	0.073	0	ppb	9.1	200	
11	B	6	NoGas	-445.952	-8.92	ppb	1.5	20	
27	Al	72	NoGas	16.720	0.33	ppb	1.4	1000	
51	V	45	He	-13.923	-0.28	ppb	4.2	200	
52	Cr	45	He	-1.240	-0.02	ppb	6.2	200	
55	Mn	72	NoGas	1853.098	37.06	ppb	0.6	200	
56	Fe	45	H2	-2.049	-0.04	ppb	8.4	1000	
59	Co	72	NoGas	67.616	1.35	ppb	1.7	200	
60	Ni	45	He	37.557	0.75	ppb	6.2	500	
63	Cu	45	He	606.964	12.14	ppb	3.0	500	
66	Zn	72	NoGas	-14.271	-0.28	ppb	3.1	1000	
75	As	45	He	-2.340	-0.05	ppb	30.1	200	
78	Se	45	H2	6.596	0.13	ppb	2.1	500	
98	Mo	115	NoGas	1.632	0.03	ppb	10.1	200	
107	Ag	115	NoGas	-0.137	0	ppb	27.7	50	
111	Cd	115	NoGas	-0.033	0	ppb	23.6	200	
118	Sn	115	NoGas	0.511	0.01	ppb	3.9	200	
121	Sb	115	NoGas	-0.242	0	ppb	10.1	25	
125	Te	115	NoGas	0.194	0	ppb	94.4	200	
133	Cs	115	NoGas	-0.459	-0.01	ppb	8.2	200	
137	Ba	115	NoGas	0.791	0.02	ppb	5.3	500	
205	Tl	209	NoGas	10.628	0.21	ppb	8.8	200	
208	Pb	209	NoGas	3.855	0.08	ppb	9.6	500	
232	Th	209	NoGas	-0.264	0	ppb	14.9	200	
238	U	209	NoGas	6.586	0.13	ppb	2.8	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	475363.40	1.4	102.64	60	120	
45	Sc	NoGas	2955959.81	3029150.02	1.0	102.48	60	120	
45	Sc	H2	1241210.75	1266569.78	5.0	102.04	60	120	
45	Sc	He	172614.5	178321.66	3.1	103.31	60	120	
72	Ge	NoGas	695614.22	707810.04	0.7	101.75	60	120	
72	Ge	H2	404365.96	411372.40	5.0	101.73	60	120	
72	Ge	He	121212.8	124152.59	3.8	102.43	60	120	
115	In	NoGas	2080659.74	2105658.78	1.0	101.2	60	120	
115	In	H2	1892159.79	1870763.19	4.5	98.87	60	120	
115	In	He	487207.98	496902.67	3.2	101.99	60	120	
159	Tb	NoGas	2072554.64	2072784.43	1.4	100.01	60	120	
209	Bi	NoGas	2233177.13	2243981.51	1.3	100.48	60	120	

Sample Name	L56147-05
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:21:43 PM
Sample Type	Sample
Total Dilution	1000.0000
Vial Location	2306

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	-0.549	0	ppb	7.2	200	
11	B	6	NoGas	-9806.286	-9.81	ppb	0.9	20	
27	Al	72	NoGas	12580.333	12.58	ppb	1.2	1000	
51	V	45	He	-260.378	-0.26	ppb	7.1	200	
52	Cr	45	He	-24.758	-0.02	ppb	5.8	200	
55	Mn	72	NoGas	1588.763	1.59	ppb	1.1	200	
56	Fe	45	H2	159.766	0.16	ppb	4.0	1000	
59	Co	72	NoGas	229.666	0.23	ppb	3.0	200	
60	Ni	45	He	145.922	0.15	ppb	3.3	500	
63	Cu	45	He	338978.325	338.98	ppb	4.5	500	
66	Zn	72	NoGas	-488.318	-0.49	ppb	0.4	1000	
75	As	45	He	-48.826	-0.05	ppb	28.8	200	
78	Se	45	H2	-67.777	-0.07	ppb	3.8	500	
98	Mo	115	NoGas	-6.340	-0.01	ppb	23.3	200	
107	Ag	115	NoGas	-3.003	0	ppb	56.7	50	
111	Cd	115	NoGas	-6.235	-0.01	ppb	21.4	200	
118	Sn	115	NoGas	15.815	0.02	ppb	2.3	200	
121	Sb	115	NoGas	-5.336	0	ppb	9.3	25	
125	Te	115	NoGas	5.386	0	ppb	57.7	200	
133	Cs	115	NoGas	-9.360	-0.01	ppb	1.8	200	
137	Ba	115	NoGas	-20.590	-0.02	ppb	10.9	500	
205	Tl	209	NoGas	254.784	0.26	ppb	8.9	200	
208	Pb	209	NoGas	62.638	0.06	ppb	9.6	500	
232	Th	209	NoGas	-6.383	-0.01	ppb	32.8	200	
238	U	209	NoGas	8.276	0.01	ppb	6.5	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	461980.78	1.6	99.75	60	120	
45	Sc	NoGas	2955959.81	2954184.47	1.4	99.94	60	120	
45	Sc	H2	1241210.75	1232937.94	5.0	99.33	60	120	
45	Sc	He	172614.5	174894.99	3.9	101.32	60	120	
72	Ge	NoGas	695614.22	692917.02	1.2	99.61	60	120	
72	Ge	H2	404365.96	396644.26	5.5	98.09	60	120	
72	Ge	He	121212.8	121618.05	4.8	100.33	60	120	
115	In	NoGas	2080659.74	2070567.00	1.6	99.51	60	120	
115	In	H2	1892159.79	1823930.00	5.1	96.39	60	120	
115	In	He	487207.98	490268.96	5.2	100.63	60	120	
159	Tb	NoGas	2072554.64	2030797.56	0.9	97.99	60	120	
209	Bi	NoGas	2233177.13	2197047.13	1.9	98.38	60	120	

Sample Name	L56147-05MS1
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:23:32 PM
Sample Type	Sample
Total Dilution	1000.0000
Vial Location	2307

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	42.397	0.04	ppb	9.3	200	
11	B	6	NoGas	-10263.268	-10.26	ppb	1.0	20	
27	Al	72	NoGas	12864.658	12.86	ppb	0.7	1000	
51	V	45	He	-213.759	-0.21	ppb	4.2	200	
52	Cr	45	He	19.996	0.02	ppb	4.2	200	
55	Mn	72	NoGas	1657.690	1.66	ppb	0.2	200	
56	Fe	45	H2	202.854	0.2	ppb	2.5	1000	
59	Co	72	NoGas	286.332	0.29	ppb	1.4	200	
60	Ni	45	He	197.377	0.2	ppb	5.1	500	
63	Cu	45	He	348158.369	348.16	ppb	3.9	500	
66	Zn	72	NoGas	-433.315	-0.43	ppb	4.2	1000	
75	As	45	He	-4.804	0	ppb	2.8	200	
78	Se	45	H2	-22.011	-0.02	ppb	11.8	500	
98	Mo	115	NoGas	39.251	0.04	ppb	8.4	200	
107	Ag	115	NoGas	6.572	0.01	ppb	3.9	50	
111	Cd	115	NoGas	40.867	0.04	ppb	5.6	200	
118	Sn	115	NoGas	57.214	0.06	ppb	2.8	200	
121	Sb	115	NoGas	3.893	0	ppb	5.0	25	
125	Te	115	NoGas	60.862	0.06	ppb	13.3	200	
133	Cs	115	NoGas	38.663	0.04	ppb	1.7	200	
137	Ba	115	NoGas	32.811	0.03	ppb	14.7	500	
205	Tl	209	NoGas	309.274	0.31	ppb	9.3	200	
208	Pb	209	NoGas	100.536	0.1	ppb	8.8	500	
232	Th	209	NoGas	36.724	0.04	ppb	5.0	200	
238	U	209	NoGas	56.094	0.06	ppb	2.7	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	465675.88	1.3	100.55	60	120	
45	Sc	NoGas	2955959.81	3003982.03	0.1	101.62	60	120	
45	Sc	H2	1241210.75	1259030.58	6.0	101.44	60	120	
45	Sc	He	172614.5	176839.25	3.9	102.45	60	120	
72	Ge	NoGas	695614.22	700145.46	0.1	100.65	60	120	
72	Ge	H2	404365.96	404376.03	6.5	100	60	120	
72	Ge	He	121212.8	123323.99	4.0	101.74	60	120	
115	In	NoGas	2080659.74	2081540.68	0.3	100.04	60	120	
115	In	H2	1892159.79	1861537.88	6.6	98.38	60	120	
115	In	He	487207.98	491350.97	4.5	100.85	60	120	
159	Tb	NoGas	2072554.64	2056005.54	0.5	99.2	60	120	
209	Bi	NoGas	2233177.13	2221479.29	0.3	99.48	60	120	

Sample Name	L56147-05MSD1
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:25:20 PM
Sample Type	Sample
Total Dilution	1000.0000
Vial Location	2308

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	26.698	0.03	ppb	6.2	200	
11	B	6	NoGas	-10670.934	-10.67	ppb	2.2	20	
27	Al	72	NoGas	12183.233	12.18	ppb	1.4	1000	
51	V	45	He	-229.106	-0.23	ppb	2.9	200	
52	Cr	45	He	19.821	0.02	ppb	4.1	200	
55	Mn	72	NoGas	1532.709	1.53	ppb	0.7	200	
56	Fe	45	H2	197.036	0.2	ppb	3.5	1000	
59	Co	72	NoGas	273.501	0.27	ppb	4.4	200	
60	Ni	45	He	200.192	0.2	ppb	10.9	500	
63	Cu	45	He	326797.244	326.8	ppb	4.3	500	
66	Zn	72	NoGas	-469.754	-0.47	ppb	2.8	1000	
75	As	45	He	-4.919	0	ppb	11.2	200	
78	Se	45	H2	-29.605	-0.03	ppb	9.6	500	
98	Mo	115	NoGas	37.064	0.04	ppb	14.2	200	
107	Ag	115	NoGas	7.316	0.01	ppb	5.6	50	
111	Cd	115	NoGas	35.962	0.04	ppb	6.4	200	
118	Sn	115	NoGas	51.634	0.05	ppb	3.0	200	
121	Sb	115	NoGas	1.893	0	ppb	14.4	25	
125	Te	115	NoGas	46.248	0.05	ppb	18.4	200	
133	Cs	115	NoGas	34.931	0.04	ppb	3.9	200	
137	Ba	115	NoGas	29.845	0.03	ppb	7.8	500	
205	Tl	209	NoGas	323.493	0.32	ppb	10.3	200	
208	Pb	209	NoGas	85.246	0.08	ppb	12.6	500	
232	Th	209	NoGas	34.922	0.04	ppb	3.2	200	
238	U	209	NoGas	51.609	0.05	ppb	2.3	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	468225.14	0.6	101.1	60	120	
45	Sc	NoGas	2955959.81	2974319.53	0.7	100.62	60	120	
45	Sc	H2	1241210.75	1272780.30	6.3	102.54	60	120	
45	Sc	He	172614.5	176867.81	2.6	102.46	60	120	
72	Ge	NoGas	695614.22	704227.33	1.0	101.24	60	120	
72	Ge	H2	404365.96	409536.61	6.7	101.28	60	120	
72	Ge	He	121212.8	123982.78	2.7	102.29	60	120	
115	In	NoGas	2080659.74	2094293.49	1.0	100.66	60	120	
115	In	H2	1892159.79	1871220.65	6.7	98.89	60	120	
115	In	He	487207.98	495356.06	3.5	101.67	60	120	
159	Tb	NoGas	2072554.64	2050887.21	0.3	98.95	60	120	
209	Bi	NoGas	2233177.13	2223151.85	0.4	99.55	60	120	

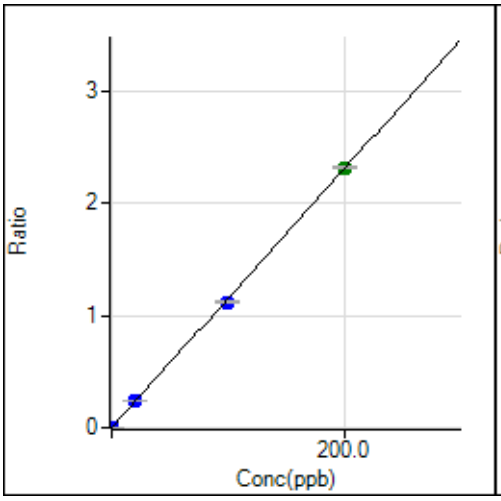
Sample Name	L56147-05DUP
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg487812.b
Acq Time	12/10/2019 4:27:09 PM
Sample Type	Sample
Total Dilution	1000.0000
Vial Location	2309

QC Analyte Table

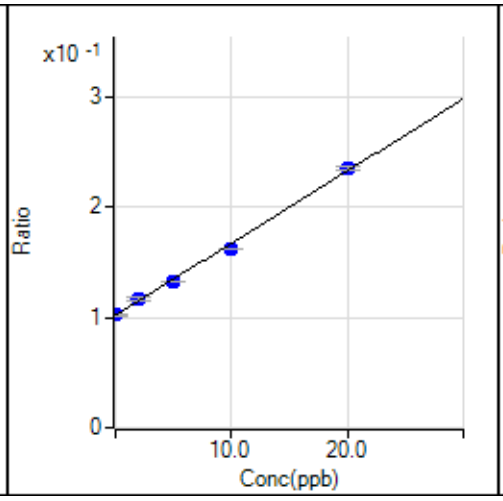
Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	-10.141	-0.01	ppb	21.9	200	
11	B	6	NoGas	-10886.025	-10.89	ppb	0.8	20	
27	Al	72	NoGas	13571.266	13.57	ppb	0.9	1000	
51	V	45	He	-265.415	-0.26	ppb	4.6	200	
52	Cr	45	He	-24.108	-0.02	ppb	7.2	200	
55	Mn	72	NoGas	1548.898	1.55	ppb	0.6	200	
56	Fe	45	H2	72.424	0.07	ppb	4.3	1000	
59	Co	72	NoGas	239.214	0.24	ppb	2.7	200	
60	Ni	45	He	142.228	0.14	ppb	5.6	500	
63	Cu	45	He	372155.769	372.16	ppb	4.3	500	
66	Zn	72	NoGas	-498.980	-0.5	ppb	4.7	1000	
75	As	45	He	-47.363	-0.05	ppb	4.0	200	
78	Se	45	H2	-77.287	-0.08	ppb	7.4	500	
98	Mo	115	NoGas	-7.412	-0.01	ppb	28.4	200	
107	Ag	115	NoGas	-2.979	0	ppb	42.3	50	
111	Cd	115	NoGas	-7.504	-0.01	ppb	31.1	200	
118	Sn	115	NoGas	8.398	0.01	ppb	14.8	200	
121	Sb	115	NoGas	-6.013	-0.01	ppb	28.0	25	
125	Te	115	NoGas	-5.118	0	ppb	173.2	200	
133	Cs	115	NoGas	-8.975	-0.01	ppb	2.7	200	
137	Ba	115	NoGas	-16.160	-0.02	ppb	17.9	500	
205	Tl	209	NoGas	277.353	0.28	ppb	9.8	200	
208	Pb	209	NoGas	35.590	0.04	ppb	11.9	500	
232	Th	209	NoGas	-7.840	-0.01	ppb	21.9	200	
238	U	209	NoGas	9.351	0.01	ppb	4.0	200	

QC ISTD Table

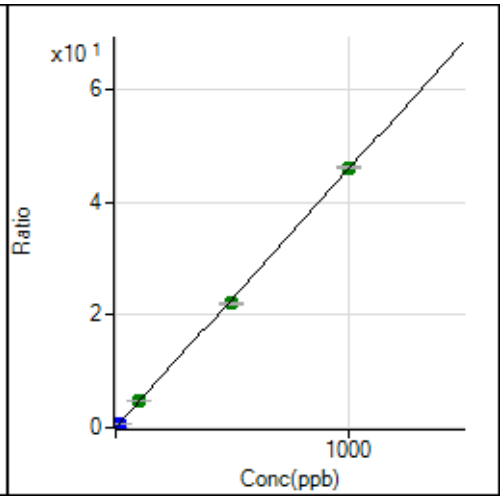
Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	463131.65	465925.02	0.7	100.6	60	120	
45	Sc	NoGas	2955959.81	3018628.98	0.5	102.12	60	120	
45	Sc	H2	1241210.75	1259070.09	5.5	101.44	60	120	
45	Sc	He	172614.5	176939.06	2.5	102.51	60	120	
72	Ge	NoGas	695614.22	709799.38	0.2	102.04	60	120	
72	Ge	H2	404365.96	405848.83	6.4	100.37	60	120	
72	Ge	He	121212.8	123385.55	3.3	101.79	60	120	
115	In	NoGas	2080659.74	2105664.00	0.5	101.2	60	120	
115	In	H2	1892159.79	1871567.36	6.2	98.91	60	120	
115	In	He	487207.98	494974.95	4.3	101.59	60	120	
159	Tb	NoGas	2072554.64	2070527.97	0.3	99.9	60	120	
209	Bi	NoGas	2233177.13	2237896.93	0.5	100.21	60	120	



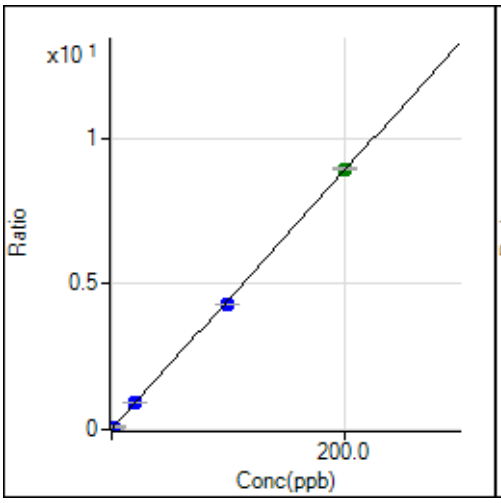
9 Be [NoGas] / ISTD: 6 Li
y = 1.150E-2 x + 3.289E-4
R 0.9998
DL 0.007429
BEC 0.0286



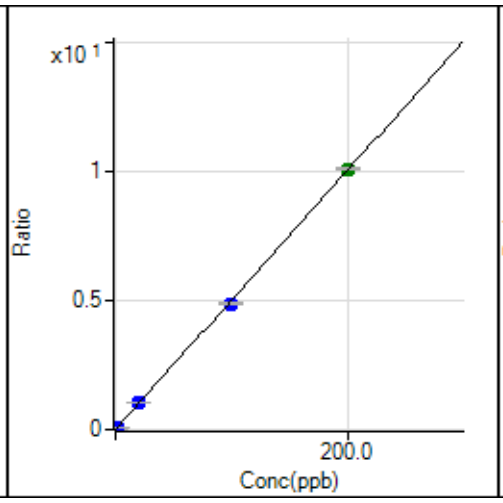
11 B [NoGas] / ISTD: 6 Li
y = 6.546E-3 x + 1.020E-1
R 0.9982
DL 0.1784
BEC 15.59



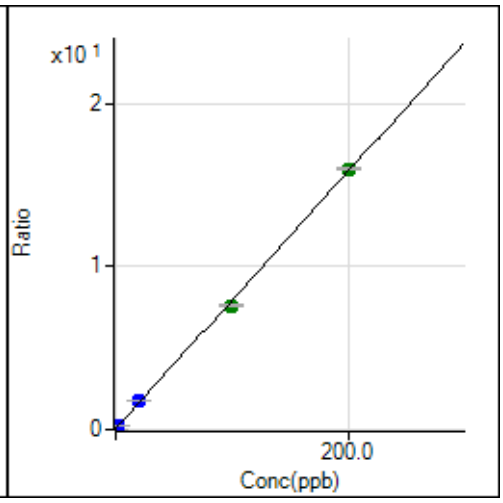
27 Al [NoGas] / ISTD: 72 Ge
y = 4.578E-2 x + 2.665E-2
R 0.9997
DL 0.05485
BEC 0.5823



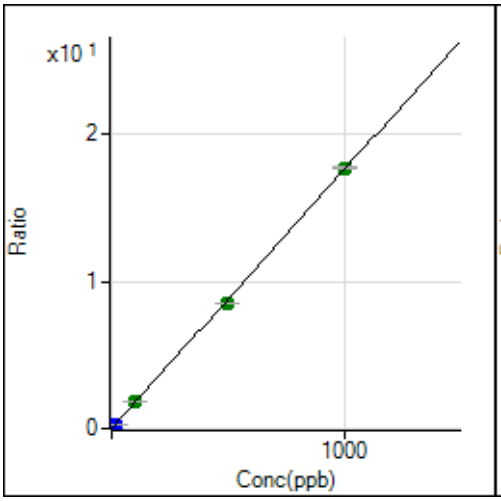
51 V [He] / ISTD: 45 Sc
y = 4.430E-2 x + 2.175E-2
R 0.9997
DL 0.07874
BEC 0.4909



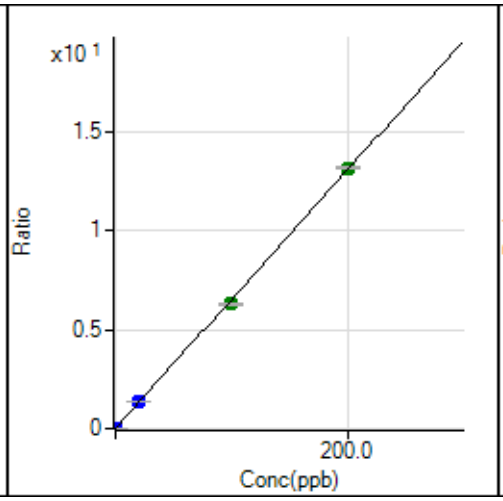
52 Cr [He] / ISTD: 45 Sc
y = 5.010E-2 x + 4.095E-3
R 0.9998
DL 0.02028
BEC 0.08173



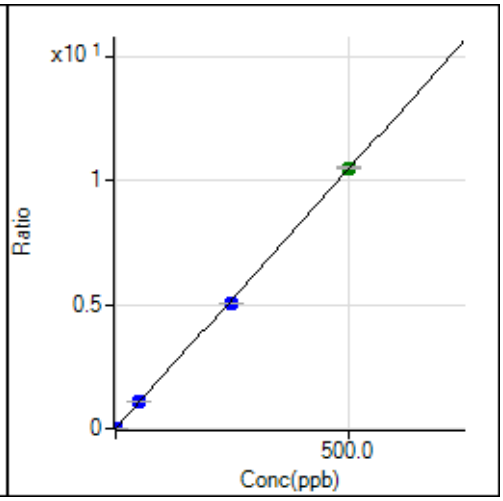
55 Mn [NoGas] / ISTD: 72 Ge
y = 7.884E-2 x + 4.782E-2
R 0.9996
DL 0.02115
BEC 0.6066



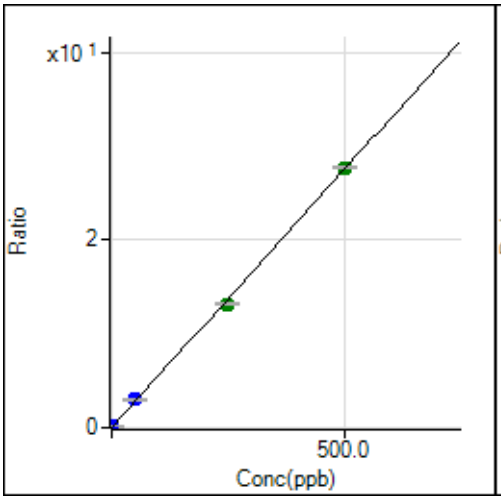
56 Fe [H2] / ISTD: 45 Sc
y = 1.756E-2 x + 9.621E-3
R 0.9997
DL 0.06126
BEC 0.548



59 Co [NoGas] / ISTD: 72 Ge
y = 6.532E-2 x + 3.084E-3
R 0.9997
DL 0.004979
BEC 0.04721



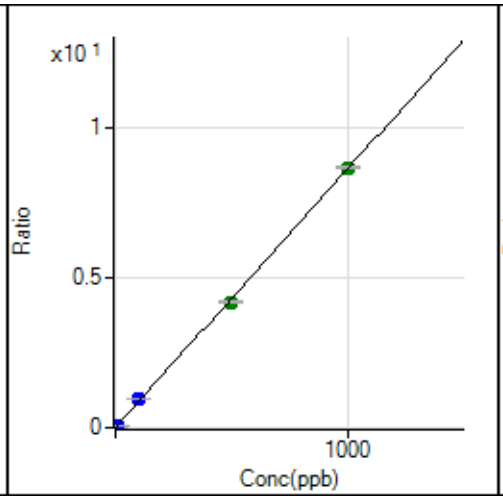
60 Ni [He] / ISTD: 45 Sc
y = 2.089E-2 x + 6.757E-4
R 0.9998
DL 0.01236
BEC 0.03234



63 Cu [He] / ISTD: 45 Sc

y = 5.494E-2 x + 6.392E-3

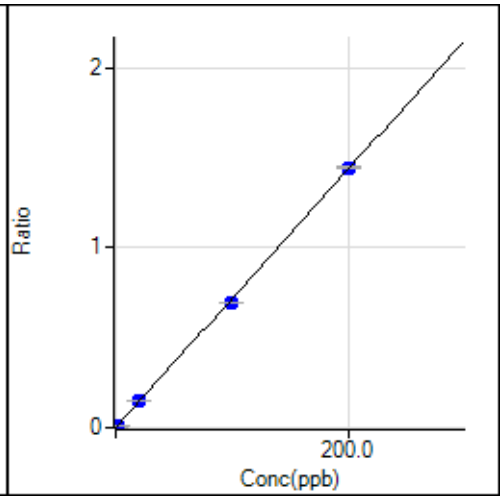
R	0.9997
DL	0.005014
BEC	0.1163



66 Zn [NoGas] / ISTD: 72 Ge

y = 8.615E-3 x + 7.928E-3

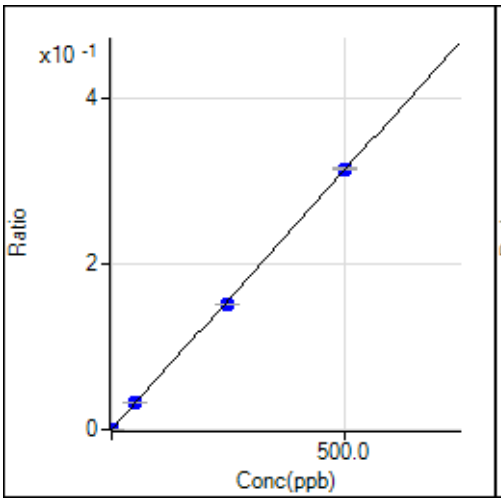
R	0.9998
DL	0.1585
BEC	0.9202



75 As [He] / ISTD: 45 Sc

y = 7.165E-3 x + 4.571E-4

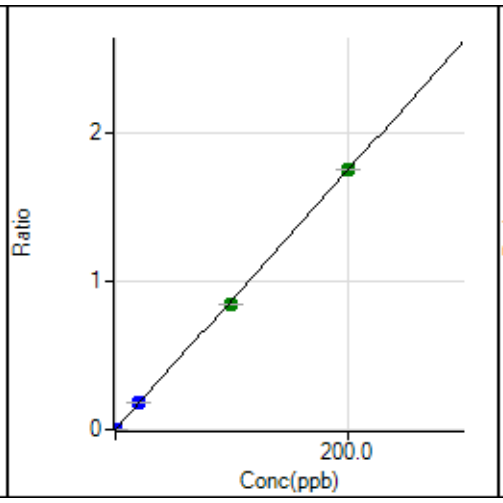
R	0.9997
DL	0.02352
BEC	0.0638



78 Se [H2] / ISTD: 45 Sc

y = 6.250E-4 x + 8.729E-5

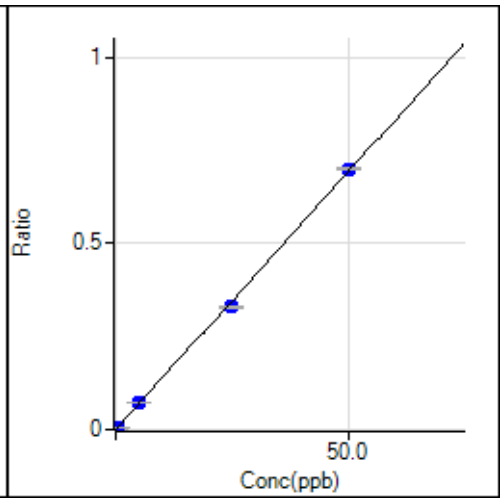
R	0.9998
DL	0.04108
BEC	0.1397



98 Mo [NoGas] / ISTD: 115 In

y = 8.724E-3 x + 9.855E-5

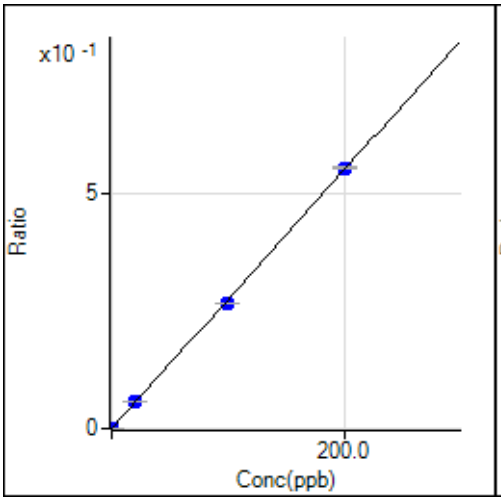
R	0.9998
DL	0.008979
BEC	0.0113



107 Ag [NoGas] / ISTD: 115 In

y = 1.382E-2 x + 5.809E-5

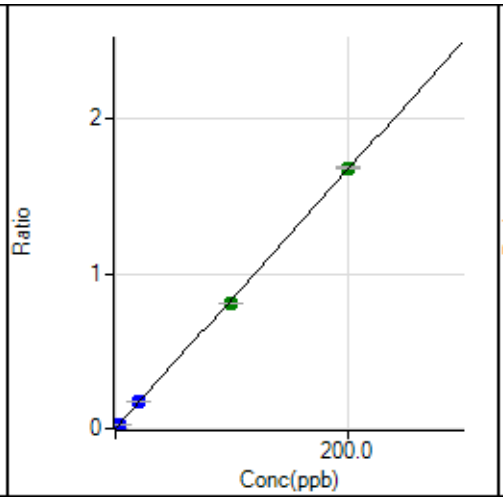
R	0.9995
DL	0.001607
BEC	0.004202



111 Cd [NoGas] / ISTD: 115 In

y = 2.749E-3 x + 3.382E-5

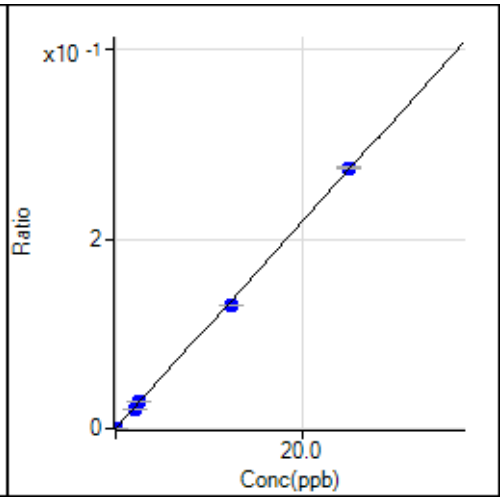
R	0.9997
DL	0.004706
BEC	0.0123



118 Sn [NoGas] / ISTD: 115 In

y = 8.358E-3 x + 6.103E-4

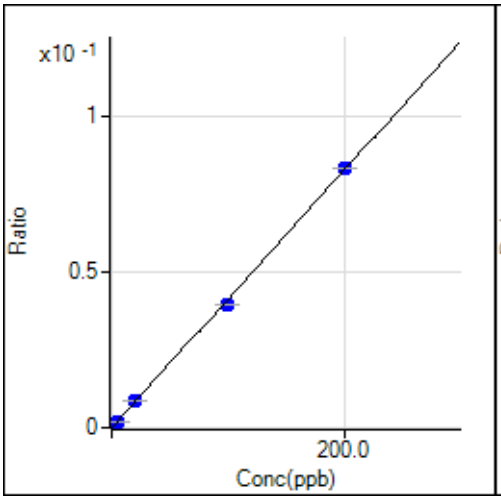
R	0.9997
DL	0.005092
BEC	0.07301



121 Sb [NoGas] / ISTD: 115 In

y = 1.090E-2 x + 1.236E-4

R	0.9996
DL	0.004009
BEC	0.01134



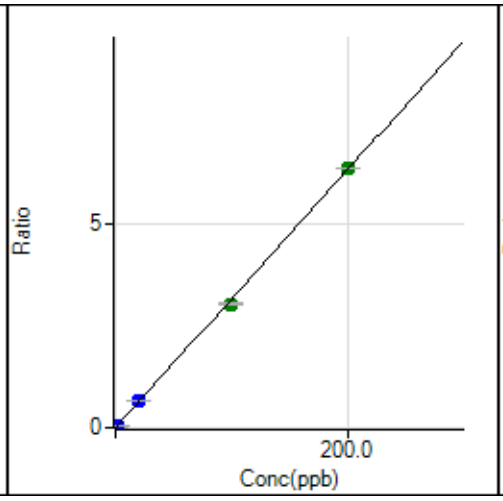
125 Te [NoGas] / ISTD: 115 In

y = 4.128E-4 x + 2.637E-6

R 0.9996

DL 0.01763

BEC 0.006388



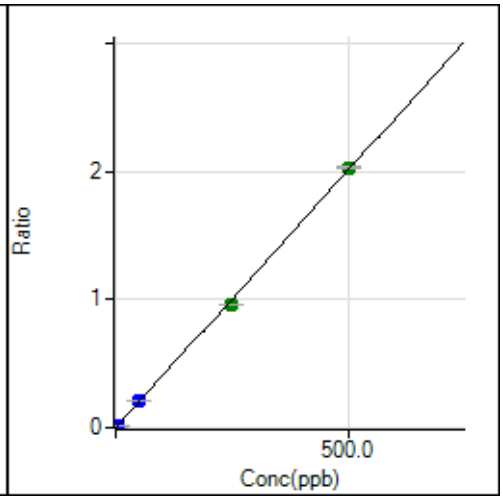
133 Cs [NoGas] / ISTD: 115 In

y = 3.149E-2 x + 6.468E-4

R 0.9997

DL 0.002539

BEC 0.02054



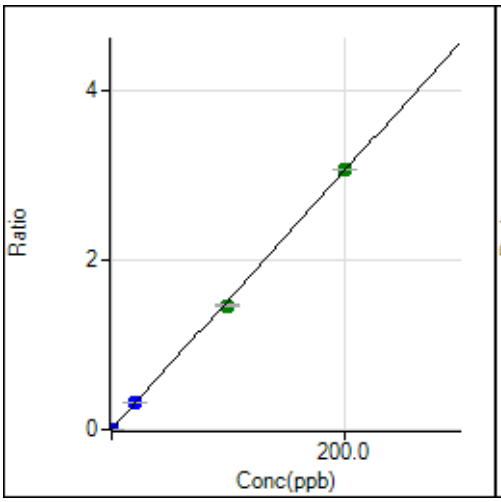
137 Ba [NoGas] / ISTD: 115 In

y = 4.012E-3 x + 1.503E-4

R 0.9996

DL 0.02226

BEC 0.03745



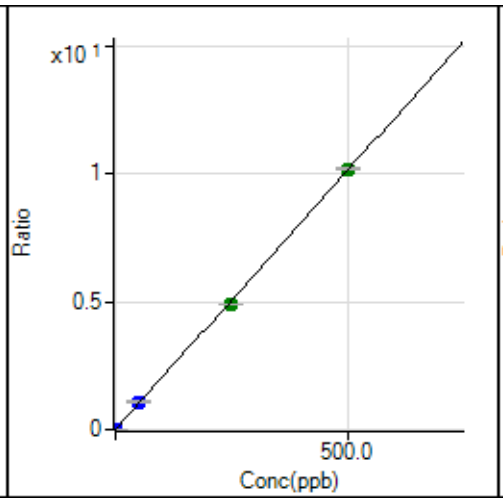
205 Tl [NoGas] / ISTD: 209 Bi

y = 1.525E-2 x + 2.736E-3

R 0.9997

DL 0.01632

BEC 0.1794



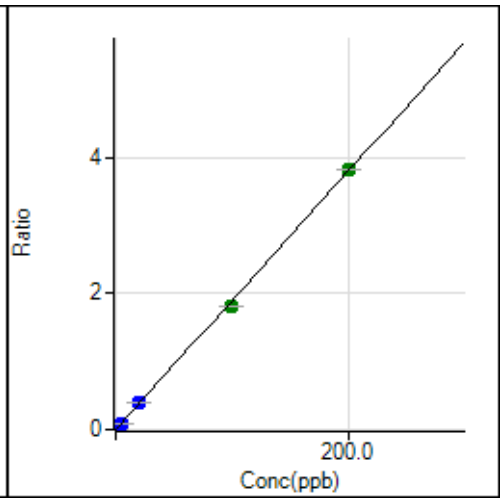
208 Pb [NoGas] / ISTD: 209 Bi

y = 2.020E-2 x + 2.915E-3

R 0.9998

DL 0.006524

BEC 0.1443



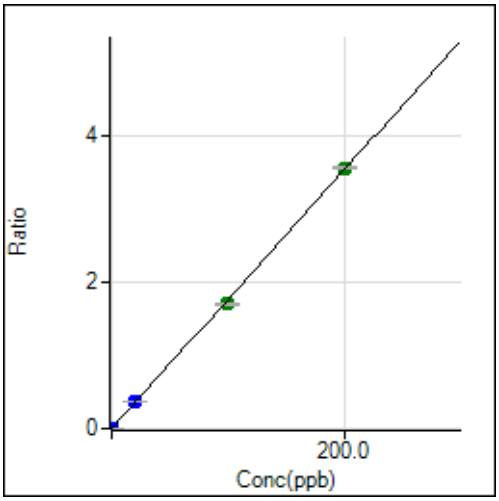
232 Th [NoGas] / ISTD: 209 Bi

y = 1.897E-2 x + 1.979E-4

R 0.9996

DL 0.00155

BEC 0.01043



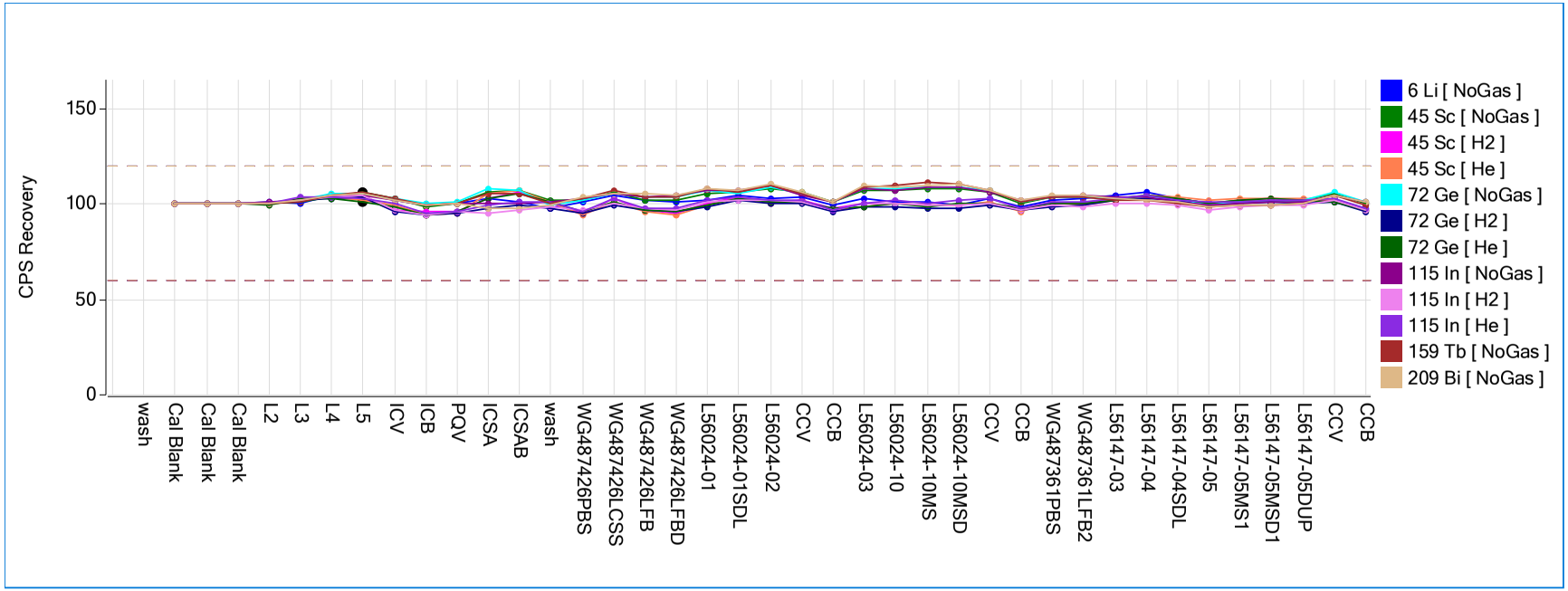
238 U [NoGas] / ISTD: 209 Bi

y = 1.770E-2 x + 1.741E-4

R 0.9997

DL 0.001072

BEC 0.009836


CPS Recovery
150
100
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wash
Cal Blank
Cal Blank
Cal Blank
L2
L3
L4
L5
ICV
ICB
PQV
ICSA
ICSAB
wash
WG487426PBS
WG487426LCSS
WG487426LFB
WG487426LFBD
L56024-01
L56024-01SDL
L56024-02
CCV
CCB
L56024-03
L56024-10
L56024-10MS
L56024-10MSD
CCV
CCB
WG487361PBS
WG487361LFB2
L56147-03
L56147-04
L56147-04SDL
L56147-05
L56147-05MS1
L56147-05MSD1
L56147-05DUP
CCV
CCB
6 Li [NoGas]
45 Sc [NoGas]
45 Sc [H2]
45 Sc [He]
72 Ge [NoGas]
72 Ge [H2]
72 Ge [He]
115 In [NoGas]
115 In [H2]
115 In [He]
159 Tb [NoGas]
209 Bi [NoGas]

EPA 6020 Tune Check Report

Acq/Data Batch C:\Agilent\ICPMH\1\DATA\6020AMU-10_Dec_2019-11_18_57.b

Acq. Date-Time 12/10/2019 11:29:24 AM

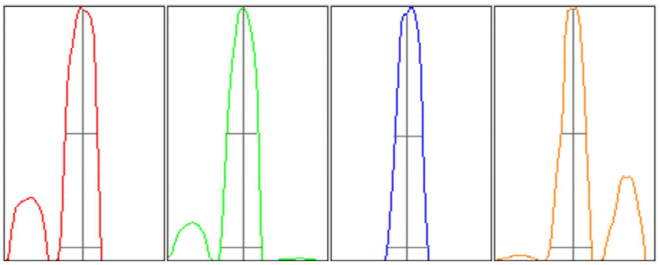
Instrument Name G8403A JP16281462

Mass	Conc. [ug/l]	Count	CPS	RSD%	RSD% (Required)	RSD% (Flag)
7		4943	49434.01	2.473	5.000	
59		12563	125633.53	2.221	5.000	
115		24185	241849.68	2.118	5.000	
205		10195	101950.76	1.918	5.000	

Oxide 156 / 140 1.252 %

Doubly Charged 70 / 140 6.498 %

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)
7	4990.57	7.00	6.90 - 7.10	
59	12926.15	58.95	58.90 - 59.10	
115	22862.61	114.95	114.90 - 115.10	
205	10391.46	205.00	204.90 - 205.10	

Mass	W-50%	W-5%	W-5% (Required)	W-5% (Flag)
7	0.61	0.773	0.900	
59	0.59	0.773	0.900	
115	0.53	0.761	0.900	
205	0.48	0.775	0.900	

Integration Time [sec] 0.1

Acquisition Time [sec] 30.02

ACZ Labs, Inc.
Standards/Reagents Information
ICPMS, Methods 6020 and 200.8

Calibration Standards

6020/200.8 Stock #1: MS190911-1 SCN
6020/200.8 Stock #2: MS191028-1 SCN
6020/200.8 Stock #3: MS190917-2 SCN

PQV STD: MS191014-4
Exp. 12/31/19

ICPMS5/6 INT STD: MS190612-2
Exp. 1/26/2020

ICPMS7 INT STD: MS190613-1
Exp. 1/26/2020

Nitric Acid: 60306

Hydrochloric Acid: 59570

VERIFIED: bsu 12/9/19

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG487836 **ICPMS MWMT**

Sample	Date	SCN	Ag	Al	As	B	Ba	Be	Cd	Co	Cr	Cs	Cu	Fe	Mn	Mo	Ni	Pb	Sb	Se	Sn	Te	Th	Tl	U	V	Zn
WG487836ICV	12/10/19 15:29	MS191014-8											X		X												
WG487836ICB	12/10/19 15:31												X		X												
WG487836PQV	12/10/19 15:33	MS191014-4											X		X												
WG487836ICSA	12/10/19 15:35												X		X												
WG487836ICSAB	12/10/19 15:36	MS191119-7											X		X												
WG487836CCV1	12/10/19 16:09	MS191028-2											X		X												
WG487836CCB1	12/10/19 16:10		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487361PBS	12/10/19 16:12		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487361LFB2	12/10/19 16:14	MS191119-5											X		X												
L56147-03	12/10/19 16:16												X														
L56147-04	12/10/19 16:18												X		X												
L56147-04SDL	12/10/19 16:19												X		X												
L56147-05	12/10/19 16:21												X														
L56147-05MS1	12/10/19 16:23	MS191119-5											X		X												
L56147-05MSD1	12/10/19 16:25	MS191119-5											X		X												
L56147-05DUP	12/10/19 16:27												X		X												
WG487836CCV2	12/10/19 16:28	MS191028-2											X		X												
WG487836CCB2	12/10/19 16:30		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG488303

ACZ Laboratories, Inc

Instrument ID: ICPMS7
Analyst: MFM
ACZ Dept: 33
Create Date: 12/17/2019 10:59
Start Date/Time:
End Date/Time:

L56147-2001131042

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	AG MS MMWMT	AS MS MMWMT	BE MS MMWMT	CD MS MMWMT	CO MS MMWMT	CR MS MMWMT	CU MS MMWMT	MN MS MMWMT	MO MS MMWMT	NI MS MMWMT	PB MS MMWMT	SB MS MMWMT	SE MS MMWMT	TH MS MMWMT	TL MS MMWMT	U MS MMWMT	V MS MMWMT	ZN MS MMWMT	Dilution
1	WG488303ICV	MS191014-8			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
2	WG488303ICB	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
3	WG488303PQV	MS191014-4			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
4	WG488303ICSA	MS191119-6			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
5	WG488303ICSAB	MS191119-7			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
6	WG488303ULRV	MS191209-5			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
7	WG488303WASH	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
8	WG487250PBS	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
9	L56147-06	STSB29_6-15			1		2440	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
10	L56147-07	STSB29-FD_6-15			1		2430	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
11	L56147-07MS	MS191119-5			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
12	L56147-07MSD	MS191119-5			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
13	L56147-08	STSB30_0.5-3			1		2730	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
14	WG488303CCV1	MS191209-4			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
15	WG488303CCB1	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
16	L56147-09	STSB30_6-15			1		3670	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
17	L56147-10	STSB31_0.5-3			1		5130	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	5
18	L56147-11	STSB31_6-15			1		3740	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
19	WG487250LFB2	MS191119-5			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
20	WG487687PBS	NONE			1	6.6		✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓			1
21	L56019-02	TOP01			1	16.8		✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓			1
22	L56019-02MS1	MS191119-5			1			✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓			1

Report Comments: Be→45 Co, Mn, Zn→45

Internal Comments

AREV: MFM 12/18/19
Initials, Date

SREV: 12-18-19
Initials, Date

12/17/2019 11:03:20 AM 112519

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG488303

ACZ Laboratories, Inc

Instrument ID: ICPMS7
Analyst:
ACZ Dept: 33
Create Date: 12/17/2019 10:59
Start Date/Time:
End Date/Time:

SE Q	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	AG MS MMW MT	AS MS MMW MT	BE MS MMW MT	CD MS MMW MT	CO MS MMW MT	CR MS MMW MT	CU MS MMW MT	MN MS MMW MT	MO MS MMW MT	NI MS MMW MT	PB MS MMW MT	SB MS MMW MT	SE MS MMW MT	TH MS MMW MT	TL MS MMW MT	U MS MMW MT	V MS MMW MT	ZN MS MMW MT	Dilution
23	L56019-02MSD1	MS191119-5			1			✓	✓	✓	✓	☐	✓	☐	☐	☐	☐	✓	✓	✓	✓	✓	✓	☐	☐	1
24	L56019-04	SLOPE-01			1	9.9		✓	✓	✓	✓	☐	✓	☐	☐	☐	☐	✓	✓	✓	✓	✓	✓	☐	☐	1
25	L56019-04SDL	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
26	WG488303CCV2	MS191209-4			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
27	WG488303CCB2	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
28	L56019-06	SLOPE-02			1	12.9		✓	✓	✓	✓	☐	✓	☐	☐	☐	☐	✓	✓	✓	✓	✓	✓	☐	☐	1
29	L56019-08	SLOPE-03			1	21.4		✓	✓	✓	✓	☐	✓	☐	☐	☐	☐	✓	✓	✓	✓	✓	✓	☐	☐	1
30	L56019-10	SLOPE-SE			1	14.7		✓	✓	✓	✓	☐	✓	☐	☐	☐	☐	✓	✓	✓	✓	✓	✓	☐	☐	1
31	WG487687LFB2	MS191119-5			1			✓	✓	✓	✓	☐	✓	☐	☐	☐	☐	✓	✓	✓	✓	✓	✓	☐	☐	1
32	WG488303CCV3	MS191209-4			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
33	WG488303CCB3	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/17/2019 11:03:21 AM 112519

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG488303

ACZ Laboratories, Inc

Instrument ID: ICPMS7
Analyst:
ACZ Dept: 33
Create Date: 12/17/2019 10:59
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56019-02	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-02MS1	ICPMS Spike
L56019-02MSD1	ICPMS Spike
L56019-04	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-06	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-08	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-10	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250LFB2	ICPMS LFB
WG487687LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/17/2019 11:03:21 AM 112519

ACZ Laboratories, Inc.

ICPMS DATA REVIEW CHECKLIST

AREV:	MFM
Date:	12/18/2019
SREV:	[illegible]
Date:	12-18-19

Workgroup:	488303
Sample Type:	MWMT
Analysis Date:	12/17/2019
Analyst:	MFM

	Yes	No	N /A
1) Is the instrument ID on the bench sheet correct?	✓		
2) Has a passing method tune been performed within 24 hours?	✓		
3) Was the low calibration point dropped? If yes, notify PM of change to PQLs.		✓	
4) Is the linear regression ≥ 0.995 for the analytes of interest?	✓		
5) Was the PQV standard analyzed & evaluated for DW samples ? (Fail in LIMS if no DW sxs in WG.)			✓
6) Do the dilution factors on the benchsheet match the sequence in the raw data?	✓		
7) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal, EC, TDS)?			✓
8) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?			✓
9) Are the % Recoveries of the internal standards within the method limits?	✓		
10) Are all of the QC critera listed in LIMS within specified limits?		✓	
11) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?	✓		
12) Are all errors properly crossed out (i.e. single-line, dated & initialed)?	✓		
13) Is a current standard/reagent form attached to the workgroup?	✓		
14) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
147-07	Mn 4380	Redo 50x
147-08	Cu 88700	Redo 200x
147-09	Cu 33500 Mn 14300	Redo 100x
147-10	Cu 499000	Redo 2000x
147-11	Cu 31700 Mn 17000	Redo 100x
-07MS/D	Cu, Mn ↓	M3
SDL	Cu	ZG
ULRV	Ag ↓	OK, no sxs >L5

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488303

Date Reported: 19-Dec-19
Run ID: R1764889
Date Analyzed: 17-Dec-19
ICAL Workgroup:
Instrument ID: ICPMS7

WG488303ICV

Tag:

Measured: 12/17/2019 12:25:50 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01852	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	92	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.04859	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	97	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.048542	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	97	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.048489	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	97	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.04913	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	98	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.051296	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	103	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.04867	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	97	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.04975	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	100	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.04955	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	99	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.01976	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	99	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.04918	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	98	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.04852	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	97	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.01989	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	99	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.05046	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	101	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0491	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	98	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.04973	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	99	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.04759	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	95	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0504	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	101	1		%	++	0.004	0.01			

WG488303ICB

Tag:

Measured: 12/17/2019 12:27:37 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

WG488303PQV

Tag:

Measured: 12/17/2019 12:29:22 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.00196	1	B	mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	98	1	B	%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.00077	1	B	mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	77	1	B	%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.000205	1	B	mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	82	1	B	%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.000204	1	B	mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	82	1	B	%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.00162	1	B	mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	81	1	B	%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.000208	1	B	mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	83	1	B	%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.0016	1	B	mg/L	++	0.0008	0.002			
SREV	COPPER	REC	80	1	B	%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.00042	1	B	mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	84	1	B	%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.00171	1	B	mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	85	1	B	%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.00042	1	B	mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	84	1	B	%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.00084	1	B	mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	84	1	B	%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.00023	1	B	mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	92	1	B	%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.00044	1	B	mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	88	1	B	%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.00042	1	B	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	84	1	B	%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0041	1	B	mg/L	++	0.001	0.005			
SREV	THORIUM	REC	82	1	B	%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.00042	1	B	mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	84	1	B	%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.00164	1	B	mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	82	1	B	%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0086	1	B	mg/L	++	0.004	0.01			
SREV	ZINC	REC	86	1	B	%	++	0.004	0.01			

WG488303ICSA

Tag:

Measured: 12/17/2019 12:31:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.000192	1	B	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.00051	1	B	mg/L	++	0.0004	0.002			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			

WG488303ICSAB

Tag:

Measured: 12/17/2019 12:32:54 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01035	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	104	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.01836	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	92	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.018406	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	92	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.018832	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	94	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.01773	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	89	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.018699	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	93	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.01642	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	82	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.01958	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	98	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.01924	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	96	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.98028	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	96	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.01693	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	85	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.01831	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	91	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.00892	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	89	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.0199	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	99	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0482	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	96	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.02098	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	105	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.01841	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	92	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0207	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	103	1		%	++	0.004	0.01			

WG487250PBS

Tag:

Measured: 12/17/2019 12:38:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.00226 ✓	1		mg/L	++	0.0008	0.002	5x = 0.0113		
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

All sample have Cu concentrations above 5x level

L56147-06

Tag:

Measured: 12/17/2019 12:40:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		2	U	mg/L	++	0.0008	0.004			
SREV	ARSENIC	IS-MWMT		2	U	mg/L	++	0.0004	0.002			
SREV	BERYLLIUM	IS-MWMT		2	U	mg/L	++	0.0002	0.0005			
SREV	CADMIUM	IS-MWMT	.0006	2		mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	COBALT	IS-MWMT	.0904	2		mg/L	++	0.0001	0.0005			
SREV	COPPER	IS-MWMT	1.16	2		mg/L	++	0.002	0.004		M3 ZG	
SREV	LEAD	IS-MWMT		2	U	mg/L	++	0.0002	0.001			
SREV	MANGANESE	IS-MWMT	3.77	2		mg/L	++	0.0008	0.004		M3	
SREV	MOLYBDENUM	IS-MWMT	.0217	2		mg/L	++	0.0004	0.001			
SREV	NICKEL	IS-MWMT	.0354	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	IS-MWMT	.0862	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	IS-MWMT		2	U	mg/L	++	0.0002	0.001			
SREV	THALLIUM	IS-MWMT		2	U	mg/L	++	0.0002	0.001			
SREV	THORIUM	IS-MWMT		2	U	mg/L	++	0.002	0.01		TB	
SREV	URANIUM	IS-MWMT	.0222	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	ZINC	IS-MWMT	.030	2		mg/L	++	0.008	0.02			

L56147-07 **Tag:** **Measured: 12/17/2019 12:41:46 PM**

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		2	U	mg/L	++	0.0008	0.004			
SREV	ARSENIC	IS-MWMT		2	U	mg/L	++	0.0004	0.002			
SREV	BERYLLIUM	IS-MWMT		2	U	mg/L	++	0.0002	0.0005			
SREV	CADMIUM	IS-MWMT	.0006	2		mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	COBALT	IS-MWMT	.106	2		mg/L	++	0.0001	0.0005			
SREV	COPPER	IS-MWMT	.396	2		mg/L	++	0.002	0.004		M3 ZG	
SREV	LEAD	IS-MWMT	.0003	2	B	mg/L	++	0.0002	0.001			
REDO	MANGANESE	REG	4.38	2	O	mg/L	OCAL	0.0008	0.004			
SREV	MOLYBDENUM	IS-MWMT	.0167	2		mg/L	++	0.0004	0.001			
SREV	NICKEL	IS-MWMT	.0406	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	IS-MWMT	.0935	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	IS-MWMT		2	U	mg/L	++	0.0002	0.001			
SREV	THALLIUM	IS-MWMT		2	U	mg/L	++	0.0002	0.001			
SREV	THORIUM	IS-MWMT		2	U	mg/L	++	0.002	0.01		TB	
SREV	URANIUM	IS-MWMT	.0236	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	ZINC	IS-MWMT	.017	2	B	mg/L	++	0.008	0.02			

L56147-07MS Tag: **Measured: 12/17/2019 12:43:33 PM**

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01054	2		mg/L	++	0.0008	0.004			
SREV	ANTIMONY	REC	105	2		%	++	0.0008	0.004			
SREV	ARSENIC	FOUND	0.04662	2		mg/L	++	0.0004	0.002			
SREV	ARSENIC	REC	93	2		%	++	0.0004	0.002			
SREV	BERYLLIUM	FOUND	0.04377	2		mg/L	++	0.0002	0.0005			
SREV	BERYLLIUM	REC	87	2		%	++	0.0002	0.0005			
SREV	CADMIUM	FOUND	0.04739	2		mg/L	++	0.0001	0.0005			
SREV	CADMIUM	REC	93	2		%	++	0.0001	0.0005			
SREV	CHROMIUM	FOUND	0.0438	2		mg/L	++	0.001	0.004			
SREV	CHROMIUM	REC	88	2		%	++	0.001	0.004			
SREV	COBALT	FOUND	0.14501	2		mg/L	++	0.0001	0.0005			
SREV	COBALT	REC	77	2		%	++	0.0001	0.0005			
SREV	COPPER	FOUND	0.4302	2		mg/L	++	0.002	0.004			
SREV	COPPER	REC	68	2		%	ALRT	0.002	0.004		M3 4x	
SREV	LEAD	FOUND	0.04969	2		mg/L	++	0.0002	0.001			
SREV	LEAD	REC	99	2		%	++	0.0002	0.001			
SREV	MANGANESE	FOUND	4.30274	2		mg/L	++	0.0008	0.004			
SREV	MANGANESE	REC	-154	2		%	ALRT	0.0008	0.004		M3 4x	
SREV	MOLYBDENUM	FOUND	0.06714	2		mg/L	++	0.0004	0.001			
SREV	MOLYBDENUM	REC	101	2		%	++	0.0004	0.001			
SREV	NICKEL	FOUND	0.08193	2		mg/L	++	0.0008	0.002			
SREV	NICKEL	REC	83	2		%	++	0.0008	0.002			
SREV	SELENIUM	FOUND	0.13697	2		mg/L	++	0.0002	0.0005			
SREV	SELENIUM	REC	87	2		%	++	0.0002	0.0005			
SREV	SILVER	FOUND	0.00897	2		mg/L	++	0.0002	0.001			
SREV	SILVER	REC	90	2		%	++	0.0002	0.001			
SREV	THALLIUM	FOUND	0.05119	2		mg/L	++	0.0002	0.001			
SREV	THALLIUM	REC	102	2		%	++	0.0002	0.001			
SREV	THORIUM	FOUND	0.0518	2		mg/L	++	0.002	0.01			
SREV	THORIUM	REC	104	2		%	++	0.002	0.01			
SREV	URANIUM	FOUND	0.0731	2		mg/L	++	0.0002	0.001			
SREV	URANIUM	REC	99	2		%	++	0.0002	0.001			
SREV	VANADIUM	FOUND	0.046	2		mg/L	++	0.001	0.004			
SREV	VANADIUM	REC	92	2		%	++	0.001	0.004			
SREV	ZINC	FOUND	0.0581	2		mg/L	++	0.008	0.02			
SREV	ZINC	REC	82	2		%	++	0.008	0.02			

L56147-07MSD Tag: **Measured:** 12/17/2019 12:45:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01068	2		mg/L	++	0.0008	0.004			
SREV	ANTIMONY	REC	107	2		%	++	0.0008	0.004			
SREV	ANTIMONY	RPD	1	2		%	++	0.0008	0.004			
SREV	ARSENIC	FOUND	0.04776	2		mg/L	++	0.0004	0.002			
SREV	ARSENIC	REC	95	2		%	++	0.0004	0.002			
SREV	ARSENIC	RPD	2	2		%	++	0.0004	0.002			
SREV	BERYLLIUM	FOUND	0.0444	2		mg/L	++	0.0002	0.0005			
SREV	BERYLLIUM	REC	89	2		%	++	0.0002	0.0005			
SREV	BERYLLIUM	RPD	1	2		%	++	0.0002	0.0005			
SREV	CADMIUM	FOUND	0.04848	2		mg/L	++	0.0001	0.0005			
SREV	CADMIUM	REC	96	2		%	++	0.0001	0.0005			
SREV	CADMIUM	RPD	2	2		%	++	0.0001	0.0005			
SREV	CHROMIUM	FOUND	0.0441	2		mg/L	++	0.001	0.004			
SREV	CHROMIUM	REC	88	2		%	++	0.001	0.004			
SREV	CHROMIUM	RPD	1	2		%	++	0.001	0.004			
SREV	COBALT	FOUND	0.14803 ✓	2		mg/L	++	0.0001	0.0005			
SREV	COBALT	REC	83	2		%	++	0.0001	0.0005			
SREV	COBALT	RPD	2	2		%	++	0.0001	0.0005			
SREV	COPPER	FOUND	0.4408	2		mg/L	++	0.002	0.004			
SREV	COPPER	REC	89	2		%	++	0.002	0.004			
SREV	COPPER	RPD	2	2		%	++	0.002	0.004			
SREV	LEAD	FOUND	0.05085 ✓	2		mg/L	++	0.0002	0.001			
SREV	LEAD	REC	101	2		%	++	0.0002	0.001			
SREV	LEAD	RPD	2	2		%	++	0.0002	0.001			
SREV	MANGANESE	FOUND	4.39029	2		mg/L	++	0.0008	0.004			
SREV	MANGANESE	REC	21	2		%	ALRT	0.0008	0.004		M3 4x	
SREV	MANGANESE	RPD	2	2		%	++	0.0008	0.004			
SREV	MOLYBDENUM	FOUND	0.06801	2		mg/L	++	0.0004	0.001			
SREV	MOLYBDENUM	REC	102	2		%	++	0.0004	0.001			
SREV	MOLYBDENUM	RPD	1	2		%	++	0.0004	0.001			
SREV	NICKEL	FOUND	0.08375	2		mg/L	++	0.0008	0.002			
SREV	NICKEL	REC	86	2		%	++	0.0008	0.002			
SREV	NICKEL	RPD	2	2		%	++	0.0008	0.002			
SREV	SELENIUM	FOUND	0.14627	2		mg/L	++	0.0002	0.0005			
SREV	SELENIUM	REC	105	2		%	++	0.0002	0.0005			
SREV	SELENIUM	RPD	7	2		%	++	0.0002	0.0005			
SREV	SILVER	FOUND	0.00914	2		mg/L	++	0.0002	0.001			
SREV	SILVER	REC	91	2		%	++	0.0002	0.001			
SREV	SILVER	RPD	2	2		%	++	0.0002	0.001			
SREV	THALLIUM	FOUND	0.05247	2		mg/L	++	0.0002	0.001			
SREV	THALLIUM	REC	105	2		%	++	0.0002	0.001			
SREV	THALLIUM	RPD	2	2		%	++	0.0002	0.001			
SREV	THORIUM	FOUND	0.0536	2		mg/L	++	0.002	0.01			
SREV	THORIUM	REC	107	2		%	++	0.002	0.01			
SREV	THORIUM	RPD	3	2		%	++	0.002	0.01			
SREV	URANIUM	FOUND	0.07425	2		mg/L	++	0.0002	0.001			
SREV	URANIUM	REC	101	2		%	++	0.0002	0.001			
SREV	URANIUM	RPD	2	2		%	++	0.0002	0.001			
SREV	VANADIUM	FOUND	0.0476	2		mg/L	++	0.001	0.004			
SREV	VANADIUM	REC	95	2		%	++	0.001	0.004			
SREV	VANADIUM	RPD	3	2		%	++	0.001	0.004			
SREV	ZINC	FOUND	0.06	2		mg/L	++	0.008	0.02			
SREV	ZINC	REC	86	2		%	++	0.008	0.02			

SREV	ZINC	RPD	3	2		%	++	0.008	0.02

L56147-08

Tag: Measured: 12/17/2019 12:47:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		2	U	mg/L	++	0.0008	0.004			
SREV	ARSENIC	IS-MWMT	.0038	2		mg/L	++	0.0004	0.002			
SREV	BERYLLIUM	IS-MWMT	.0034	2		mg/L	++	0.0002	0.0005			
SREV	CADMIUM	IS-MWMT	.0017	2		mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	COBALT	IS-MWMT	.123	2		mg/L	++	0.0001	0.0005			
REDO	COPPER	REG	88.7	2	O	mg/L	OCAL	0.002	0.004			
SREV	LEAD	IS-MWMT	.0017	2		mg/L	++	0.0002	0.001			
SREV	MANGANESE	IS-MWMT	3.26	2		mg/L	++	0.0008	0.004		M3	
SREV	MOLYBDENUM	IS-MWMT		2	U	mg/L	++	0.0004	0.001			
SREV	NICKEL	IS-MWMT	.132	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	IS-MWMT	.0022	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	IS-MWMT		2	U	mg/L	++	0.0002	0.001			
SREV	THALLIUM	IS-MWMT	.001	2		mg/L	++	0.0002	0.001			
SREV	THORIUM	IS-MWMT		2	U	mg/L	++	0.002	0.01		TB	
SREV	URANIUM	IS-MWMT	.024	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	ZINC	IS-MWMT	.168	2		mg/L	++	0.008	0.02			

L56147-09

Tag: Measured: 12/17/2019 12:48:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		2	U	mg/L	++	0.0008	0.004			
SREV	ARSENIC	IS-MWMT	.002	2		mg/L	++	0.0004	0.002			
SREV	BERYLLIUM	IS-MWMT	.0042	2		mg/L	++	0.0002	0.0005			
SREV	CADMIUM	IS-MWMT	.0048	2		mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	COBALT	IS-MWMT	.994	2		mg/L	++	0.0001	0.0005			
REDO	COPPER	REG	33.5	2	O	mg/L	OCAL	0.002	0.004			
SREV	LEAD	IS-MWMT	.001	2		mg/L	++	0.0002	0.001			
REDO	MANGANESE	REG	14.3	2	O	mg/L	OCAL	0.0008	0.004			
SREV	MOLYBDENUM	IS-MWMT	.0027	2		mg/L	++	0.0004	0.001			
SREV	NICKEL	IS-MWMT	.574	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	IS-MWMT	.0852	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	IS-MWMT		2	U	mg/L	++	0.0002	0.001			
SREV	THALLIUM	IS-MWMT	.0003	2	B	mg/L	++	0.0002	0.001			
SREV	THORIUM	IS-MWMT		2	U	mg/L	++	0.002	0.01		TB	
SREV	URANIUM	IS-MWMT	.0416	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	ZINC	IS-MWMT	.412	2		mg/L	++	0.008	0.02			

L56147-10

Tag:

Measured: 12/17/2019 12:50:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		5	U	mg/L	++	0.002	0.01			
SREV	ARSENIC	IS-MWMT	.006	5		mg/L	++	0.001	0.005			
SREV	BERYLLIUM	IS-MWMT	.0044	5		mg/L	++	0.0004	0.001			
SREV	CADMIUM	IS-MWMT	.0094	5		mg/L	++	0.0003	0.001			
SREV	CHROMIUM	IS-MWMT		5	U	mg/L	++	0.003	0.01			
SREV	COBALT	IS-MWMT	.596	5		mg/L	++	0.0003	0.001			
REDO	COPPER	REG	499	5	O	mg/L	OCAL	0.004	0.01			
SREV	LEAD	IS-MWMT	.0175	5		mg/L	++	0.0005	0.003			
SREV	MANGANESE	IS-MWMT	6.34	5		mg/L	++	0.002	0.01		M3	
SREV	MOLYBDENUM	IS-MWMT		5	U	mg/L	++	0.001	0.003			
SREV	NICKEL	IS-MWMT	.461	5		mg/L	++	0.002	0.005			
SREV	SELENIUM	IS-MWMT	.0155	5		mg/L	++	0.0005	0.001			
SREV	SILVER	IS-MWMT		5	U	mg/L	++	0.0005	0.003			
SREV	THALLIUM	IS-MWMT	.0025	5	B	mg/L	++	0.0005	0.003			
SREV	THORIUM	IS-MWMT		5	U	mg/L	++	0.005	0.03		TB	
SREV	URANIUM	IS-MWMT	.079	5		mg/L	++	0.0005	0.003			
SREV	VANADIUM	IS-MWMT		5	U	mg/L	++	0.003	0.01			
SREV	ZINC	IS-MWMT	2.02	5		mg/L	++	0.02	0.05			

L56147-11

Tag:

Measured: 12/17/2019 12:52:27 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		2	U	mg/L	++	0.0008	0.004			
SREV	ARSENIC	IS-MWMT	.0024	2		mg/L	++	0.0004	0.002			
SREV	BERYLLIUM	IS-MWMT	.0021	2		mg/L	++	0.0002	0.0005			
SREV	CADMIUM	IS-MWMT	.0079	2		mg/L	++	0.0001	0.0005			
SREV	CHROMIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	COBALT	IS-MWMT	1.08	2		mg/L	++	0.0001	0.0005			
REDO	COPPER	REG	31.7	2	O	mg/L	OCAL	0.002	0.004			
SREV	LEAD	IS-MWMT	.0006	2	B	mg/L	++	0.0002	0.001			
REDO	MANGANESE	REG	17.000	2	O	mg/L	OCAL	0.0008	0.004			
SREV	MOLYBDENUM	IS-MWMT	.0014	2		mg/L	++	0.0004	0.001			
SREV	NICKEL	IS-MWMT	.448	2		mg/L	++	0.0008	0.002			
SREV	SELENIUM	IS-MWMT	.0432	2		mg/L	++	0.0002	0.0005			
SREV	SILVER	IS-MWMT		2	U	mg/L	++	0.0002	0.001			
SREV	THALLIUM	IS-MWMT	.0003	2	B	mg/L	++	0.0002	0.001			
SREV	THORIUM	IS-MWMT		2	U	mg/L	++	0.002	0.01		TB	
SREV	URANIUM	IS-MWMT	.0494	2		mg/L	++	0.0002	0.001			
SREV	VANADIUM	IS-MWMT		2	U	mg/L	++	0.001	0.004			
SREV	ZINC	IS-MWMT	.595	2		mg/L	++	0.008	0.02			

WG487250LFB2 Tag: Measured: 12/17/2019 12:54:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01022	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	102	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.05035	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	101	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.046778	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	93	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.046935	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	94	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.04789	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	96	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.045866	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	92	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.05483	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	109	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.04695	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	94	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.04713	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	94	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.04733	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	94	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.04892	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	98	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.04752	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	95	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.00979	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	98	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.04588	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	92	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0457	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	91	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.04587	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	92	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.04851	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	97	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0491	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	98	1		%	++	0.004	0.01			

WG488303CCV1

Tag:

Measured: 12/17/2019 12:56:01 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01211	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	97	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.09958	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	99	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.098409	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	98	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.097875	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	98	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.09606	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	96	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.096758	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	97	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.24403	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	97	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.24168	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	97	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.09614	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	96	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.10016	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	100	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.24351	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	97	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.2498	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	100	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.02434	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	97	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.09719	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	97	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0966	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	97	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.09653	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	97	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.09654	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	97	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.4848	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	97	1		%	++	0.004	0.01			

WG488303CCB1

Tag:

Measured: 12/17/2019 12:57:47 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.00013	1	B	mg/L	++	0.0001	0.0003	0.00065		
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

WG487687PBS

Tag:

Measured: 12/17/2019 12:59:32 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002	BATCH QC		
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.00149	1	B	mg/L	++	0.0008	0.002			
SREV	LEAD	FOUND	0.00022	1	B	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.00078	1	B	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

L56019-02MS1 Tag: Measured: 12/17/2019 1:03:06 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01036	1		mg/L	++	0.0004	0.002	BATCH QC		
SREV	ANTIMONY	REC	104	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.04951	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	98	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.047938	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	96	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.04696	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	94	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.04651	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	93	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.046932	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	94	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.05352	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	93	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.04802	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	96	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.04867	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	92	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.04803	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	96	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.04755	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	95	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.04837	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	97	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.0097	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	97	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.04693	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	94	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0471	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	94	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.04735	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	95	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.04755	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	95	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0523	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	104	1		%	++	0.004	0.01			

L56019-02MSD1 Tag: Measured: 12/17/2019 1:04:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01043	1		mg/L	++	0.0004	0.002	BATCH QC		
SREV	ANTIMONY	REC	104	1		%	++	0.0004	0.002			
SREV	ANTIMONY	RPD	1	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.04766	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	95	1		%	++	0.0002	0.001			
SREV	ARSENIC	RPD	4	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.047043	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	94	1		%	++	0.00008	0.0003			
SREV	BERYLLIUM	RPD	2	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.046735	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	93	1		%	++	0.00005	0.0003			
SREV	CADMIUM	RPD	0	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.04604	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	92	1		%	++	0.0005	0.002			
SREV	CHROMIUM	RPD	1	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.045942	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	92	1		%	++	0.00005	0.0003			
SREV	COBALT	RPD	2	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.05195	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	90	1		%	++	0.0008	0.002			
SREV	COPPER	RPD	3	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.04771	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	95	1		%	++	0.0001	0.0005			
SREV	LEAD	RPD	1	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.0476	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	90	1		%	++	0.0004	0.002			
SREV	MANGANESE	RPD	2	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.04763	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	95	1		%	++	0.0002	0.0005			
SREV	MOLYBDENUM	RPD	1	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.04688	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	94	1		%	++	0.0004	0.001			
SREV	NICKEL	RPD	1	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.04795	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	96	1		%	++	0.0001	0.0003			
SREV	SELENIUM	RPD	1	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.00973	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	97	1		%	++	0.0001	0.0005			
SREV	SILVER	RPD	0	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.04661	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	93	1		%	++	0.0001	0.0005			
SREV	THALLIUM	RPD	1	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0473	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	95	1		%	++	0.001	0.005			
SREV	THORIUM	RPD	0	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.04704	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	94	1		%	++	0.0001	0.0005			
SREV	URANIUM	RPD	1	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.047	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	94	1		%	++	0.0005	0.002			
SREV	VANADIUM	RPD	1	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.0518	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	103	1		%	++	0.004	0.01			

L56019-04SDL Tag: Measured: 12/17/2019 1:08:27 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	D		1	U	%	++	0.0004	0.002			
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002	BATCH QC		
SREV	ANTIMONY	REG	0	1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	D		1	U	%	++	0.0002	0.001			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	ARSENIC	REG	0	1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	D		1	U	%	++	0.00008	0.0003			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REG	0	1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	D		1	U	%	++	0.00005	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REG	0	1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	D		1	U	%	++	0.0005	0.002			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REG	0	1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	D		1	U	%	++	0.00005	0.0003			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COBALT	REG	0	1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	D	11	1		%	ALRT	0.0008	0.002		ZG	
SREV	COPPER	FOUND	0.00287	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REG	0.01435	1		mg/L	++	0.0008	0.002			
SREV	LEAD	D		1	U	%	++	0.0001	0.0005			
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	LEAD	REG	0	1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	D	2	1		%	++	0.0004	0.002			
SREV	MANGANESE	FOUND	0.00051	1	B	mg/L	++	0.0004	0.002			
SREV	MANGANESE	REG	0.00255	1	B	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	D		1	U	%	++	0.0002	0.0005			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REG	0	1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	D		1	U	%	++	0.0004	0.001			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	NICKEL	REG	0	1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	D		1	U	%	++	0.0001	0.0003			
SREV	SELENIUM	FOUND		1	U	mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REG	0	1	U	mg/L	++	0.0001	0.0003			
SREV	SILVER	D		1	U	%	++	0.0001	0.0005			
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	SILVER	REG	0	1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	D		1	U	%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REG	0	1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	D		1	U	%	++	0.001	0.005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	THORIUM	REG	0	1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	D		1	U	%	++	0.0001	0.0005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	URANIUM	REG	0	1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	D		1	U	%	++	0.0005	0.002			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	VANADIUM	REG	0	1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	D		1	U	%	++	0.004	0.01			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

SREV	ZINC	REG	0	1	U	mg/L	++	0.004	0.01	BATCH QC

L56019-06

Tag: Measured: 12/17/2019 1:10:15 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	IS-MWMT	.0003	1	B	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	IS-MWMT		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	IS-MWMT		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	IS-MWMT		1	U	mg/L	++	0.0005	0.002			
SREV	LEAD	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	SELENIUM	IS-MWMT		1	U	mg/L	++	0.0001	0.0003		TA	
SREV	SILVER	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	IS-MWMT		1	U	mg/L	++	0.001	0.005		TA TB	
SREV	URANIUM	IS-MWMT		1	U	mg/L	++	0.0001	0.0005		TA	

L56019-08

Tag: Measured: 12/17/2019 1:12:02 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	IS-MWMT	.0004	1	B	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	IS-MWMT		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	IS-MWMT		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	IS-MWMT		1	U	mg/L	++	0.0005	0.002			
SREV	LEAD	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	SELENIUM	IS-MWMT	.0001	1	B	mg/L	++	0.0001	0.0003		TA	
SREV	SILVER	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	IS-MWMT		1	U	mg/L	++	0.001	0.005		TA TB	
SREV	URANIUM	IS-MWMT		1	U	mg/L	++	0.0001	0.0005		TA	

L56019-10

Tag: Measured: 12/17/2019 1:13:49 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	IS-MWMT		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	IS-MWMT	.0004	1	B	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	IS-MWMT		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	IS-MWMT		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	IS-MWMT		1	U	mg/L	++	0.0005	0.002			
SREV	LEAD	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	SELENIUM	IS-MWMT		1	U	mg/L	++	0.0001	0.0003		TA	
SREV	SILVER	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	IS-MWMT		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	IS-MWMT		1	U	mg/L	++	0.001	0.005		TA TB	
SREV	URANIUM	IS-MWMT		1	U	mg/L	++	0.0001	0.0005		TA	

WG488303CCV2

Tag:

Measured: 12/17/2019 1:17:23 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.01147	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	92	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	0.09495	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	95	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	0.09495	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	95	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	0.094105	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	94	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	0.09137	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	91	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	0.093946	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	94	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	0.23066	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	92	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	0.23704	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	95	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	0.09354	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	93	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	0.09649	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	96	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	0.23087	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	92	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.23062	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	92	1		%	++	0.0001	0.0003			
SREV	SILVER	FOUND	0.02324	1		mg/L	++	0.0001	0.0005			
SREV	SILVER	REC	93	1		%	++	0.0001	0.0005			
SREV	THALLIUM	FOUND	0.09556	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	95	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	0.0948	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	95	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	0.095	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	95	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	0.0924	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	92	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	0.4704	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	94	1		%	++	0.004	0.01			

WG488303CCB2

Tag:

Measured: 12/17/2019 1:19:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	ARSENIC	FOUND		1	U	mg/L	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND		1	U	mg/L	++	0.00008	0.0003			
SREV	CADMIUM	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	COBALT	FOUND		1	U	mg/L	++	0.00005	0.0003			
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	LEAD	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND		1	U	mg/L	++	0.0002	0.0005			
SREV	NICKEL	FOUND		1	U	mg/L	++	0.0004	0.001			
SREV	SELENIUM	FOUND	0.00013	1	B	mg/L	++	0.0001	0.0003	5x = 0.00065		
SREV	SILVER	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THALLIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	THORIUM	FOUND		1	U	mg/L	++	0.001	0.005			
SREV	URANIUM	FOUND		1	U	mg/L	++	0.0001	0.0005			
SREV	VANADIUM	FOUND		1	U	mg/L	++	0.0005	0.002			
SREV	ZINC	FOUND		1	U	mg/L	++	0.004	0.01			

WG488303ULRV

Tag:

Measured: 12/17/2019 1:20:55 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ANTIMONY	FOUND	0.25571	1		mg/L	++	0.0004	0.002			
SREV	ANTIMONY	REC	102	1		%	++	0.0004	0.002			
SREV	ARSENIC	FOUND	1.9668	1		mg/L	++	0.0002	0.001			
SREV	ARSENIC	REC	98	1		%	++	0.0002	0.001			
SREV	BERYLLIUM	FOUND	1.920573	1		mg/L	++	0.00008	0.0003			
SREV	BERYLLIUM	REC	96	1		%	++	0.00008	0.0003			
SREV	CADMIUM	FOUND	1.939539	1		mg/L	++	0.00005	0.0003			
SREV	CADMIUM	REC	97	1		%	++	0.00005	0.0003			
SREV	CHROMIUM	FOUND	1.88809	1		mg/L	++	0.0005	0.002			
SREV	CHROMIUM	REC	94	1		%	++	0.0005	0.002			
SREV	COBALT	FOUND	1.873678	1		mg/L	++	0.00005	0.0003			
SREV	COBALT	REC	94	1		%	++	0.00005	0.0003			
SREV	COPPER	FOUND	4.66576	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	93	1		%	++	0.0008	0.002			
SREV	LEAD	FOUND	4.72506	1		mg/L	++	0.0001	0.0005			
SREV	LEAD	REC	94	1		%	++	0.0001	0.0005			
SREV	MANGANESE	FOUND	1.87277	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	93	1		%	++	0.0004	0.002			
SREV	MOLYBDENUM	FOUND	2.02063	1		mg/L	++	0.0002	0.0005			
SREV	MOLYBDENUM	REC	101	1		%	++	0.0002	0.0005			
SREV	NICKEL	FOUND	4.79259	1		mg/L	++	0.0004	0.001			
SREV	NICKEL	REC	96	1		%	++	0.0004	0.001			
SREV	SELENIUM	FOUND	5.3915	1		mg/L	++	0.0001	0.0003			
SREV	SELENIUM	REC	108	1		%	++	0.0001	0.0003			
FAIL	SILVER	FOUND	0.41759	1		mg/L	++	0.0001	0.0005			
FAIL	SILVER	REC	83	1		%	ALRT	0.0001	0.0005			
SREV	THALLIUM	FOUND	1.91132	1		mg/L	++	0.0001	0.0005			
SREV	THALLIUM	REC	95	1		%	++	0.0001	0.0005			
SREV	THORIUM	FOUND	1.9547	1		mg/L	++	0.001	0.005			
SREV	THORIUM	REC	98	1		%	++	0.001	0.005			
SREV	URANIUM	FOUND	1.90951	1		mg/L	++	0.0001	0.0005			
SREV	URANIUM	REC	95	1		%	++	0.0001	0.0005			
SREV	VANADIUM	FOUND	1.95933	1		mg/L	++	0.0005	0.002			
SREV	VANADIUM	REC	98	1		%	++	0.0005	0.002			
SREV	ZINC	FOUND	9.8472	1		mg/L	++	0.004	0.01			
SREV	ZINC	REC	98	1		%	++	0.004	0.01			

ACZ Laboratories, Inc.
A Full Service Environmental Testing Laboratory

Sample Summary

Index	15
Label	WG487250PBS
Start Time	12/17/2019 12:38:13 PM
Dilution Factor	1
Rack	3
Vial	1

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	-0.007 ppb	44.1 %	547 cps
11B (STD)	39.725 ppb	0.8 %	332,217 cps
27Al (STD)	3.034 ppb	0.1 %	157,273 cps
51V (KED)	-0.013 ppb	47.1 %	456 cps
52Cr (KED)	0.206 ppb	5.7 %	1,084 cps
55Mn (STD)	0.345 ppb	1.2 %	53,420 cps
56Fe (KEDH)	2.907 ppb	2.4 %	97,985 cps
59Co (STD)	0.014 ppb	4.0 %	1,592 cps
60Ni (KED)	0.118 ppb	8.7 %	416 cps
63Cu (KED)	2.262 ppb	2.2 %	15,256 cps
66Zn (STD)	1.505 ppb	0.9 %	16,944 cps
75As (KED)	0.006 ppb	374.6 %	21 cps
78Se (KEDH)	-0.011 ppb	118.9 %	14 cps
98Mo (STD)	0.027 ppb	14.7 %	1,595 cps
107Ag (STD)	0.002 ppb	26.6 %	293 cps
111Cd (STD)	0.001 ppb	121.0 %	40 cps
118Sn (STD)	-0.115 ppb	2.6 %	5,819 cps
121Sb (STD)	-0.010 ppb	21.1 %	1,710 cps
125Te (STD)	-0.019 ppb	33.4 %	76 cps
133Cs (STD)	-0.001 ppb	5.4 %	511 cps
137Ba (STD)	0.566 ppb	1.3 %	12,362 cps
205Tl (STD)	-0.001 ppb	29.5 %	357 cps
208Pb (STD)	0.024 ppb	5.0 %	4,664 cps
232Th (STD)	-0.042 ppb	4.5 %	5,198 cps
238U (STD)	0.002 ppb	9.4 %	796 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	97.609 %	0.5 %	339,071 cps
45Sc (STD)	101.985 %	0.4 %	1,845,163 cps
45Sc (KED)	104.281 %	1.3 %	15,120 cps
45Sc (KEDH)	101.424 %	2.7 %	336,671 cps
72Ge (STD)	101.796 %	0.8 %	353,132 cps
72Ge (KED)	101.615 %	1.9 %	15,257 cps
72Ge (KEDH)	102.415 %	4.3 %	160,057 cps
115In (STD)	101.811 %	0.4 %	1,691,086 cps
115In (KED)	103.243 %	1.8 %	145,571 cps
115In (KEDH)	103.709 %	6.1 %	1,171,643 cps
159Tb (STD)	102.535 %	0.5 %	2,364,294 cps
209Bi (STD)	102.319 %	1.1 %	2,805,944 cps

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Sample Summary

Index	16
Label	L56147-06
Start Time	12/17/2019 12:40:00 PM
Dilution Factor	2
Rack	3
Vial	2

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	0.087 ppb	7.1 %	1,020 cps
11B (STD)	103.824 ppb	1.9 %	596,226 cps
27Al (STD)	4.626 ppb	1.0 %	132,978 cps
51V (KED)	-0.113 ppb	7.8 %	336 cps
52Cr (KED)	0.218 ppb	7.3 %	704 cps
55Mn (STD)	3,768.266 ppb	1.2 %	**228,284,073 cps**
56Fe (KEDH)	8.565 ppb	0.9 %	139,693 cps
59Co (STD)	90.377 ppb	1.2 %	**3,805,685 cps**
60Ni (KED)	35.381 ppb	3.0 %	43,154 cps
63Cu (KED)	1,158.089 ppb	2.0 %	**3,960,200 cps**
66Zn (STD)	29.675 ppb	1.6 %	167,517 cps
75As (KED)	0.333 ppb	30.5 %	97 cps
78Se (KEDH)	86.231 ppb	1.8 %	46,014 cps
98Mo (STD)	21.689 ppb	0.4 %	353,810 cps
107Ag (STD)	0.005 ppb	9.3 %	292 cps
111Cd (STD)	0.553 ppb	0.8 %	3,492 cps
118Sn (STD)	-0.117 ppb	11.0 %	7,741 cps
121Sb (STD)	0.358 ppb	1.0 %	9,034 cps
125Te (STD)	0.147 ppb	16.2 %	269 cps
133Cs (STD)	0.710 ppb	1.8 %	58,113 cps
137Ba (STD)	18.822 ppb	1.1 %	191,907 cps
205Tl (STD)	0.127 ppb	2.3 %	6,735 cps
208Pb (STD)	0.190 ppb	1.6 %	13,264 cps
232Th (STD)	-0.063 ppb	12.9 %	5,786 cps
238U (STD)	22.234 ppb	1.5 %	1,669,180 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	134.580 %	0.5 %	467,496 cps
45Sc (STD)	116.722 %	0.7 %	2,111,790 cps
45Sc (KED)	107.097 %	1.8 %	15,529 cps
45Sc (KEDH)	136.139 %	2.4 %	451,908 cps
72Ge (STD)	109.174 %	0.9 %	378,725 cps
72Ge (KED)	97.511 %	2.5 %	14,641 cps
72Ge (KEDH)	105.162 %	4.4 %	164,350 cps
115In (STD)	97.103 %	1.1 %	1,612,885 cps
115In (KED)	89.808 %	1.1 %	126,628 cps
115In (KEDH)	103.604 %	4.7 %	1,170,457 cps
159Tb (STD)	97.318 %	0.9 %	2,243,984 cps
209Bi (STD)	83.608 %	0.7 %	2,292,831 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	17
Label	L56147-07
Start Time	12/17/2019 12:41:46 PM
Dilution Factor	2
Rack	3
Vial	3

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	0.017 ppb	8.9 %	739 cps
11B (STD)	108.431 ppb	0.8 %	580,699 cps
27Al (STD)	12.180 ppb	1.2 %	319,356 cps
51V (KED)	-0.103 ppb	7.5 %	356 cps
52Cr (KED)	0.265 ppb	12.0 %	813 cps
55Mn (STD)	4,380.295 ppb	0.8 %	**261,444,457 cps**
56Fe (KEDH)	14.451 ppb	2.5 %	231,896 cps
59Co (STD)	106.328 ppb	0.5 %	**4,410,991 cps**
60Ni (KED)	40.601 ppb	2.4 %	50,198 cps
63Cu (KED)	396.224 ppb	2.2 %	1,374,053 cps
66Zn (STD)	17.344 ppb	0.7 %	97,555 cps
75As (KED)	0.233 ppb	31.7 %	74 cps
78Se (KEDH)	93.484 ppb	2.5 %	51,783 cps
98Mo (STD)	16.693 ppb	0.6 %	270,599 cps
107Ag (STD)	0.006 ppb	10.3 %	301 cps
111Cd (STD)	0.601 ppb	3.3 %	3,770 cps
118Sn (STD)	-0.154 ppb	3.5 %	6,982 cps
121Sb (STD)	0.261 ppb	4.5 %	7,073 cps
125Te (STD)	0.132 ppb	25.4 %	251 cps
133Cs (STD)	0.808 ppb	0.9 %	65,659 cps
137Ba (STD)	17.302 ppb	0.7 %	175,230 cps
205Tl (STD)	0.125 ppb	4.5 %	6,583 cps
208Pb (STD)	0.302 ppb	1.7 %	20,570 cps
232Th (STD)	-0.075 ppb	6.3 %	4,815 cps
238U (STD)	23.607 ppb	2.1 %	1,754,841 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	125.584 %	0.7 %	436,248 cps
45Sc (STD)	115.002 %	0.7 %	2,080,661 cps
45Sc (KED)	108.609 %	2.4 %	15,748 cps
45Sc (KEDH)	140.960 %	1.8 %	467,910 cps
72Ge (STD)	108.940 %	0.6 %	377,914 cps
72Ge (KED)	96.970 %	0.5 %	14,560 cps
72Ge (KEDH)	109.169 %	2.3 %	170,613 cps
115In (STD)	96.444 %	0.4 %	1,601,947 cps
115In (KED)	89.307 %	0.4 %	125,921 cps
115In (KEDH)	106.442 %	3.6 %	1,202,523 cps
159Tb (STD)	96.091 %	1.8 %	2,215,705 cps
209Bi (STD)	82.780 %	1.2 %	2,270,112 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	18
Label	L56147-07MS
Start Time	12/17/2019 12:43:33 PM
Dilution Factor	2
Rack	3
Vial	4

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	43.766 ppb	1.2 %	167,969 cps
11B (STD)	115.061 ppb	1.1 %	605,228 cps
27Al (STD)	59.840 ppb	1.8 %	1,475,950 cps
51V (KED)	45.999 ppb	0.6 %	67,324 cps
52Cr (KED)	43.772 ppb	0.2 %	89,774 cps
55Mn (STD)	4,302.740 ppb	1.3 %	**255,825,209 cps**
56Fe (KEDH)	56.486 ppb	2.0 %	832,250 cps
59Co (STD)	145.010 ppb	1.4 %	**5,992,104 cps**
60Ni (KED)	81.929 ppb	0.6 %	96,375 cps
63Cu (KED)	430.194 ppb	0.7 %	1,421,406 cps
66Zn (STD)	58.132 ppb	1.1 %	319,533 cps
75As (KED)	46.615 ppb	1.6 %	10,551 cps
78Se (KEDH)	136.965 ppb	2.0 %	74,072 cps
98Mo (STD)	67.142 ppb	2.0 %	1,080,540 cps
107Ag (STD)	8.971 ppb	1.9 %	270,302 cps
111Cd (STD)	47.391 ppb	1.1 %	293,500 cps
118Sn (STD)	46.930 ppb	1.3 %	905,268 cps
121Sb (STD)	10.539 ppb	2.1 %	206,037 cps
125Te (STD)	46.323 ppb	2.8 %	48,967 cps
133Cs (STD)	46.528 ppb	2.3 %	**3,726,632 cps**
137Ba (STD)	64.397 ppb	3.5 %	647,840 cps
205Tl (STD)	51.186 ppb	2.0 %	2,551,148 cps
208Pb (STD)	49.690 ppb	1.3 %	3,320,524 cps
232Th (STD)	51.807 ppb	1.9 %	**3,854,921 cps**
238U (STD)	73.103 ppb	1.3 %	**5,473,203 cps**

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	123.426 %	0.9 %	428,750 cps
45Sc (STD)	114.554 %	0.9 %	2,072,565 cps
45Sc (KED)	103.445 %	0.3 %	14,999 cps
45Sc (KEDH)	135.266 %	2.5 %	449,010 cps
72Ge (STD)	107.400 %	0.3 %	372,573 cps
72Ge (KED)	94.732 %	1.0 %	14,224 cps
72Ge (KEDH)	106.603 %	2.8 %	166,603 cps
115In (STD)	95.927 %	0.8 %	1,593,350 cps
115In (KED)	86.229 %	1.6 %	121,581 cps
115In (KEDH)	102.878 %	4.3 %	1,162,252 cps
159Tb (STD)	96.784 %	0.9 %	2,231,678 cps
209Bi (STD)	83.392 %	0.9 %	2,286,900 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	19
Label	L56147-07MSD
Start Time	12/17/2019 12:45:20 PM
Dilution Factor	2
Rack	3
Vial	5

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	44.404 ppb	0.9 %	167,593 cps
11B (STD)	116.613 ppb	0.9 %	604,723 cps
27Al (STD)	62.729 ppb	0.7 %	1,520,981 cps
51V (KED)	47.578 ppb	0.9 %	70,017 cps
52Cr (KED)	44.136 ppb	1.9 %	91,033 cps
55Mn (STD)	4,390.295 ppb	0.2 %	**256,706,227 cps**
56Fe (KEDH)	74.808 ppb	1.9 %	1,080,664 cps
59Co (STD)	148.029 ppb	0.2 %	**6,015,678 cps**
60Ni (KED)	83.751 ppb	1.4 %	99,081 cps
63Cu (KED)	440.797 ppb	1.5 %	1,464,726 cps
66Zn (STD)	59.994 ppb	0.9 %	324,224 cps
75As (KED)	47.758 ppb	3.8 %	10,869 cps
78Se (KEDH)	146.267 ppb	1.9 %	77,982 cps
98Mo (STD)	68.006 ppb	0.7 %	1,084,800 cps
107Ag (STD)	9.141 ppb	0.7 %	272,970 cps
111Cd (STD)	48.479 ppb	0.2 %	297,588 cps
118Sn (STD)	47.749 ppb	0.6 %	912,767 cps
121Sb (STD)	10.679 ppb	1.3 %	206,914 cps
125Te (STD)	47.052 ppb	0.5 %	49,302 cps
133Cs (STD)	47.688 ppb	0.4 %	**3,785,916 cps**
137Ba (STD)	65.500 ppb	1.2 %	653,190 cps
205Tl (STD)	52.465 ppb	0.7 %	2,575,348 cps
208Pb (STD)	50.854 ppb	0.8 %	3,346,755 cps
232Th (STD)	53.632 ppb	2.0 %	**3,929,531 cps**
238U (STD)	74.249 ppb	0.3 %	**5,474,754 cps**

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	121.712 %	0.7 %	422,797 cps
45Sc (STD)	112.661 %	0.6 %	2,038,314 cps
45Sc (KED)	104.043 %	1.2 %	15,086 cps
45Sc (KEDH)	135.853 %	3.1 %	450,957 cps
72Ge (STD)	105.640 %	0.9 %	366,467 cps
72Ge (KED)	94.266 %	3.0 %	14,154 cps
72Ge (KEDH)	105.082 %	4.2 %	164,225 cps
115In (STD)	95.074 %	0.4 %	1,579,179 cps
115In (KED)	87.408 %	1.9 %	123,243 cps
115In (KEDH)	102.559 %	4.5 %	1,158,649 cps
159Tb (STD)	96.013 %	1.2 %	2,213,905 cps
209Bi (STD)	82.135 %	0.8 %	2,252,441 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	20
Label	L56147-08
Start Time	12/17/2019 12:47:07 PM
Dilution Factor	2
Rack	3
Vial	6

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	3.396 ppb	2.1 %	13,915 cps
11B (STD)	129.195 ppb	0.6 %	583,749 cps
27Al (STD)	8,530.674 ppb	0.4 %	**205,957,536 cps**
51V (KED)	-0.034 ppb	9.1 %	431 cps
52Cr (KED)	0.840 ppb	2.2 %	1,918 cps
55Mn (STD)	3,260.031 ppb	0.8 %	**197,568,240 cps**
56Fe (KEDH)	607.288 ppb	2.2 %	**8,477,479 cps**
59Co (STD)	122.933 ppb	1.0 %	**5,177,950 cps**
60Ni (KED)	131.587 ppb	2.5 %	151,920 cps
63Cu (KED)	88,669.037 ppb	2.1 %	**287,653,228 cps**
66Zn (STD)	167.624 ppb	1.5 %	934,104 cps
75As (KED)	3.833 ppb	13.0 %	870 cps
78Se (KEDH)	2.156 ppb	9.2 %	1,154 cps
98Mo (STD)	0.195 ppb	7.6 %	3,712 cps
107Ag (STD)	0.013 ppb	7.8 %	506 cps
111Cd (STD)	1.712 ppb	1.2 %	10,495 cps
118Sn (STD)	-0.098 ppb	15.2 %	7,918 cps
121Sb (STD)	0.628 ppb	0.6 %	13,962 cps
125Te (STD)	0.242 ppb	9.7 %	362 cps
133Cs (STD)	0.701 ppb	1.5 %	56,010 cps
137Ba (STD)	30.907 ppb	1.7 %	307,256 cps
205Tl (STD)	1.007 ppb	2.8 %	51,076 cps
208Pb (STD)	1.690 ppb	2.8 %	114,610 cps
232Th (STD)	0.317 ppb	5.5 %	34,292 cps
238U (STD)	23.988 ppb	1.5 %	1,814,210 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	106.164 %	0.2 %	368,787 cps
45Sc (STD)	116.766 %	0.2 %	2,112,576 cps
45Sc (KED)	101.611 %	2.5 %	14,733 cps
45Sc (KEDH)	133.124 %	3.0 %	441,898 cps
72Ge (STD)	106.422 %	0.3 %	369,180 cps
72Ge (KED)	105.461 %	2.1 %	15,835 cps
72Ge (KEDH)	103.040 %	3.9 %	161,035 cps
115In (STD)	94.728 %	1.1 %	1,573,445 cps
115In (KED)	87.197 %	0.3 %	122,946 cps
115In (KEDH)	99.145 %	4.5 %	1,120,077 cps
159Tb (STD)	102.117 %	1.1 %	2,354,647 cps
209Bi (STD)	84.228 %	0.8 %	2,309,836 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	21
Label	L56147-09
Start Time	12/17/2019 12:48:53 PM
Dilution Factor	2
Rack	3
Vial	7

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	4.219 ppb	1.3 %	16,452 cps
11B (STD)	128.094 ppb	0.3 %	757,609 cps
27Al (STD)	6,563.588 ppb	0.5 %	**157,638,059 cps**
51V (KED)	-0.092 ppb	12.5 %	344 cps
52Cr (KED)	0.174 ppb	13.2 %	573 cps
55Mn (STD)	14,346.774 ppb	0.7 %	**835,400,837 cps**
56Fe (KEDH)	20.190 ppb	3.6 %	294,417 cps
59Co (STD)	993.863 ppb	0.8 %	**40,220,945 cps**
60Ni (KED)	573.775 ppb	3.0 %	653,969 cps
63Cu (KED)	33,486.520 ppb	3.6 %	**107,305,006 cps**
66Zn (STD)	411.917 ppb	1.8 %	2,201,989 cps
75As (KED)	2.002 ppb	19.6 %	456 cps
78Se (KEDH)	85.241 ppb	3.4 %	43,913 cps
98Mo (STD)	2.722 ppb	1.5 %	42,612 cps
107Ag (STD)	0.019 ppb	4.5 %	669 cps
111Cd (STD)	4.788 ppb	0.8 %	28,474 cps
118Sn (STD)	-0.159 ppb	4.2 %	6,564 cps
121Sb (STD)	0.238 ppb	5.8 %	6,333 cps
125Te (STD)	0.191 ppb	10.3 %	300 cps
133Cs (STD)	0.623 ppb	2.0 %	48,396 cps
137Ba (STD)	18.562 ppb	0.7 %	179,359 cps
205Tl (STD)	0.298 ppb	2.1 %	14,529 cps
208Pb (STD)	1.013 ppb	1.8 %	65,027 cps
232Th (STD)	0.030 ppb	44.4 %	12,070 cps
238U (STD)	41.615 ppb	1.0 %	2,971,174 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	138.957 %	0.9 %	482,702 cps
45Sc (STD)	112.202 %	0.3 %	2,029,997 cps
45Sc (KED)	100.414 %	3.2 %	14,560 cps
45Sc (KEDH)	134.241 %	2.7 %	445,606 cps
72Ge (STD)	105.865 %	0.6 %	367,246 cps
72Ge (KED)	96.792 %	1.9 %	14,533 cps
72Ge (KEDH)	101.498 %	2.6 %	158,625 cps
115In (STD)	92.031 %	1.2 %	1,528,644 cps
115In (KED)	84.174 %	1.2 %	118,684 cps
115In (KEDH)	98.890 %	5.2 %	1,117,203 cps
159Tb (STD)	97.483 %	0.4 %	2,247,797 cps
209Bi (STD)	79.522 %	0.7 %	2,180,790 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	22
Label	L56147-10
Start Time	12/17/2019 12:50:40 PM
Dilution Factor	5
Rack	3
Vial	8

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	4.440 ppb	2.1 %	6,645 cps
11B (STD)	143.865 ppb	1.2 %	259,109 cps
27Al (STD)	34,862.451 ppb	1.5 %	**320,195,110 cps**
51V (KED)	-0.285 ppb	6.0 %	298 cps
52Cr (KED)	2.577 ppb	2.9 %	2,167 cps
55Mn (STD)	6,341.155 ppb	0.9 %	**134,360,478 cps**
56Fe (KEDH)	1,768.121 ppb	3.0 %	**9,495,944 cps**
59Co (STD)	596.213 ppb	0.7 %	**8,779,345 cps**
60Ni (KED)	460.901 ppb	1.1 %	200,452 cps
63Cu (KED)	499,028.122 ppb	1.0 %	**610,003,191 cps**
66Zn (STD)	2,015.058 ppb	1.1 %	**3,916,993 cps**
75As (KED)	5.513 ppb	9.4 %	478 cps
78Se (KEDH)	15.547 ppb	5.8 %	3,154 cps
98Mo (STD)	0.579 ppb	23.9 %	4,255 cps
107Ag (STD)	0.011 ppb	24.0 %	251 cps
111Cd (STD)	9.397 ppb	3.3 %	22,775 cps
118Sn (STD)	3.451 ppb	1.1 %	35,398 cps
121Sb (STD)	0.179 ppb	5.8 %	3,297 cps
125Te (STD)	-0.088 ppb	20.3 %	72 cps
133Cs (STD)	1.057 ppb	0.4 %	33,654 cps
137Ba (STD)	12.619 ppb	0.9 %	49,875 cps
205Tl (STD)	2.507 ppb	1.4 %	52,875 cps
208Pb (STD)	17.487 ppb	0.9 %	491,348 cps
232Th (STD)	-0.110 ppb	11.0 %	7,549 cps
238U (STD)	78.985 ppb	1.3 %	2,484,183 cps

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	104.444 %	0.9 %	362,811 cps
45Sc (STD)	102.062 %	0.7 %	1,846,554 cps
45Sc (KED)	95.696 %	1.2 %	13,876 cps
45Sc (KEDH)	110.922 %	2.7 %	368,201 cps
72Ge (STD)	101.224 %	1.1 %	351,149 cps
72Ge (KED)	96.451 %	1.1 %	14,482 cps
72Ge (KEDH)	99.106 %	3.8 %	154,886 cps
115In (STD)	93.744 %	0.5 %	1,557,087 cps
115In (KED)	88.056 %	0.7 %	124,158 cps
115In (KEDH)	97.692 %	5.4 %	1,103,666 cps
159Tb (STD)	104.076 %	0.6 %	2,399,812 cps
209Bi (STD)	87.581 %	1.0 %	2,401,775 cps

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Sample Summary

Index	23
Label	L56147-11
Start Time	12/17/2019 12:52:27 PM
Dilution Factor	2
Rack	3
Vial	9

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	2.099 ppb	1.4 %	8,253 cps
11B (STD)	157.676 ppb	0.6 %	848,654 cps
27Al (STD)	5,504.789 ppb	0.6 %	**129,984,179 cps**
51V (KED)	-0.085 ppb	39.1 %	344 cps
52Cr (KED)	0.186 ppb	12.0 %	583 cps
55Mn (STD)	16,968.131 ppb	0.3 %	**957,456,771 cps**
56Fe (KEDH)	24.063 ppb	2.9 %	339,443 cps
59Co (STD)	1,080.980 ppb	0.7 %	**42,391,450 cps**
60Ni (KED)	447.651 ppb	4.5 %	497,102 cps
63Cu (KED)	31,689.693 ppb	4.7 %	**98,937,801 cps**
66Zn (STD)	595.369 ppb	0.6 %	**3,083,124 cps**
75As (KED)	2.391 ppb	2.7 %	529 cps
78Se (KEDH)	43.242 ppb	2.1 %	21,759 cps
98Mo (STD)	1.441 ppb	1.7 %	22,493 cps
107Ag (STD)	0.023 ppb	5.8 %	764 cps
111Cd (STD)	7.861 ppb	0.7 %	46,022 cps
118Sn (STD)	-0.141 ppb	5.1 %	6,796 cps
121Sb (STD)	0.111 ppb	7.5 %	3,912 cps
125Te (STD)	0.151 ppb	12.5 %	256 cps
133Cs (STD)	0.644 ppb	0.2 %	49,260 cps
137Ba (STD)	7.720 ppb	1.2 %	73,613 cps
205Tl (STD)	0.250 ppb	1.6 %	12,327 cps
208Pb (STD)	0.631 ppb	0.8 %	40,971 cps
232Th (STD)	-0.057 ppb	6.8 %	5,945 cps
238U (STD)	49.395 ppb	0.5 %	**3,549,053 cps**

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	126.704 %	0.4 %	440,139 cps
45Sc (STD)	108.729 %	0.6 %	1,967,165 cps
45Sc (KED)	97.890 %	4.3 %	14,194 cps
45Sc (KEDH)	129.557 %	3.2 %	430,057 cps
72Ge (STD)	104.079 %	0.2 %	361,052 cps
72Ge (KED)	94.947 %	1.4 %	14,256 cps
72Ge (KEDH)	99.124 %	4.0 %	154,914 cps
115In (STD)	90.633 %	0.2 %	1,505,415 cps
115In (KED)	84.028 %	2.1 %	118,478 cps
115In (KEDH)	97.560 %	4.3 %	1,102,171 cps
159Tb (STD)	97.426 %	0.3 %	2,246,474 cps
209Bi (STD)	80.034 %	0.4 %	2,194,812 cps

Failures are not associated with analytes in this SDG

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Sample Summary

Index	24
Label	WG487250LFB2
Start Time	12/17/2019 12:54:14 PM
Dilution Factor	1
Rack	3
Vial	10

Analytes	Concentration average	Concentration RSD	Intensity average
9Be (STD)	46.778 ppb	1.6 %	298,227 cps
11B (STD)	46.896 ppb	1.5 %	372,166 cps
27Al (STD)	55.258 ppb	0.6 %	2,385,524 cps
51V (KED)	48.513 ppb	2.1 %	126,778 cps
52Cr (KED)	47.892 ppb	1.9 %	175,806 cps
55Mn (STD)	47.126 ppb	1.0 %	**4,679,817 cps**
56Fe (KEDH)	50.262 ppb	1.5 %	1,333,870 cps
59Co (STD)	45.866 ppb	1.6 %	**3,155,194 cps**
60Ni (KED)	48.922 ppb	1.7 %	103,127 cps
63Cu (KED)	54.826 ppb	1.4 %	324,835 cps
66Zn (STD)	49.104 ppb	0.4 %	447,842 cps
75As (KED)	50.351 ppb	3.0 %	20,405 cps
78Se (KEDH)	47.525 ppb	1.8 %	46,755 cps
98Mo (STD)	47.330 ppb	1.1 %	1,522,206 cps
107Ag (STD)	9.792 ppb	1.2 %	589,548 cps
111Cd (STD)	46.935 ppb	0.9 %	580,974 cps
118Sn (STD)	47.313 ppb	1.2 %	1,814,079 cps
121Sb (STD)	10.224 ppb	1.1 %	397,655 cps
125Te (STD)	46.826 ppb	1.3 %	98,826 cps
133Cs (STD)	46.266 ppb	1.4 %	**7,406,198 cps**
137Ba (STD)	49.172 ppb	1.1 %	988,676 cps
205Tl (STD)	45.882 ppb	0.4 %	**5,425,662 cps**
208Pb (STD)	46.949 ppb	0.8 %	**7,443,757 cps**
232Th (STD)	45.744 ppb	0.7 %	**8,066,842 cps**
238U (STD)	45.865 ppb	1.4 %	**8,147,833 cps**

Internal Standards	Concentration average	Concentration RSD	Intensity average
6Li (STD)	92.869 %	0.6 %	322,603 cps
45Sc (STD)	95.359 %	1.3 %	1,725,276 cps
45Sc (KED)	92.727 %	1.9 %	13,445 cps
45Sc (KEDH)	94.314 %	3.9 %	313,071 cps
72Ge (STD)	94.522 %	0.6 %	327,899 cps
72Ge (KED)	96.311 %	1.5 %	14,461 cps
72Ge (KEDH)	96.924 %	5.3 %	151,476 cps
115In (STD)	95.863 %	0.8 %	1,592,285 cps
115In (KED)	97.644 %	1.0 %	137,676 cps
115In (KEDH)	96.450 %	6.6 %	1,089,635 cps
159Tb (STD)	96.914 %	1.0 %	2,234,681 cps
209Bi (STD)	98.944 %	0.5 %	2,713,395 cps

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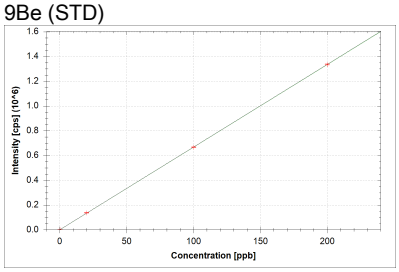
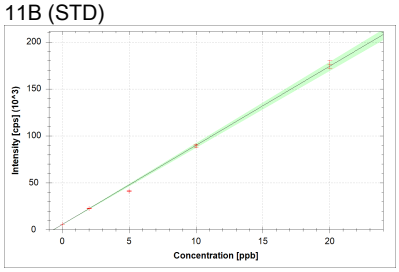
Calibration Curves:

9Be (STD)



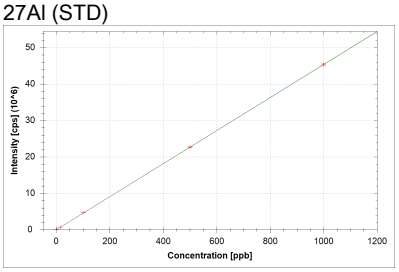
f(x) = 6674.0387*x + 584.6479
R^2 = 1.0000
BEC = 0.088 ppb
LoD = 0.0143 ppb

11B (STD)



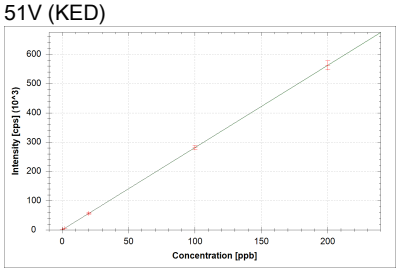
f(x) = 8422.9572*x + 5748.3183
R^2 = 0.9974
BEC = 0.682 ppb
LoD = 0.0226 ppb

27Al (STD)



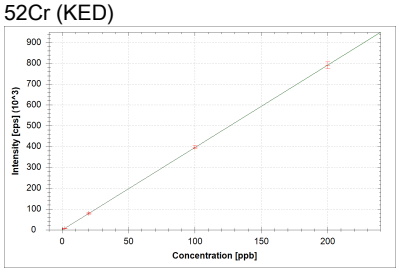
f(x) = 45368.6882*x + 16856.0237
R^2 = 1.0000
BEC = 0.372 ppb
LoD = 0.0377 ppb

51V (KED)



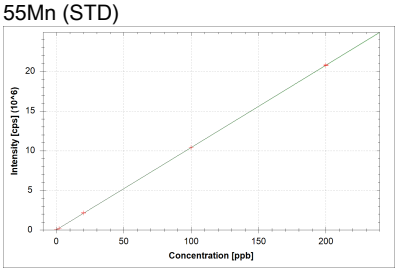
f(x) = 2809.1612*x + 471.9661
R^2 = 1.0000
BEC = 0.168 ppb
LoD = 0.0303 ppb

52Cr (KED)



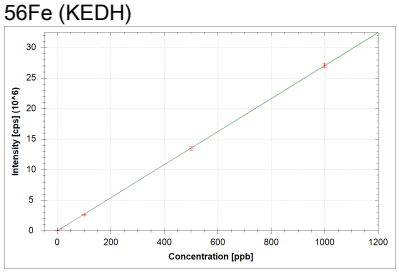
f(x) = 3954.9696*x + 226.6199
R^2 = 1.0000
BEC = 0.057 ppb
LoD = 0.0162 ppb

55Mn (STD)



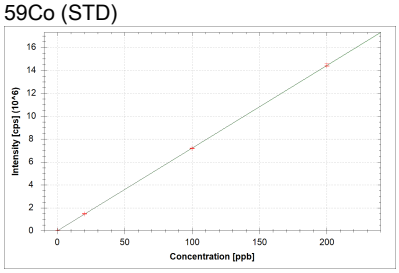
f(x) = 103792.8169*x + 16557.1860
R^2 = 1.0000
BEC = 0.160 ppb
LoD = 0.0152 ppb

56Fe (KEDH)



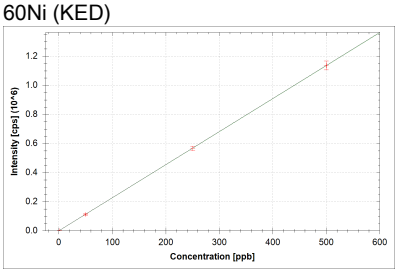
f(x) = 27028.0153*x + 17058.9478
R^2 = 1.0000
BEC = 0.631 ppb
LoD = 0.0327 ppb

59Co (STD)



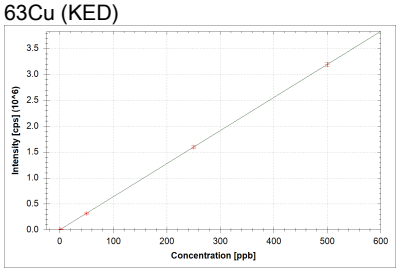
f(x) = 72135.8692*x + 561.8996
R^2 = 1.0000
BEC = 0.008 ppb
LoD = 0.0024 ppb

60Ni (KED)



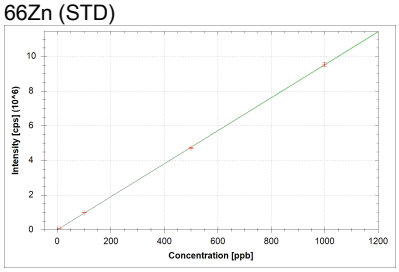
f(x) = 2271.0988*x + 130.7388
R^2 = 1.0000
BEC = 0.058 ppb
LoD = 0.0228 ppb

63Cu (KED)



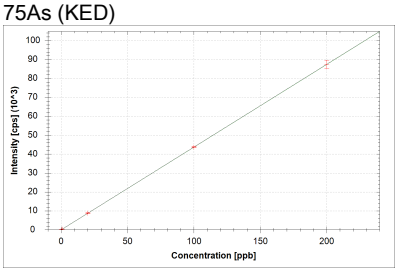
f(x) = 6387.2438*x + 183.6578
R^2 = 1.0000
BEC = 0.029 ppb
LoD = 0.0078 ppb

66Zn (STD)



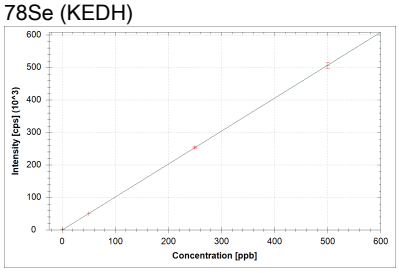
f(x) = 9517.7363*x + 2289.3414
R^2 = 1.0000
BEC = 0.241 ppb
LoD = 0.0257 ppb

75As (KED)



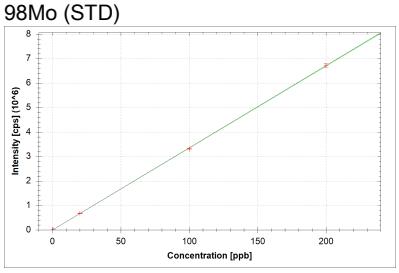
f(x) = 436.8429*x + 17.7545
R^2 = 1.0000
BEC = 0.041 ppb
LoD = 0.0814 ppb

78Se (KEDH)



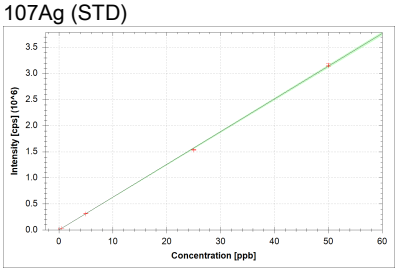
f(x) = 1013.9271*x + 24.8960
R^2 = 1.0000
BEC = 0.025 ppb
LoD = 0.0300 ppb

98Mo (STD)



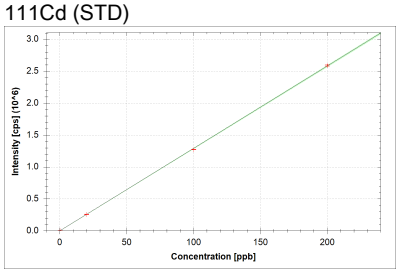
f(x) = 33537.3922*x + 657.2223
R^2 = 0.9999
BEC = 0.020 ppb
LoD = 0.0069 ppb

107Ag (STD)



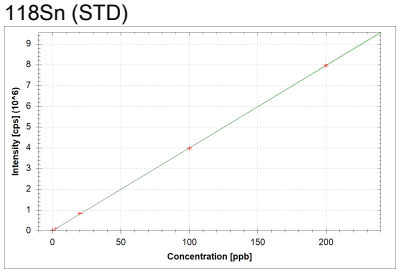
f(x) = 62794.4661*x + 132.2629
R^2 = 0.9998
BEC = 0.002 ppb
LoD = 0.0009 ppb

111Cd (STD)



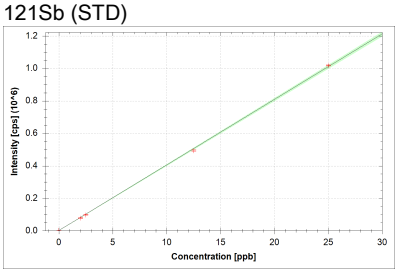
f(x) = 12911.9678*x + 28.3599
R^2 = 0.9999
BEC = 0.002 ppb
LoD = 0.0021 ppb

118Sn (STD)



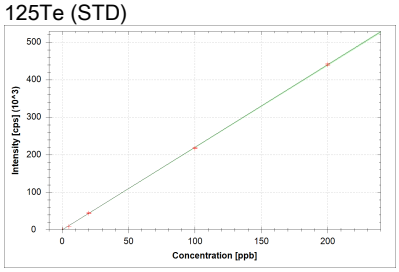
f(x) = 39781.3916*x + 10304.1135
R^2 = 1.0000
BEC = 0.259 ppb
LoD = 0.0312 ppb

121Sb (STD)



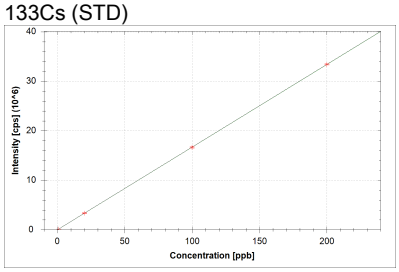
f(x) = 40372.5316*x + 2069.4501
R^2 = 0.9996
BEC = 0.051 ppb
LoD = 0.0067 ppb

125Te (STD)



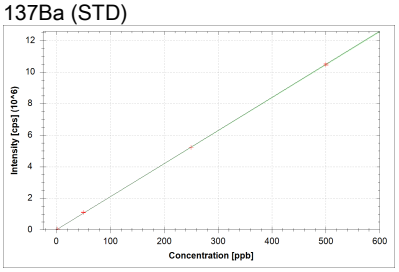
f(x) = 2199.2738*x + 115.5435
R^2 = 0.9999
BEC = 0.053 ppb
LoD = 0.0042 ppb

133Cs (STD)



f(x) = 166984.0651*x + 587.6290
R^2 = 1.0000
BEC = 0.004 ppb
LoD = 0.0014 ppb

137Ba (STD)



f(x) = 20969.7941*x + 281.0578
R^2 = 1.0000
BEC = 0.013 ppb
LoD = 0.0060 ppb

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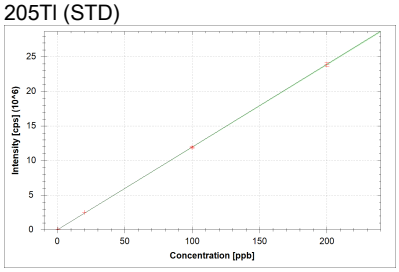
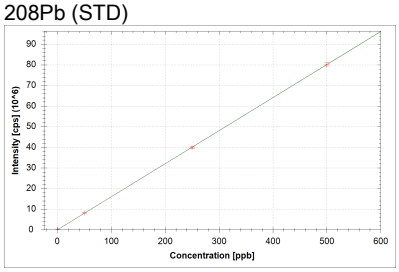
205Tl (STD)



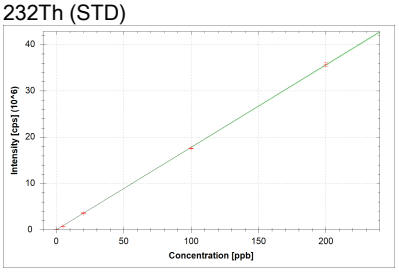
f(x) = 119505.3296*x + 453.5560
R^2 = 1.0000
BEC = 0.004 ppb
LoD = 0.0009 ppb

208Pb (STD)



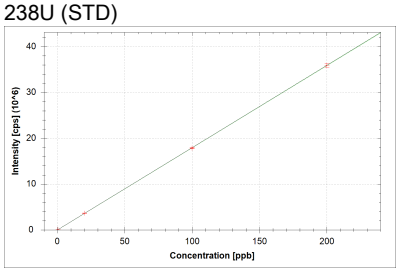
f(x) = 160229.9978*x + 633.3461
R^2 = 1.0000
BEC = 0.004 ppb
LoD = 0.0012 ppb

232Th (STD)



f(x) = 177956.9567*x + 12525.1275
R^2 = 0.9999
BEC = 0.070 ppb
LoD = 0.0129 ppb

238U (STD)



f(x) = 179536.2914*x + 417.8167
R^2 = 1.0000
BEC = 0.002 ppb
LoD = 0.0002 ppb

Performance Report

QTEGRA

System

Start time:	12/17/2019 9:06:43 AM
Instrument:	iCAP RQ
Operator:	LAB\clean
Template:	Daily AMU2
Instrument Serial Number:	RQ00998
Last Autotune:	Autotune-!CaliTune STDS-20191205-100709546.imatdat
Solution:	Custom ACZ 1ppb tune solution

Sensitivity & Stability Test

Result	Runs	Sweeps
Passed	3	60

Sensitivity

Analyte	Result	Value	Condition	Limit
Bkg4.5	Passed	6.5 CPS	Less than	15.0 CPS
Bkg220.7	Passed	4.8 CPS	Less than	15.0 CPS
9Be	Passed	17,505.0 CPS	Greater than	10,000.0 CPS
7Li	Passed	71,580.0 CPS	Greater than	50,000.0 CPS
59Co	Passed	176,326.0 CPS	Greater than	100,000.0 CPS
24Mg	Passed	115,773.0 CPS	Greater than	10,000.0 CPS
238U	Passed	405,542.0 CPS	Greater than	330,000.0 CPS
209Bi	Passed	309,302.0 CPS	Greater than	165,000.0 CPS
208Pb	Passed	197,776.0 CPS	Greater than	10,000.0 CPS
205Tl	Passed	274,667.0 CPS	Greater than	10,000.0 CPS
140Ce.16O/140Ce	Passed	0.0267	Less than	0.03
137Ba++/137Ba	Passed	0.0295	Less than	0.05
115In	Passed	371,407.0 CPS	Greater than	220,000.0 CPS

Stability

Analyte	Value	Limit
9Be	1.1 %	5
7Li	0.7 %	5
59Co	0.5 %	5
24Mg	1.2 %	5
208Pb	0.6 %	5
205Tl	0.6 %	5
115In	0.6 %	5

Mass Calibration Test

Result	Channels	Dwell	MeasureWidth	PointSpacing	Sweeps
Passed	75	0.04	1.5	0.02	5

Analyte	Result	Centroid Mass [u]	Offset	Peak width [u]	Peak width min [u]	Peak width max [u]
7Li	Passed	6.9956	0.0204	0.732	0.650	0.850
9Be	Passed	8.9850	0.0272	0.728	0.650	0.850
24Mg	Passed	23.9738	0.0112	0.712	0.650	0.850
59Co	Passed	58.9307	0.0025	0.711	0.650	0.850
115In	Passed	114.8990	0.0049	0.735	0.650	0.850
205Tl	Passed	204.9898	0.0154	0.759	0.650	0.850
208Pb	Passed	207.9929	0.0163	0.748	0.650	0.850

Tune Settings

Parameter	Value
Additional Gas Flow 1	0.00
Additional Gas Flow 2	0.00
Additional Gas Flow 3	0.00
Angular Deflection	-290.00
Auxilliary Flow	0.80
CCT Bias	-2.00
CCT Entry Lens	-42.00
CCT Exit Lens	-160.00
CCT Focus Lens	2.60
CCT1 Flow	0.00
CCT1 Shut-Off Valve	0.00
CCT2 Flow	0.00
CCT2 Shut-Off Valve	0.00
Cool Flow	14.00
D1 Lens	-212.00
D2 Lens	-80.00
Deflection Entry Lens	-35.00
Dry Pump Speed	0.00
Extraction Lens 1 Negative	0.00
Extraction Lens 1 Polarity	0.00
Extraction Lens 1 Positive	0.00
Extraction Lens 2	-143.51
Focus Lens	20.60
Nebulizer Flow	0.93
Peristaltic Pump Speed	40.00
Plasma Power	1550.00
Pole Bias	-1.00
Quad Entry Lens	-21.00
Sampling Depth	5.00
Spray Chamber Temperature	2.70
Torch Horizontal Position	-0.33
Torch Vertical Position	-0.76
Virtual CCT Mass Maximum Dac Limit Set	4095.00
Virtual CCT Mass parameter b	0.65
Virtual CCT Mass to Dac Factor	130.00
Virtual CCT Mass to Dac Offset	37.50

Vacuum Check

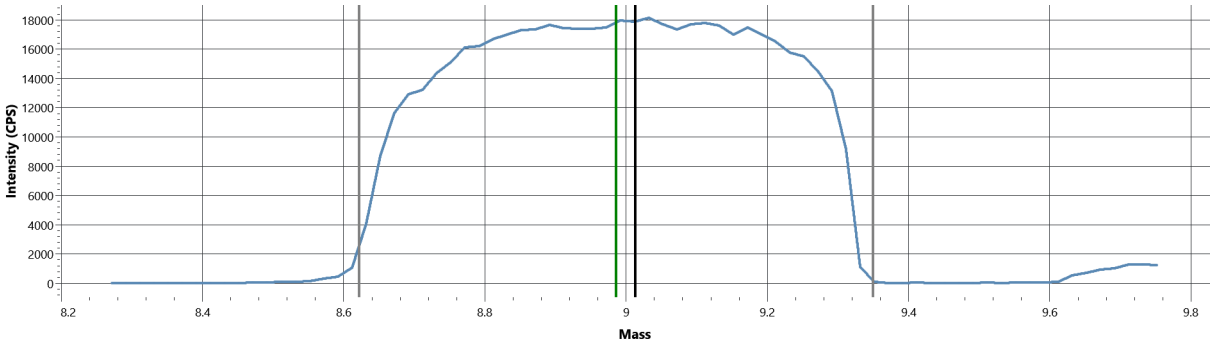
Parameter	Result	Value
Analyzer Pressure	Vacuum ok	2.813e-7
Interface Pressure		1.320e+0

Detector Voltages

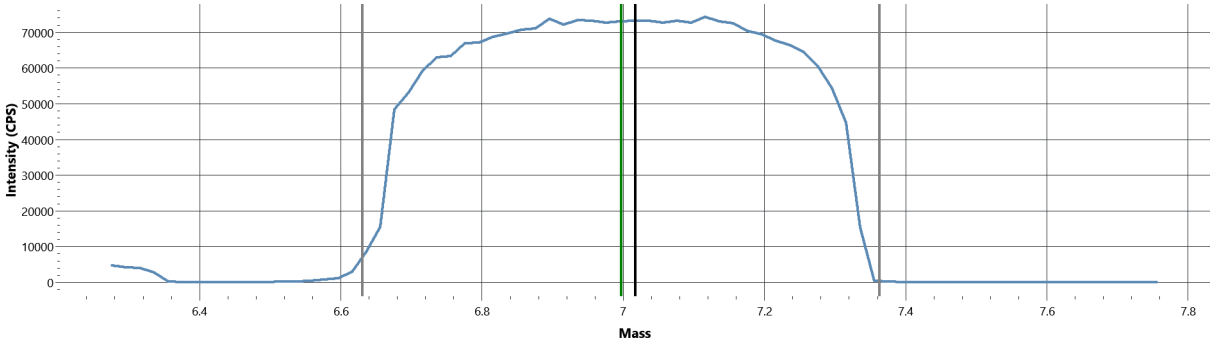
Analog	Counting
-2137.50	1537.50

Mass Calibration Peaks

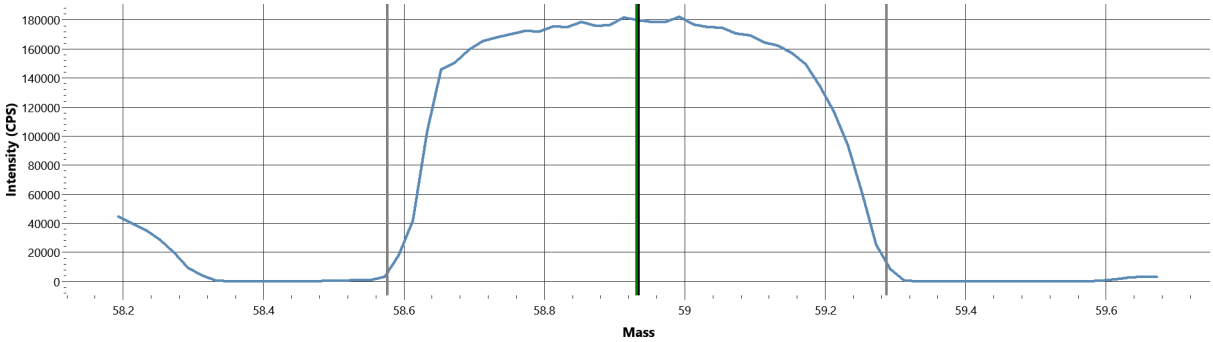
Analyte: 9Be



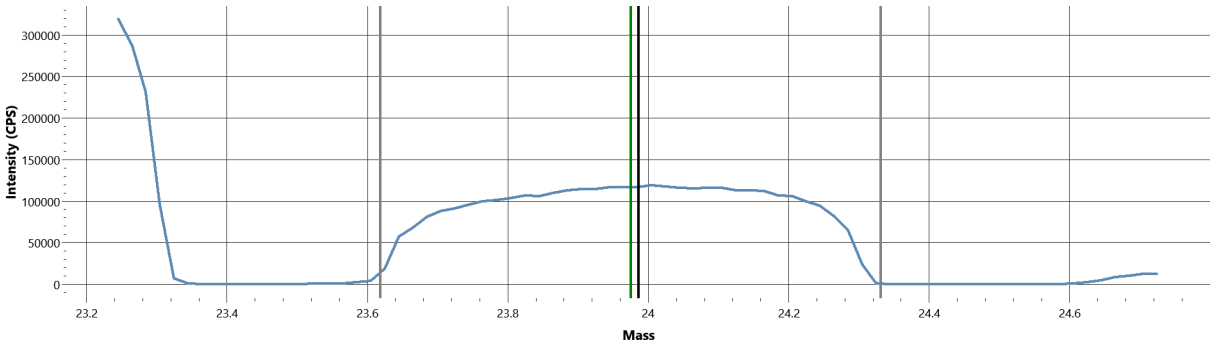
Analyte: 7Li



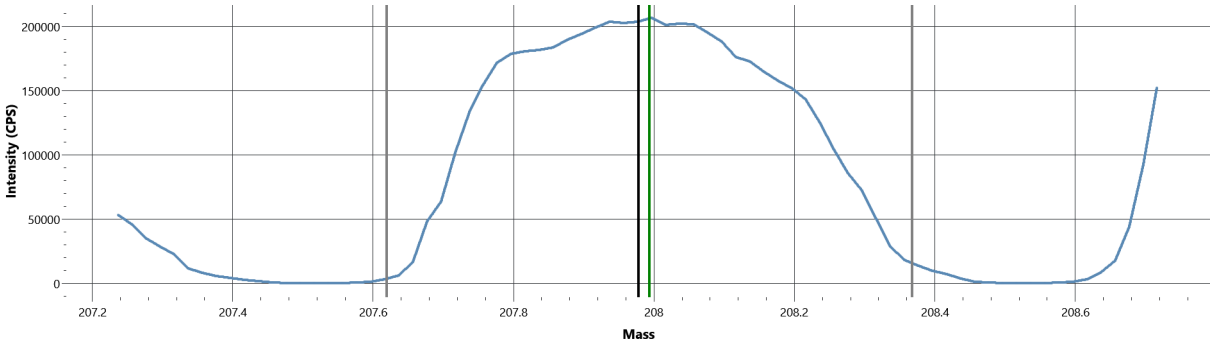
Analyte: 59Co



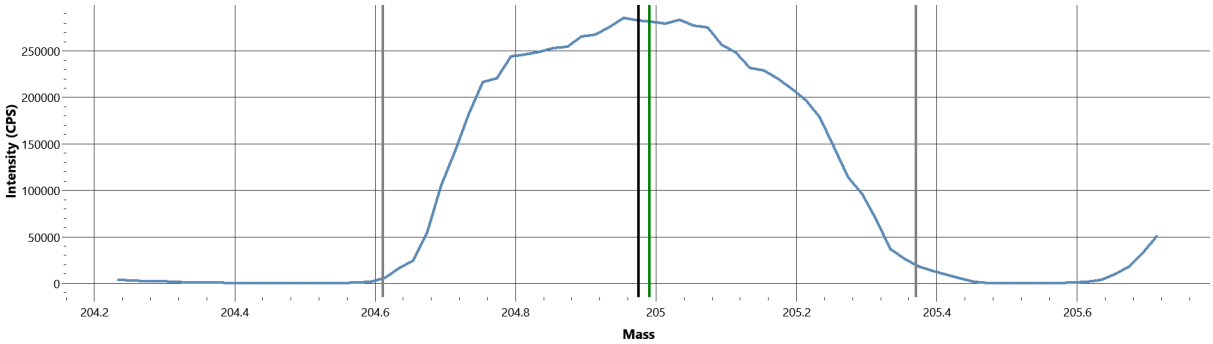
Analyte: 24Mg



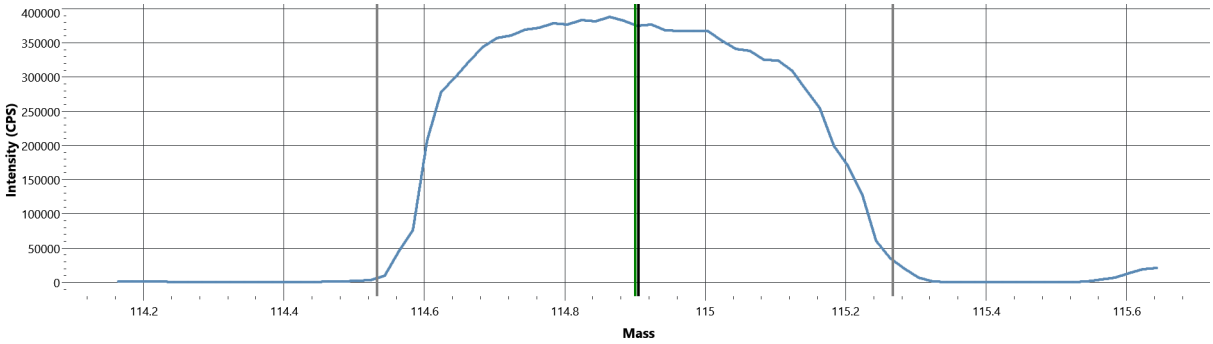
Analyte: 208Pb



Analyte: 205Tl



Analyte: 115In



ACZ Labs, Inc.
Standards/Reagents Information
ICPMS, Methods 6020 and 200.8

Calibration Standards

6020/200.8 Stock #1: MS191209-1 SCN
6020/200.8 Stock #2: MS191209-2 SCN
6020/200.8 Stock #3: MS191209-3 SCN

PQV STD: MS191014-4
Exp. 12/31/19

ICPMS5/6 INT STD: MS190612-2
Exp. 1/26/2020

ICPMS7 INT STD: MS190613-1
Exp. 1/26/2020

Nitric Acid: 60320

Hydrochloric Acid: 59570

VERIFIED: MFM 12/17/19

ACZ Laboratories, Inc.
A Full Service Environmental Testing Laboratory

LabBook Summary:

LabBook name	WG488303.imexp
Based on Template:	6020_6
Qtegra version (last saved):	2.10.3324.131
LabBook started:	12/17/2019 12:13:26 PM
LabBook finished:	12/17/2019 1:26:16 PM

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG488303 **ICPMS MWMT**

Sample	Date	SCN	Ag	Al	As	B	Ba	Be	Cd	Co	Cr	Cs	Cu	Fe	Mn	Mo	Ni	Pb	Sb	Se	Sn	Te	Th	Tl	U	V	Zn
WG488303ICV	12/17/19 12:25	MS191014-8	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG488303ICB	12/17/19 12:27		X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG488303PQV	12/17/19 12:29	MS191014-4	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG488303ICSA	12/17/19 12:31		X		X			X	X		X		X		X		X		X	X			X		X	X	
WG488303ICSAB	12/17/19 12:32	MS191119-7	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG487250PBS	12/17/19 12:38		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L56147-06	12/17/19 12:40		X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56147-07	12/17/19 12:41		X		X			X	X	X	X		X			X	X	X	X	X			X	X	X	X	X
L56147-07MS	12/17/19 12:43	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56147-07MSD	12/17/19 12:45	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56147-08	12/17/19 12:47		X		X			X	X	X	X				X	X	X	X	X	X			X	X	X	X	X
L56147-09	12/17/19 12:48		X		X			X	X	X	X					X	X	X	X	X			X	X	X	X	X
L56147-10	12/17/19 12:50		X		X			X	X	X	X				X	X	X	X	X	X			X	X	X	X	X
L56147-11	12/17/19 12:52		X		X			X	X	X	X					X	X	X	X	X			X	X	X	X	X
WG487250LFB2	12/17/19 12:54	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG488303CCV1	12/17/19 12:56	MS191209-4	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG488303CCB1	12/17/19 12:57		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487687PBS	12/17/19 12:59		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L56019-02	12/17/19 13:01		X		X			X	X		X							X	X	X			X	X	X		
L56019-02MS1	12/17/19 13:03	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56019-02MSD1	12/17/19 13:04	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56019-04	12/17/19 13:06		X		X			X	X		X							X	X	X			X	X	X		
L56019-04SDL	12/17/19 13:08		X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
L56019-06	12/17/19 13:10		X		X			X	X		X							X	X	X			X	X	X		
L56019-08	12/17/19 13:12		X		X			X	X		X							X	X	X			X	X	X		
L56019-10	12/17/19 13:13		X		X			X	X		X							X	X	X			X	X	X		

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG488303 **ICPMS MWMT**

Sample	Date	SCN	Ag	Al	As	B	Ba	Be	Cd	Co	Cr	Cs	Cu	Fe	Mn	Mo	Ni	Pb	Sb	Se	Sn	Te	Th	Tl	U	V	Zn
WG487687LFB2	12/17/19 13:15	MS191119-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG488303CCV2	12/17/19 13:17	MS191209-4	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X
WG488303CCB2	12/17/19 13:19		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG488303ULRV	12/17/19 13:20	MS191209-5	X		X			X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG488444

ACZ Laboratories, Inc

Instrument ID: ICPMS6
Analyst: Bu
ACZ Dept: 33
Create Date: 12/18/2019 13:12
Start Date/Time: 12/18/19 1:15 PM
End Date/Time:

L56147 20191231042 SE

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	CU MS MW MT	MN MS MW MT	Dilution
1	WG488444ICV	MS191014-8			1			☑	☑	1
2	WG488444ICB	NONE			1			☑	☑	1
3	WG488444PQV	MS191014-4			1			☑	☑	1
4	WG488444ICSA	MS191119-6			1			☑	☑	1
5	WG488444ICSAB	MS191119-7			1			☑	☑	1
6	WG488444ULRV	MS191209-5			1			☑	☑	1
7	WG488444WASH	NONE			1			☑	☑	1
8	WG487250PBS	NONE			1			☑	☑	1
9	L56147-07	STSB29-FD_6-15			1		2430	☐	☑	~~2~~ 50
10	L56147-07MS	MS191119-5			1			☑	☑	~~2~~ 50
11	L56147-07MSD	MS191119-5			1			☑	☑	~~2~~ 50
12	L56147-08	STSB30_0.5-3			1		2730	☑	☐	~~2~~ 200
13	L56147-09	STSB30_6-15			1		3670	☑	☑	~~2~~ 100
14	WG488444CCV1	MS191209-4			1			☑	☑	1
15	WG488444CCB1	NONE			1			☑	☑	1
16	L56147-09SDL	NONE			1			☑	☑	~~2~~ 100
17	L56147-10	STSB31_0.5-3			1		5130	☑	☐	~~5~~ 2000
18	L56147-11	STSB31_6-15			1		3740	☑	☑	~~2~~ 100
19	WG487250LFB2	MS191119-5			1			☑	☑	1
20	WG488444CCV2	MS191209-4			1			☑	☑	1
21	WG488444CCB2	NONE			1			☑	☑	1

Bu 12/18/19

↑ Mn
↑ Cu
↑ Cu/Mn
↑ Cu/Mn
↑ Cu
↑ Cu/Mn

Report Comments: Run together with WG488452 as "WG488444". Bu 12/18/19

Internal Comments: No ULRV
Bu → 45-60

AREV: Bu 12/18/19
Initials, Date

SREV: 12-19-19
Initials, Date

12/18/2019 1:13:24 PM 121719

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG488444

ACZ Laboratories, Inc

Instrument ID: ICPMS6
Analyst:
ACZ Dept: 33
Create Date: 12/18/2019 13:12
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/18/2019 1:13:24 PM 121719

ACZ Laboratories, Inc.
ICPMS DATA REVIEW CHECKLIST

AREV:	Bm
Date:	12/18/19
SREV:	BL
Date:	12-19-19

Workgroup:	458444
Sample Type:	MWMT
Analysis Date:	12/18/19
Analyst:	Bm

	Yes	No	N/A
1) Is the instrument ID on the bench sheet correct?	Y		
2) Has a passing method tune been performed within 24 hours?	Y		
3) Was the low calibration point dropped? If yes, notify PM of change to PQLs.			Y
4) Is the linear regression ≥ 0.995 for the analytes of interest?	Y		
5) Was the PQV standard analyzed & evaluated for DW samples ? (Fail in LIMS if no DW sxs in WG.)	Y		Y Bm 12/18/19
6) Do the dilution factors on the benchsheet match the sequence in the raw data?	Y		
7) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal, EC, TDS)?			Y
8) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?			Y
9) Are the % Recoveries of the internal standards within the method limits?	Y		
10) Are all of the QC critera listed in LIMS within specified limits?		Y	
11) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?	Y		
12) Are all errors properly crossed out (i.e. single-line, dated & initialed)?	Y		
13) Is a current standard/reagent form attached to the workgroup?	Y		
14) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?			

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
250PBS	↑Cu	B7 flagged assoc. sxs
147-07/ms/msD	↓Cu = 72%, 70%	M3 flagged assoc. sxs
147-08	Cu value > LS, no	REDO sxs @ 500x
↓	ULRV run	↓
147-07/ms/msD	↓Mn = 66%, 60%	M3 flagged assoc. sxs
147-11	Mn value > LS, no ULRV run	REDO @ 200x
CCV3/LCB3	Unnecessary run by software	Failed @ review

FRMII012.02.08.10

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488444

Date Reported: 19-Dec-19
Run ID: R1765093
Date Analyzed: 18-Dec-19
ICAL Workgroup:
Instrument ID: ICPMS6

WG488444ICV

Tag: Measured: 12/18/2019 2:25:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.05075	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	102	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.05013	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	100	1		%	++	0.0004	0.002			

WG488444ICB

Tag: Measured: 12/18/2019 2:27:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

WG488444PQV

Tag: Measured: 12/18/2019 2:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.00173	1	B	mg/L	++	0.0008	0.002			
SREV	COPPER	REC	86	1	B	%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.00168	1	B	mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	84	1	B	%	++	0.0004	0.002			

WG488444ICSA

Tag: Measured: 12/18/2019 2:31:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.00046	1	B	mg/L	++	0.0004	0.002			

WG488444ICSAB

Tag: Measured: 12/18/2019 2:32:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.01828	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	91	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.02031	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	101	1		%	++	0.0004	0.002			

WG488444CCV1

Tag: Measured: 12/18/2019 3:05:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.26116	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	104	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.10198	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	102	1		%	++	0.0004	0.002			

WG488444CCB1

Tag: Measured: 12/18/2019 3:07:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

WG487250PBS

Tag: 1 Measured: 12/18/2019 3:09:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.00279	1		mg/L	ALRT	0.0008	0.002		B7	5x = 0.01395
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

WG487250LFB2

Tag: 1 Measured: 12/18/2019 3:11:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.05314	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	106	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.05031	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	100	1		%	++	0.0004	0.002			

L56147-07

Tag: 1 Measured: 12/18/2019 3:12:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	COPPER	REG	.50	50		mg/L	++	0.04	0.1			
SREV	MANGANESE	IS-MWMT	5.22	50		mg/L	++	0.02	0.1		M3	

L56147-07MS

Tag: 1 Measured: 12/18/2019 3:14:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.536	50		mg/L	++	0.04	0.1			
SREV	COPPER	REC	72	50		%	ALRT	0.04	0.1		M3	4x
SREV	MANGANESE	FOUND	5.253	50		mg/L	++	0.02	0.1			
SREV	MANGANESE	REC	66	50		%	ALRT	0.02	0.1		M3	4x

L56147-07MSD

Tag: 1 Measured: 12/18/2019 3:16:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.535	50		mg/L	++	0.04	0.1			
SREV	COPPER	REC	70	50		%	ALRT	0.04	0.1		M3	4x
SREV	COPPER	RPD	0	50		%	++	0.04	0.1			
SREV	MANGANESE	FOUND	5.25	50		mg/L	++	0.02	0.1			
SREV	MANGANESE	REC	60	50		%	ALRT	0.02	0.1		M3	4x
SREV	MANGANESE	RPD	0	50		%	++	0.02	0.1			

L56147-08

Tag: 1 Measured: 12/18/2019 3:18:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
REDO	COPPER	REG	108	200		mg/L	++	0.2	0.4			

L56147-09

Tag: 1 Measured: 12/18/2019 3:20:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	IS-MWMT	40.7	100		mg/L	++	0.08	0.2		B7 M3	
SREV	MANGANESE	IS-MWMT	17.7	100		mg/L	++	0.04	0.2		M3	

L56147-09SDL

Tag: Measured: 12/18/2019 3:21:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	D	1	100		%	++	0.08	0.2			
SREV	COPPER	FOUND	8.262	100		mg/L	++	0.08	0.2			
SREV	COPPER	REG	41.31	100		mg/L	++	0.08	0.2			
SREV	MANGANESE	D	1	100		%	++	0.04	0.2			
SREV	MANGANESE	FOUND	3.591	100		mg/L	++	0.04	0.2			
SREV	MANGANESE	REG	17.955	100		mg/L	++	0.04	0.2			

L56147-10

Tag: 1 Measured: 12/18/2019 3:23:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	IS-MWMT	548	2000		mg/L	++	2	4		B7 M3	

L56147-11

Tag: 1 Measured: 12/18/2019 3:25:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	IS-MWMT	39.0	100		mg/L	++	0.08	0.2		B7 M3	
REDO	MANGANESE	REG	21.2	100		mg/L	++	0.04	0.2			

WG488444CCV2

Tag: Measured: 12/18/2019 3:27:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.25632	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	102	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.10212	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	102	1		%	++	0.0004	0.002			

WG488444CCB2

Tag: Measured: 12/18/2019 3:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

WG488444CCV3

Tag: Measured: 12/18/2019 3:31:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	COPPER	FOUND	0.2558	1		mg/L	++	0.0008	0.002			
FAIL	COPPER	REC	102	1		%	++	0.0008	0.002			
FAIL	MANGANESE	FOUND	0.10298	1		mg/L	++	0.0004	0.002			
FAIL	MANGANESE	REC	103	1		%	++	0.0004	0.002			

WG488444CCB3

Tag: Measured: 12/18/2019 3:32:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
FAIL	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

Sample Name	WG487250PBS
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:09:19 PM
Sample Type	Sample
Total Dilution	1.0000
Vial Location	2201

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	0.017	0.02	ppb	16.1	200	
11	B	6	NoGas	47.061	47.06	ppb	0.8	20	OCAL
27	Al	72	NoGas	3.151	3.15	ppb	0.8	1000	
51	V	45	He	-0.378	-0.38	ppb	3.1	200	
52	Cr	45	He	0.195	0.2	ppb	4.2	200	
55	Mn	72	NoGas	0.149	0.15	ppb	0.3	200	
56	Fe	45	H2	3.496	3.5	ppb	1.8	1000	
59	Co	72	NoGas	0.019	0.02	ppb	3.1	200	
60	Ni	45	He	0.134	0.13	ppb	6.8	500	
63	Cu	45	He	2.793	2.79	ppb	0.7	500	
66	Zn	72	NoGas	3.008	3.01	ppb	0.7	1000	
75	As	45	He	-0.015	-0.02	ppb	19.2	200	
78	Se	45	H2	0.026	0.03	ppb	22.1	500	
98	Mo	115	NoGas	0.020	0.02	ppb	24.6	200	
107	Ag	115	NoGas	0.004	0	ppb	4.7	50	
111	Cd	115	NoGas	0.001	0	ppb	29.0	200	
118	Sn	115	NoGas	-0.203	-0.2	ppb	2.9	200	
121	Sb	115	NoGas	0.014	0.01	ppb	18.5	25	
125	Te	115	NoGas	0.003	0	ppb	34.6	200	
133	Cs	115	NoGas	0.003	0	ppb	3.6	200	
137	Ba	115	NoGas	0.613	0.61	ppb	1.6	500	
205	Tl	209	NoGas	0.012	0.01	ppb	2.5	200	
208	Pb	209	NoGas	0.019	0.02	ppb	1.9	500	
232	Th	209	NoGas	0.007	0.01	ppb	3.2	200	
238	U	209	NoGas	0.004	0	ppb	9.5	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	494487.88	1.1	79.21	60	120	
45	Sc	NoGas	3534236.11	3715823.32	1.3	105.14	60	120	
45	Sc	H2	1420927.9	1455364.14	2.3	102.42	60	120	
45	Sc	He	200234.16	197560.24	1.4	98.66	60	120	
72	Ge	NoGas	850879.98	886353.19	0.9	104.17	60	120	
72	Ge	H2	465593.12	472435.23	2.0	101.47	60	120	
72	Ge	He	141552.35	142192.28	0.4	100.45	60	120	
115	In	NoGas	2569295.7	2868780.54	0.6	111.66	60	120	
115	In	H2	2281755.4	2489399.35	1.9	109.1	60	120	
115	In	He	606387.04	628639.89	1.1	103.67	60	120	
159	Tb	NoGas	2661135.38	3031661.41	0.3	113.92	60	120	
209	Bi	NoGas	2796913.01	3249305.98	0.7	116.17	60	120	

Sample Name	WG487250LFB2
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:11:07 PM
Sample Type	Sample
Total Dilution	1.0000
Vial Location	2202

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	45.479	45.48	ppb	0.8	200	
11	B	6	NoGas	57.466	57.47	ppb	2.2	20	OCAL
27	Al	72	NoGas	51.660	51.66	ppb	0.3	1000	
51	V	45	He	50.428	50.43	ppb	0.9	200	
52	Cr	45	He	49.374	49.37	ppb	0.9	200	
55	Mn	72	NoGas	50.312	50.31	ppb	0.6	200	
56	Fe	45	H2	56.098	56.1	ppb	1.5	1000	
59	Co	72	NoGas	49.916	49.92	ppb	1.1	200	
60	Ni	45	He	50.232	50.23	ppb	1.1	500	
63	Cu	45	He	53.141	53.14	ppb	1.3	500	
66	Zn	72	NoGas	52.416	52.42	ppb	0.2	1000	
75	As	45	He	51.077	51.08	ppb	0.5	200	
78	Se	45	H2	50.569	50.57	ppb	2.2	500	
98	Mo	115	NoGas	48.272	48.27	ppb	1.6	200	
107	Ag	115	NoGas	10.121	10.12	ppb	0.5	50	
111	Cd	115	NoGas	48.775	48.78	ppb	0.5	200	
118	Sn	115	NoGas	48.421	48.42	ppb	0.7	200	
121	Sb	115	NoGas	10.442	10.44	ppb	1.0	25	
125	Te	115	NoGas	47.492	47.49	ppb	1.2	200	
133	Cs	115	NoGas	48.665	48.66	ppb	0.9	200	
137	Ba	115	NoGas	50.084	50.08	ppb	0.3	500	
205	Tl	209	NoGas	49.184	49.18	ppb	0.1	200	
208	Pb	209	NoGas	49.170	49.17	ppb	0.1	500	
232	Th	209	NoGas	49.568	49.57	ppb	0.5	200	
238	U	209	NoGas	49.839	49.84	ppb	0.6	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	519908.02	2.0	83.28	60	120	
45	Sc	NoGas	3534236.11	3770507.35	1.6	106.69	60	120	
45	Sc	H2	1420927.9	1477330.11	2.5	103.97	60	120	
45	Sc	He	200234.16	198967.82	1.0	99.37	60	120	
72	Ge	NoGas	850879.98	911724.30	0.9	107.15	60	120	
72	Ge	H2	465593.12	481487.48	1.8	103.41	60	120	
72	Ge	He	141552.35	144830.44	1.0	102.32	60	120	
115	In	NoGas	2569295.7	2889906.53	0.8	112.48	60	120	
115	In	H2	2281755.4	2496590.39	3.0	109.42	60	120	
115	In	He	606387.04	635631.00	0.9	104.82	60	120	
159	Tb	NoGas	2661135.38	3048020.92	0.7	114.54	60	120	
209	Bi	NoGas	2796913.01	3264558.06	1.1	116.72	60	120	

Sample Name	L56147-07
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:12:56 PM
Sample Type	Sample
Total Dilution	50.0000
Vial Location	2203

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	1.430	0.03	ppb	18.3	200	
11	B	6	NoGas	232.678	4.65	ppb	0.8	20	
27	Al	72	NoGas	38.138	0.76	ppb	0.8	1000	
51	V	45	He	-28.314	-0.57	ppb	8.4	200	
52	Cr	45	He	-0.489	-0.01	ppb	8.9	200	
55	Mn	72	NoGas	5222.908	104.46	ppb	0.7	200	
56	Fe	45	H2	28.381	0.57	ppb	1.6	1000	
59	Co	72	NoGas	122.903	2.46	ppb	0.7	200	
60	Ni	45	He	48.235	0.96	ppb	2.9	500	
63	Cu	45	He	500.218	10	ppb	1.0	500	
66	Zn	72	NoGas	88.200	1.76	ppb	1.2	1000	
75	As	45	He	-1.791	-0.04	ppb	3.5	200	
78	Se	45	H2	93.575	1.87	ppb	1.9	500	
98	Mo	115	NoGas	19.839	0.4	ppb	5.4	200	
107	Ag	115	NoGas	0.065	0	ppb	24.1	50	
111	Cd	115	NoGas	0.607	0.01	ppb	3.4	200	
118	Sn	115	NoGas	-11.656	-0.23	ppb	7.5	200	
121	Sb	115	NoGas	0.674	0.01	ppb	13.4	25	
125	Te	115	NoGas	0.766	0.02	ppb	21.5	200	
133	Cs	115	NoGas	1.493	0.03	ppb	3.9	200	
137	Ba	115	NoGas	18.371	0.37	ppb	1.2	500	
205	Tl	209	NoGas	4.305	0.09	ppb	11.6	200	
208	Pb	209	NoGas	2.427	0.05	ppb	12.9	500	
232	Th	209	NoGas	1.982	0.04	ppb	15.5	200	
238	U	209	NoGas	22.308	0.45	ppb	1.1	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	527776.30	0.6	84.54	60	120	
45	Sc	NoGas	3534236.11	3799709.29	1.6	107.51	60	120	
45	Sc	H2	1420927.9	1489279.18	3.2	104.81	60	120	
45	Sc	He	200234.16	205382.47	1.8	102.57	60	120	
72	Ge	NoGas	850879.98	912490.62	0.5	107.24	60	120	
72	Ge	H2	465593.12	486207.76	3.2	104.43	60	120	
72	Ge	He	141552.35	149744.41	1.3	105.79	60	120	
115	In	NoGas	2569295.7	2887476.04	0.9	112.38	60	120	
115	In	H2	2281755.4	2525680.38	2.6	110.69	60	120	
115	In	He	606387.04	641391.26	0.7	105.77	60	120	
159	Tb	NoGas	2661135.38	3039989.18	0.4	114.24	60	120	
209	Bi	NoGas	2796913.01	3230367.51	0.5	115.5	60	120	

Sample Name	L56147-07MS
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:14:45 PM
Sample Type	Sample
Total Dilution	50.0000
Vial Location	2204

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	45.873	0.92	ppb	2.7	200	
11	B	6	NoGas	212.326	4.25	ppb	0.4	20	
27	Al	72	NoGas	88.036	1.76	ppb	0.9	1000	
51	V	45	He	23.159	0.46	ppb	1.5	200	
52	Cr	45	He	49.251	0.98	ppb	1.5	200	
55	Mn	72	NoGas	5253.023	105.06	ppb	0.4	200	
56	Fe	45	H2	74.925	1.5	ppb	2.7	1000	
59	Co	72	NoGas	173.438	3.47	ppb	0.4	200	
60	Ni	45	He	94.690	1.89	ppb	3.3	500	
63	Cu	45	He	535.543	10.71	ppb	2.0	500	
66	Zn	72	NoGas	155.589	3.11	ppb	0.5	1000	
75	As	45	He	48.803	0.98	ppb	5.2	200	
78	Se	45	H2	137.885	2.76	ppb	3.5	500	
98	Mo	115	NoGas	63.521	1.27	ppb	1.2	200	
107	Ag	115	NoGas	9.979	0.2	ppb	0.4	50	
111	Cd	115	NoGas	47.728	0.96	ppb	2.7	200	
118	Sn	115	NoGas	36.736	0.74	ppb	1.3	200	
121	Sb	115	NoGas	10.833	0.22	ppb	1.6	25	
125	Te	115	NoGas	45.761	0.92	ppb	11.7	200	
133	Cs	115	NoGas	49.081	0.98	ppb	1.3	200	
137	Ba	115	NoGas	67.164	1.34	ppb	1.2	500	
205	Tl	209	NoGas	57.861	1.16	ppb	2.9	200	
208	Pb	209	NoGas	51.460	1.03	ppb	1.7	500	
232	Th	209	NoGas	47.920	0.96	ppb	1.3	200	
238	U	209	NoGas	71.623	1.43	ppb	0.3	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	517253.66	0.8	82.86	60	120	
45	Sc	NoGas	3534236.11	3809844.85	1.0	107.8	60	120	
45	Sc	H2	1420927.9	1528000.39	3.5	107.54	60	120	
45	Sc	He	200234.16	206228.50	2.0	102.99	60	120	
72	Ge	NoGas	850879.98	904547.98	1.1	106.31	60	120	
72	Ge	H2	465593.12	493868.18	3.5	106.07	60	120	
72	Ge	He	141552.35	148894.70	2.4	105.19	60	120	
115	In	NoGas	2569295.7	2887720.08	1.1	112.39	60	120	
115	In	H2	2281755.4	2510457.19	4.1	110.02	60	120	
115	In	He	606387.04	645284.94	1.9	106.41	60	120	
159	Tb	NoGas	2661135.38	3010172.87	0.9	113.12	60	120	
209	Bi	NoGas	2796913.01	3206132.23	0.8	114.63	60	120	

Sample Name	L56147-07MSD
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:16:33 PM
Sample Type	Sample
Total Dilution	50.0000
Vial Location	2205

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	44.691	0.89	ppb	3.7	200	
11	B	6	NoGas	202.778	4.06	ppb	0.7	20	
27	Al	72	NoGas	86.591	1.73	ppb	0.4	1000	
51	V	45	He	21.186	0.42	ppb	1.0	200	
52	Cr	45	He	47.387	0.95	ppb	3.7	200	
55	Mn	72	NoGas	5249.601	104.99	ppb	1.2	200	
56	Fe	45	H2	87.471	1.75	ppb	2.7	1000	
59	Co	72	NoGas	174.213	3.48	ppb	1.4	200	
60	Ni	45	He	97.129	1.94	ppb	1.6	500	
63	Cu	45	He	534.605	10.69	ppb	1.0	500	
66	Zn	72	NoGas	145.637	2.91	ppb	1.1	1000	
75	As	45	He	49.800	1	ppb	2.3	200	
78	Se	45	H2	144.196	2.88	ppb	2.6	500	
98	Mo	115	NoGas	64.935	1.3	ppb	1.9	200	
107	Ag	115	NoGas	9.975	0.2	ppb	0.3	50	
111	Cd	115	NoGas	48.447	0.97	ppb	1.5	200	
118	Sn	115	NoGas	37.486	0.75	ppb	0.7	200	
121	Sb	115	NoGas	10.862	0.22	ppb	0.1	25	
125	Te	115	NoGas	50.680	1.01	ppb	9.0	200	
133	Cs	115	NoGas	50.458	1.01	ppb	0.7	200	
137	Ba	115	NoGas	66.969	1.34	ppb	0.5	500	
205	Tl	209	NoGas	59.783	1.2	ppb	2.1	200	
208	Pb	209	NoGas	50.734	1.01	ppb	0.7	500	
232	Th	209	NoGas	48.155	0.96	ppb	1.9	200	
238	U	209	NoGas	71.204	1.42	ppb	0.1	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	517902.51	1.2	82.96	60	120	
45	Sc	NoGas	3534236.11	3827928.60	1.4	108.31	60	120	
45	Sc	H2	1420927.9	1517000.95	2.3	106.76	60	120	
45	Sc	He	200234.16	208618.93	0.8	104.19	60	120	
72	Ge	NoGas	850879.98	911375.00	1.0	107.11	60	120	
72	Ge	H2	465593.12	493743.54	2.6	106.05	60	120	
72	Ge	He	141552.35	150738.35	1.7	106.49	60	120	
115	In	NoGas	2569295.7	2873592.11	0.5	111.84	60	120	
115	In	H2	2281755.4	2514544.69	2.4	110.2	60	120	
115	In	He	606387.04	654786.28	0.9	107.98	60	120	
159	Tb	NoGas	2661135.38	3039725.02	0.4	114.23	60	120	
209	Bi	NoGas	2796913.01	3230434.73	0.8	115.5	60	120	

Sample Name	L56147-08
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:18:21 PM
Sample Type	Sample
Total Dilution	200.0000
Vial Location	2206

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	5.271	0.03	ppb	18.2	200	
11	B	6	NoGas	302.997	1.52	ppb	0.5	20	
27	Al	72	NoGas	9596.639	47.98	ppb	0.9	1000	
51	V	45	He	-114.147	-0.57	ppb	3.0	200	
52	Cr	45	He	-3.369	-0.02	ppb	8.1	200	
55	Mn	72	NoGas	4149.431	20.75	ppb	0.4	200	
56	Fe	45	H2	748.938	3.74	ppb	1.9	1000	
59	Co	72	NoGas	164.571	0.82	ppb	2.8	200	
60	Ni	45	He	155.021	0.78	ppb	5.8	500	
63	Cu	45	He	108026.740	540.13	ppb	1.9	500	OCAL
66	Zn	72	NoGas	504.565	2.52	ppb	1.3	1000	
75	As	45	He	-7.993	-0.04	ppb	15.5	200	
78	Se	45	H2	3.329	0.02	ppb	10.0	500	
98	Mo	115	NoGas	0.141	0	ppb	27.4	200	
107	Ag	115	NoGas	0.026	0	ppb	37.7	50	
111	Cd	115	NoGas	1.483	0.01	ppb	5.8	200	
118	Sn	115	NoGas	-38.731	-0.19	ppb	3.0	200	
121	Sb	115	NoGas	0.716	0	ppb	17.5	25	
125	Te	115	NoGas	-0.031	0	ppb	43.3	200	
133	Cs	115	NoGas	6.867	0.03	ppb	13.1	200	
137	Ba	115	NoGas	39.462	0.2	ppb	4.9	500	
205	Tl	209	NoGas	47.427	0.24	ppb	11.2	200	
208	Pb	209	NoGas	6.568	0.03	ppb	9.4	500	
232	Th	209	NoGas	1.286	0.01	ppb	7.7	200	
238	U	209	NoGas	22.442	0.11	ppb	2.0	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	527214.37	1.2	84.45	60	120	
45	Sc	NoGas	3534236.11	3801874.85	0.6	107.57	60	120	
45	Sc	H2	1420927.9	1505662.20	1.4	105.96	60	120	
45	Sc	He	200234.16	208646.71	1.0	104.2	60	120	
72	Ge	NoGas	850879.98	901092.36	1.4	105.9	60	120	
72	Ge	H2	465593.12	488452.76	1.8	104.91	60	120	
72	Ge	He	141552.35	150543.89	0.2	106.35	60	120	
115	In	NoGas	2569295.7	2848011.52	0.8	110.85	60	120	
115	In	H2	2281755.4	2502413.02	2.5	109.67	60	120	
115	In	He	606387.04	649182.67	1.8	107.06	60	120	
159	Tb	NoGas	2661135.38	2985062.80	1.0	112.17	60	120	
209	Bi	NoGas	2796913.01	3178536.82	0.4	113.64	60	120	

Sample Name	L56147-09
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:20:10 PM
Sample Type	Sample
Total Dilution	100.0000
Vial Location	2207

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	5.200	0.05	ppb	10.3	200	
11	B	6	NoGas	244.906	2.45	ppb	2.6	20	
27	Al	72	NoGas	7298.029	72.98	ppb	0.8	1000	
51	V	45	He	-56.619	-0.57	ppb	9.6	200	
52	Cr	45	He	-2.125	-0.02	ppb	7.5	200	
55	Mn	72	NoGas	17745.006	177.45	ppb	0.4	200	
56	Fe	45	H2	52.604	0.53	ppb	1.6	1000	
59	Co	72	NoGas	1197.681	11.98	ppb	0.6	200	
60	Ni	45	He	673.688	6.74	ppb	0.1	500	
63	Cu	45	He	40702.152	407.02	ppb	0.4	500	
66	Zn	72	NoGas	674.840	6.75	ppb	0.9	1000	
75	As	45	He	-4.004	-0.04	ppb	17.5	200	
78	Se	45	H2	79.544	0.8	ppb	2.7	500	
98	Mo	115	NoGas	6.140	0.06	ppb	1.4	200	
107	Ag	115	NoGas	0.037	0	ppb	25.5	50	
111	Cd	115	NoGas	4.644	0.05	ppb	12.0	200	
118	Sn	115	NoGas	-22.656	-0.23	ppb	37.6	200	
121	Sb	115	NoGas	0.319	0	ppb	5.9	25	
125	Te	115	NoGas	-0.115	0	ppb	15.7	200	
133	Cs	115	NoGas	3.845	0.04	ppb	6.8	200	
137	Ba	115	NoGas	22.166	0.22	ppb	2.6	500	
205	Tl	209	NoGas	24.380	0.24	ppb	10.2	200	
208	Pb	209	NoGas	3.075	0.03	ppb	7.4	500	
232	Th	209	NoGas	0.165	0	ppb	7.5	200	
238	U	209	NoGas	37.522	0.38	ppb	0.2	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	545086.06	0.6	87.32	60	120	
45	Sc	NoGas	3534236.11	3844799.29	1.0	108.79	60	120	
45	Sc	H2	1420927.9	1521223.72	1.1	107.06	60	120	
45	Sc	He	200234.16	209688.00	0.9	104.72	60	120	
72	Ge	NoGas	850879.98	909090.97	0.6	106.84	60	120	
72	Ge	H2	465593.12	490426.42	0.9	105.33	60	120	
72	Ge	He	141552.35	151052.56	0.1	106.71	60	120	
115	In	NoGas	2569295.7	2864968.41	0.8	111.51	60	120	
115	In	H2	2281755.4	2506646.64	1.6	109.86	60	120	
115	In	He	606387.04	651741.74	0.8	107.48	60	120	
159	Tb	NoGas	2661135.38	3009612.80	1.0	113.1	60	120	
209	Bi	NoGas	2796913.01	3188392.30	0.6	114	60	120	

Sample Name	L56147-09SDL
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:21:59 PM
Sample Type	Sample
Total Dilution	100.0000
Vial Location	2208

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	1.317	0.01	ppb	5.8	200	
11	B	6	NoGas	82.584	0.83	ppb	0.6	20	
27	Al	72	NoGas	1511.617	15.12	ppb	1.1	1000	
51	V	45	He	-57.446	-0.57	ppb	8.0	200	
52	Cr	45	He	-2.032	-0.02	ppb	10.0	200	
55	Mn	72	NoGas	3590.774	35.91	ppb	0.5	200	
56	Fe	45	H2	33.571	0.34	ppb	3.2	1000	
59	Co	72	NoGas	249.010	2.49	ppb	1.3	200	
60	Ni	45	He	133.317	1.33	ppb	0.9	500	
63	Cu	45	He	8261.967	82.62	ppb	1.2	500	
66	Zn	72	NoGas	308.097	3.08	ppb	1.3	1000	
75	As	45	He	-4.798	-0.05	ppb	23.6	200	
78	Se	45	H2	17.525	0.18	ppb	6.8	500	
98	Mo	115	NoGas	1.254	0.01	ppb	38.0	200	
107	Ag	115	NoGas	-0.016	0	ppb	26.4	50	
111	Cd	115	NoGas	0.502	0	ppb	41.9	200	
118	Sn	115	NoGas	-25.270	-0.25	ppb	5.7	200	
121	Sb	115	NoGas	-0.082	0	ppb	8.8	25	
125	Te	115	NoGas	-0.485	0	ppb	49.5	200	
133	Cs	115	NoGas	3.696	0.04	ppb	6.3	200	
137	Ba	115	NoGas	4.956	0.05	ppb	4.0	500	
205	Tl	209	NoGas	25.048	0.25	ppb	11.7	200	
208	Pb	209	NoGas	1.438	0.01	ppb	10.6	500	
232	Th	209	NoGas	0.012	0	ppb	15.1	200	
238	U	209	NoGas	7.554	0.08	ppb	3.5	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	533998.88	1.1	85.54	60	120	
45	Sc	NoGas	3534236.11	3817954.99	1.1	108.03	60	120	
45	Sc	H2	1420927.9	1509557.65	3.0	106.24	60	120	
45	Sc	He	200234.16	205005.06	0.6	102.38	60	120	
72	Ge	NoGas	850879.98	897126.14	1.0	105.44	60	120	
72	Ge	H2	465593.12	488670.73	3.0	104.96	60	120	
72	Ge	He	141552.35	149709.20	0.4	105.76	60	120	
115	In	NoGas	2569295.7	2852878.04	1.1	111.04	60	120	
115	In	H2	2281755.4	2502132.33	1.7	109.66	60	120	
115	In	He	606387.04	638142.46	1.4	105.24	60	120	
159	Tb	NoGas	2661135.38	2980355.78	0.4	112	60	120	
209	Bi	NoGas	2796913.01	3171434.39	1.0	113.39	60	120	

Sample Name	L56147-10
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:23:48 PM
Sample Type	Sample
Total Dilution	2000.0000
Vial Location	2209

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	12.624	0.01	ppb	24.7	200	
11	B	6	NoGas	922.531	0.46	ppb	0.8	20	
27	Al	72	NoGas	38242.677	19.12	ppb	0.9	1000	
51	V	45	He	-1146.108	-0.57	ppb	9.3	200	
52	Cr	45	He	-32.389	-0.02	ppb	6.1	200	
55	Mn	72	NoGas	6713.709	3.36	ppb	0.5	200	
56	Fe	45	H2	2528.819	1.26	ppb	5.2	1000	
59	Co	72	NoGas	836.758	0.42	ppb	2.4	200	
60	Ni	45	He	502.433	0.25	ppb	12.4	500	
63	Cu	45	He	547647.211	273.82	ppb	1.6	500	
66	Zn	72	NoGas	5170.870	2.58	ppb	0.4	1000	
75	As	45	He	-95.278	-0.05	ppb	9.1	200	
78	Se	45	H2	38.747	0.02	ppb	9.9	500	
98	Mo	115	NoGas	4.677	0	ppb	13.1	200	
107	Ag	115	NoGas	-0.382	0	ppb	32.7	50	
111	Cd	115	NoGas	4.362	0	ppb	32.7	200	
118	Sn	115	NoGas	-455.344	-0.23	ppb	3.9	200	
121	Sb	115	NoGas	-2.764	0	ppb	23.5	25	
125	Te	115	NoGas	-11.209	-0.01	ppb	86.6	200	
133	Cs	115	NoGas	73.204	0.04	ppb	13.1	200	
137	Ba	115	NoGas	30.094	0.02	ppb	18.7	500	
205	Tl	209	NoGas	517.099	0.26	ppb	10.8	200	
208	Pb	209	NoGas	36.387	0.02	ppb	9.9	500	
232	Th	209	NoGas	-1.129	0	ppb	26.7	200	
238	U	209	NoGas	70.560	0.04	ppb	5.7	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	525339.98	0.4	84.15	60	120	
45	Sc	NoGas	3534236.11	3711146.94	0.4	105.01	60	120	
45	Sc	H2	1420927.9	1471381.12	3.1	103.55	60	120	
45	Sc	He	200234.16	205281.77	0.9	102.52	60	120	
72	Ge	NoGas	850879.98	886675.07	0.5	104.21	60	120	
72	Ge	H2	465593.12	473552.50	1.4	101.71	60	120	
72	Ge	He	141552.35	146800.94	0.7	103.71	60	120	
115	In	NoGas	2569295.7	2788039.26	0.7	108.51	60	120	
115	In	H2	2281755.4	2430167.33	2.6	106.5	60	120	
115	In	He	606387.04	634572.93	0.4	104.65	60	120	
159	Tb	NoGas	2661135.38	2918342.25	0.4	109.67	60	120	
209	Bi	NoGas	2796913.01	3130266.06	0.6	111.92	60	120	

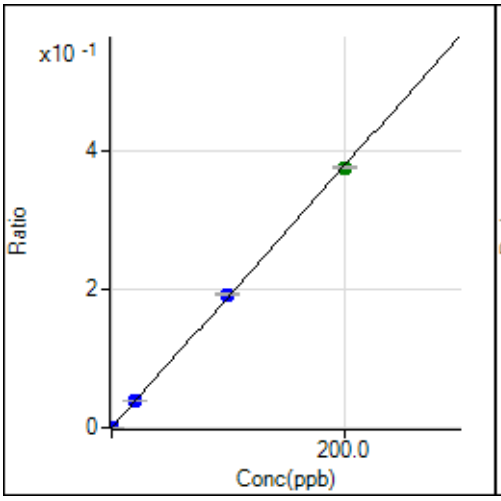
Sample Name	L56147-11
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488444.b
Acq Time	12/18/2019 3:25:37 PM
Sample Type	Sample
Total Dilution	100.0000
Vial Location	2210

QC Analyte Table

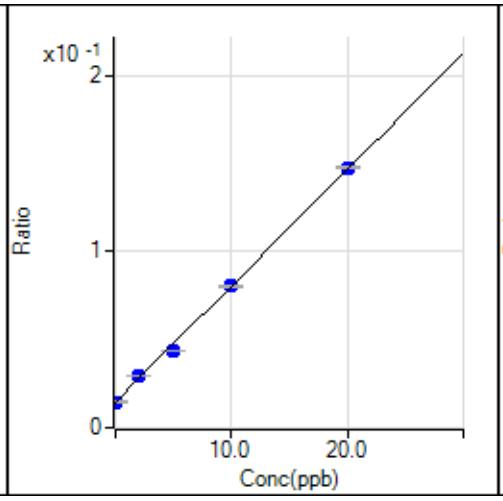
Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	45	NoGas	2.917	0.03	ppb	16.4	200	
11	B	6	NoGas	269.552	2.7	ppb	1.6	20	
27	Al	72	NoGas	6397.531	63.98	ppb	1.2	1000	
51	V	45	He	-56.369	-0.56	ppb	2.6	200	
52	Cr	45	He	-1.448	-0.01	ppb	1.8	200	
55	Mn	72	NoGas	21157.117	211.57	ppb	0.9	200	OCAL
56	Fe	45	H2	54.835	0.55	ppb	4.2	1000	
59	Co	72	NoGas	1308.881	13.09	ppb	0.7	200	
60	Ni	45	He	527.625	5.28	ppb	1.2	500	
63	Cu	45	He	39013.830	390.14	ppb	1.1	500	
66	Zn	72	NoGas	916.217	9.16	ppb	1.0	1000	
75	As	45	He	-3.980	-0.04	ppb	24.0	200	
78	Se	45	H2	44.917	0.45	ppb	3.9	500	
98	Mo	115	NoGas	1.447	0.01	ppb	25.4	200	
107	Ag	115	NoGas	-0.001	0	ppb	27.5	50	
111	Cd	115	NoGas	7.970	0.08	ppb	15.7	200	
118	Sn	115	NoGas	-25.466	-0.26	ppb	4.3	200	
121	Sb	115	NoGas	0.019	0	ppb	16.3	25	
125	Te	115	NoGas	-0.294	0	ppb	0.0	200	
133	Cs	115	NoGas	4.102	0.04	ppb	5.2	200	
137	Ba	115	NoGas	10.242	0.1	ppb	1.3	500	
205	Tl	209	NoGas	25.872	0.26	ppb	11.9	200	
208	Pb	209	NoGas	2.172	0.02	ppb	13.7	500	
232	Th	209	NoGas	-0.071	0	ppb	7.9	200	
238	U	209	NoGas	47.729	0.48	ppb	0.7	200	

QC ISTD Table

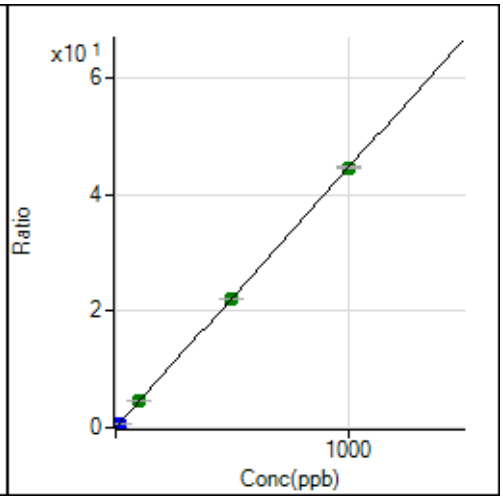
Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	624264.33	549154.06	1.1	87.97	60	120	
45	Sc	NoGas	3534236.11	3806908.32	2.0	107.72	60	120	
45	Sc	H2	1420927.9	1515010.50	2.5	106.62	60	120	
45	Sc	He	200234.16	210504.69	1.1	105.13	60	120	
72	Ge	NoGas	850879.98	910080.24	0.6	106.96	60	120	
72	Ge	H2	465593.12	490446.98	2.4	105.34	60	120	
72	Ge	He	141552.35	150944.83	0.9	106.64	60	120	
115	In	NoGas	2569295.7	2843282.35	1.5	110.66	60	120	
115	In	H2	2281755.4	2495212.75	2.6	109.35	60	120	
115	In	He	606387.04	652818.46	1.3	107.66	60	120	
159	Tb	NoGas	2661135.38	2986515.78	0.5	112.23	60	120	
209	Bi	NoGas	2796913.01	3175816.26	1.3	113.55	60	120	



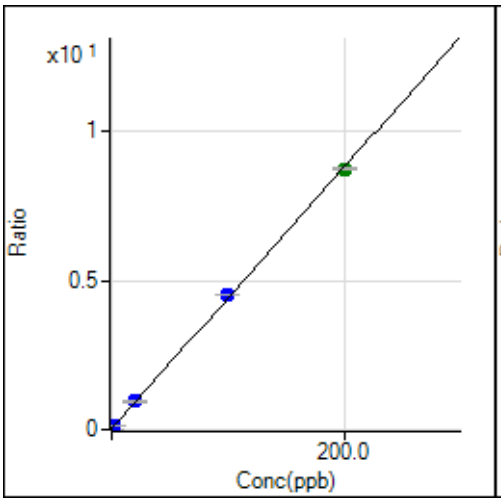
9 Be [NoGas] / ISTD: 45 Sc
y = 1.893E-3 x + 1.321E-5
R 0.9999
DL 0.005193
BEC 0.006977



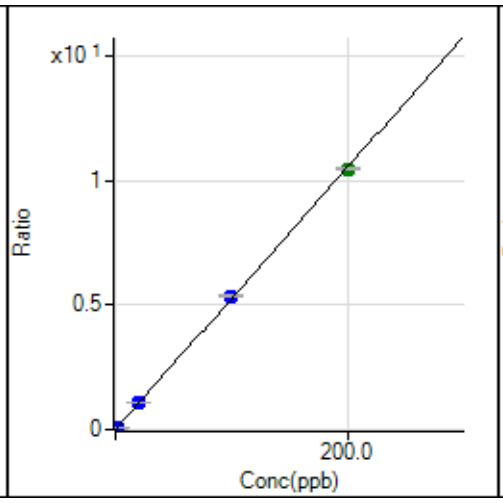
11 B [NoGas] / ISTD: 6 Li
y = 6.613E-3 x + 1.464E-2
R 0.9992
DL 0.1046
BEC 2.214



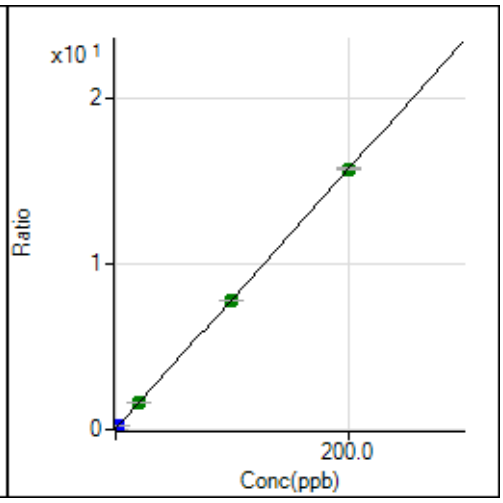
27 Al [NoGas] / ISTD: 72 Ge
y = 4.455E-2 x + 1.712E-2
R 1.0000
DL 0.01578
BEC 0.3843



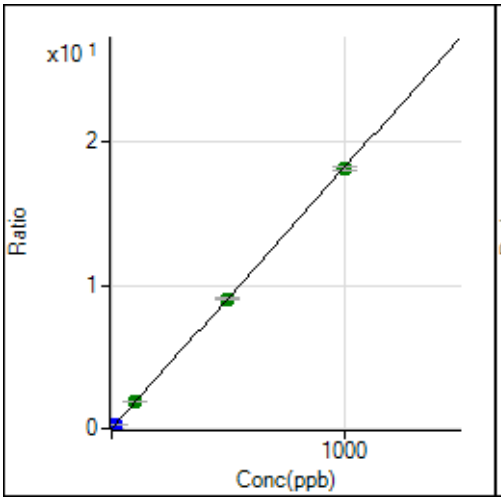
51 V [He] / ISTD: 45 Sc
y = 4.391E-2 x + 2.778E-2
R 0.9999
DL 0.02833
BEC 0.6327



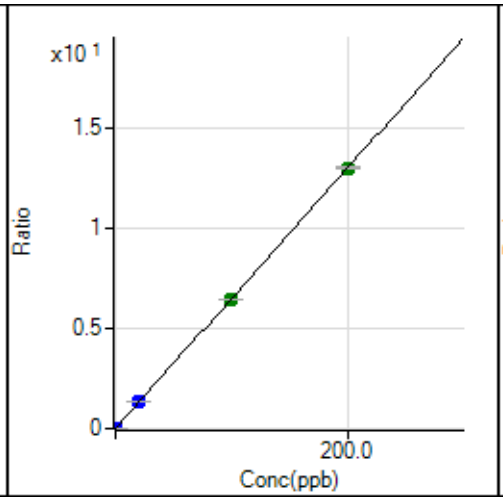
52 Cr [He] / ISTD: 45 Sc
y = 5.263E-2 x + 3.634E-3
R 0.9999
DL 0.005107
BEC 0.06905



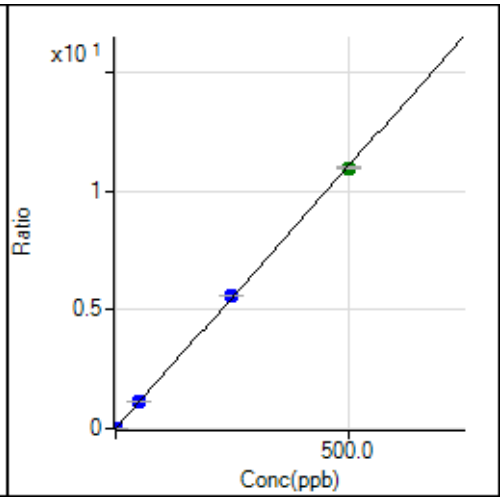
55 Mn [NoGas] / ISTD: 72 Ge
y = 7.818E-2 x + 4.748E-2
R 1.0000
DL 0.02335
BEC 0.6073



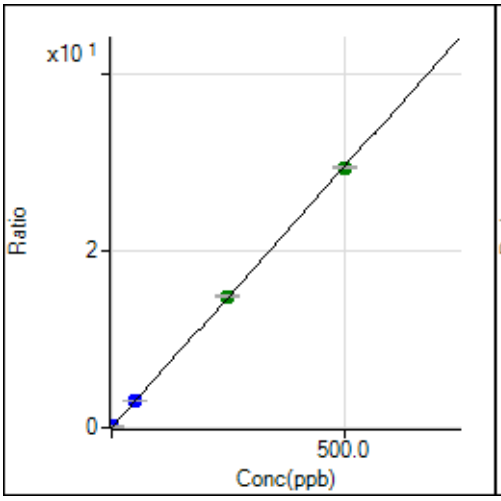
56 Fe [H2] / ISTD: 45 Sc
y = 1.818E-2 x + 3.022E-3
R 1.0000
DL 0.02238
BEC 0.1663



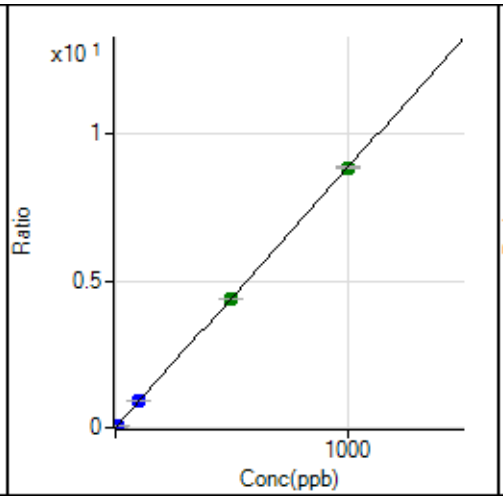
59 Co [NoGas] / ISTD: 72 Ge
y = 6.497E-2 x + 1.655E-3
R 1.0000
DL 0.002127
BEC 0.02547



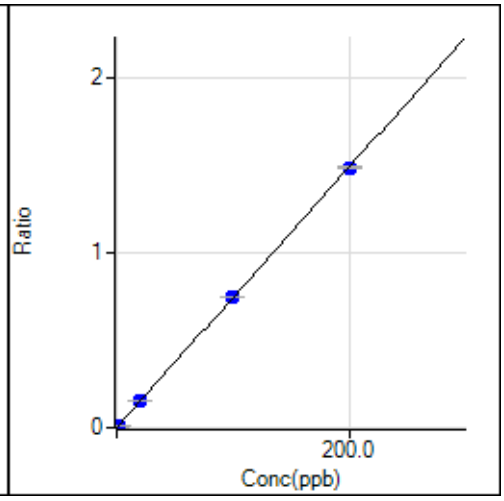
60 Ni [He] / ISTD: 45 Sc
y = 2.204E-2 x + 3.888E-4
R 0.9999
DL 0.008998
BEC 0.01764



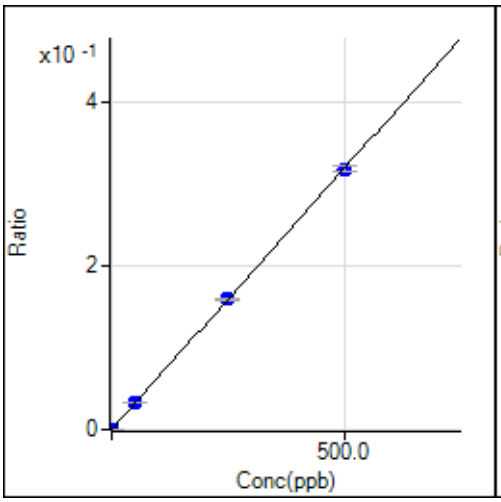
63 Cu [He] / ISTD: 45 Sc
y = 5.887E-2 x + 7.273E-3
R 1.0000
DL 0.01315
BEC 0.1236



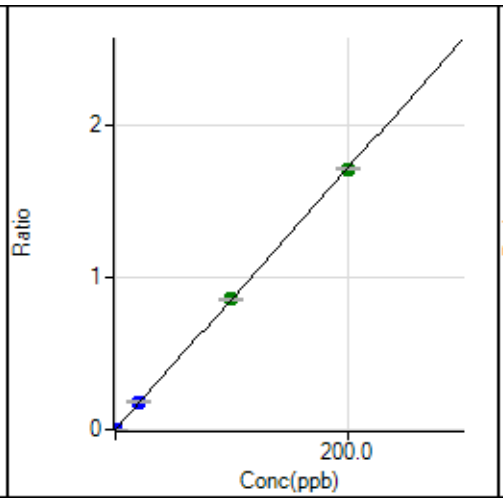
66 Zn [NoGas] / ISTD: 72 Ge
y = 8.837E-3 x + 3.337E-3
R 1.0000
DL 0.0838
BEC 0.3776



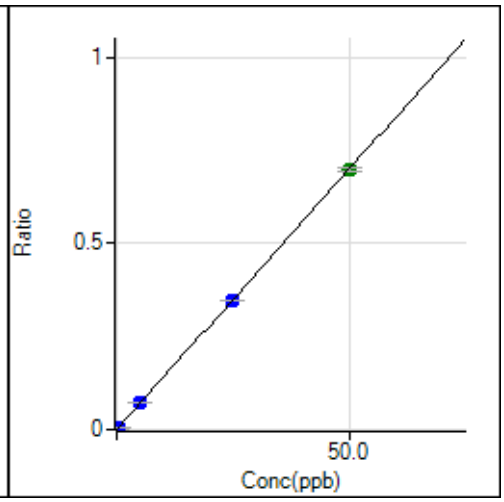
75 As [He] / ISTD: 45 Sc
y = 7.442E-3 x + 4.438E-4
R 1.0000
DL 0.008701
BEC 0.05963



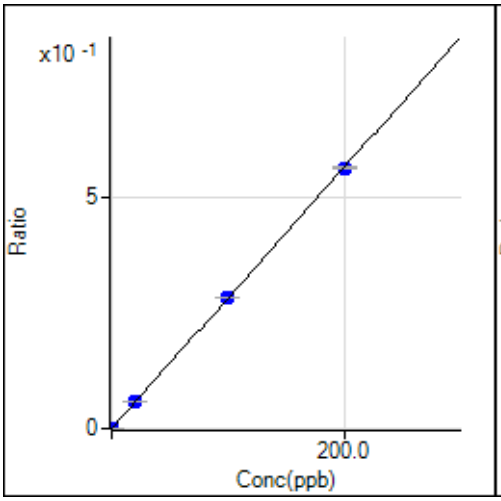
78 Se [H2] / ISTD: 45 Sc
y = 6.377E-4 x + 3.941E-5
R 1.0000
DL 0.02379
BEC 0.0618



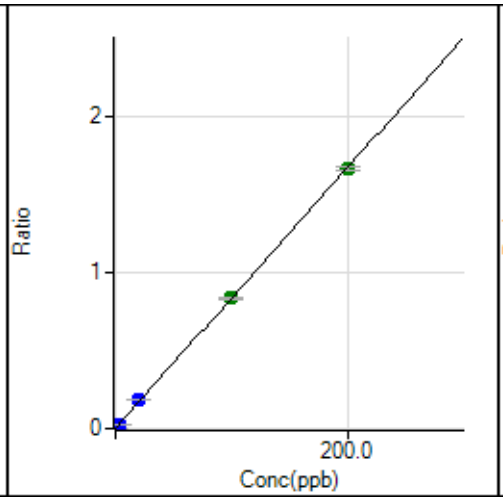
98 Mo [NoGas] / ISTD: 115 In
y = 8.563E-3 x + 2.090E-5
R 1.0000
DL 0.00163
BEC 0.002441



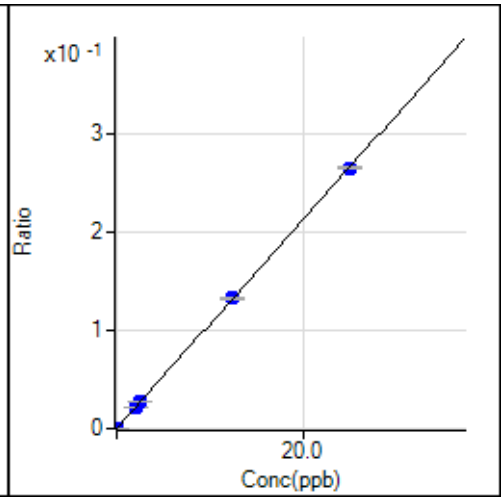
107 Ag [NoGas] / ISTD: 115 In
y = 1.397E-2 x + 1.384E-5
R 1.0000
DL 0.0005929
BEC 0.000991



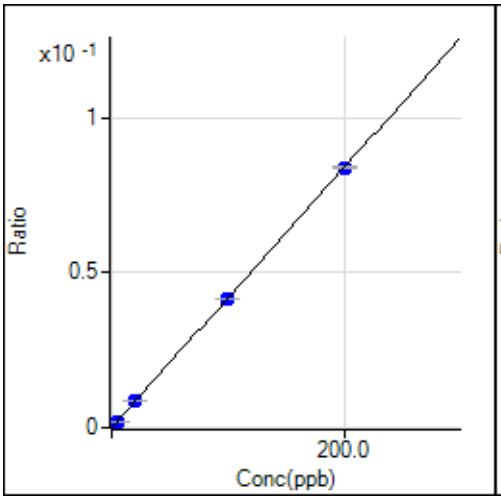
111 Cd [NoGas] / ISTD: 115 In
y = 2.815E-3 x + 1.273E-5
R 1.0000
DL 0.004324
BEC 0.004522



118 Sn [NoGas] / ISTD: 115 In
y = 8.323E-3 x + 2.673E-3
R 1.0000
DL 0.01837
BEC 0.3212



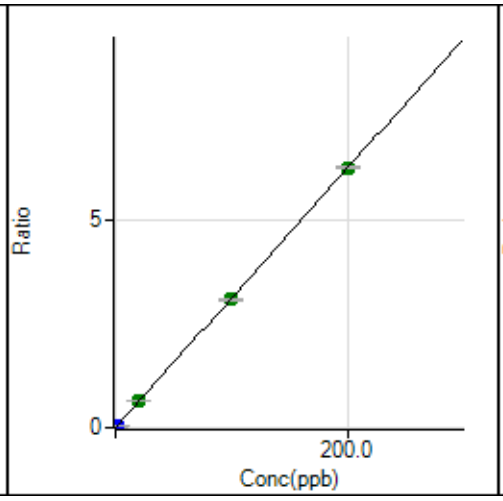
121 Sb [NoGas] / ISTD: 115 In
y = 1.058E-2 x + 4.847E-5
R 1.0000
DL 0.002519
BEC 0.004582



125 Te [NoGas] / ISTD: 115 In

y = 4.194E-4 x + 4.750E-6

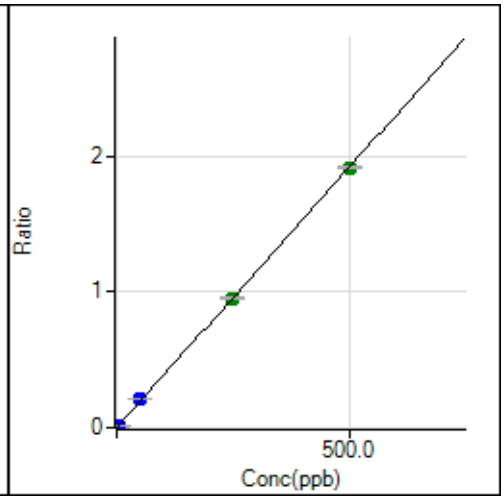
R	1.0000
DL	0.02332
BEC	0.01132



133 Cs [NoGas] / ISTD: 115 In

y = 3.121E-2 x + 4.338E-4

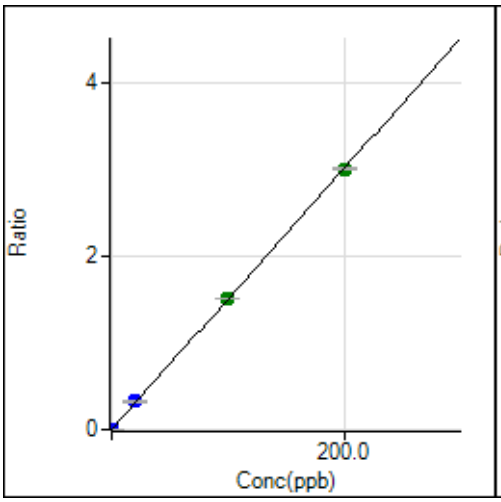
R	1.0000
DL	0.002429
BEC	0.0139



137 Ba [NoGas] / ISTD: 115 In

y = 3.830E-3 x + 3.329E-5

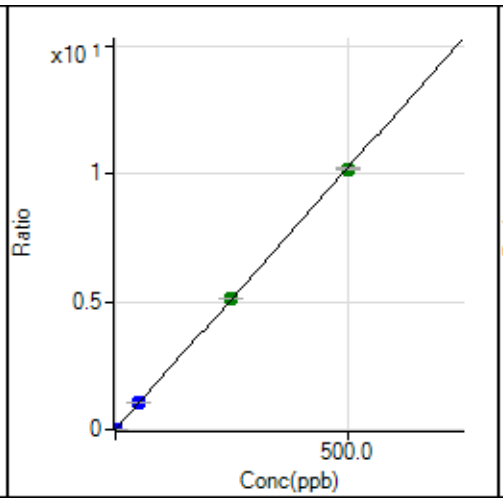
R	1.0000
DL	0.002419
BEC	0.008691



205 Tl [NoGas] / ISTD: 209 Bi

y = 1.500E-2 x + 2.118E-3

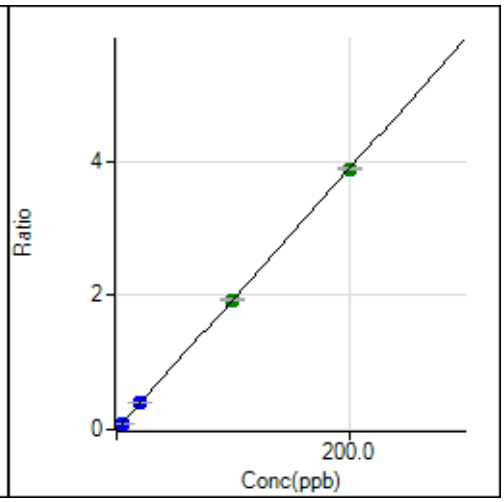
R	1.0000
DL	0.01422
BEC	0.1412



208 Pb [NoGas] / ISTD: 209 Bi

y = 2.040E-2 x + 1.669E-3

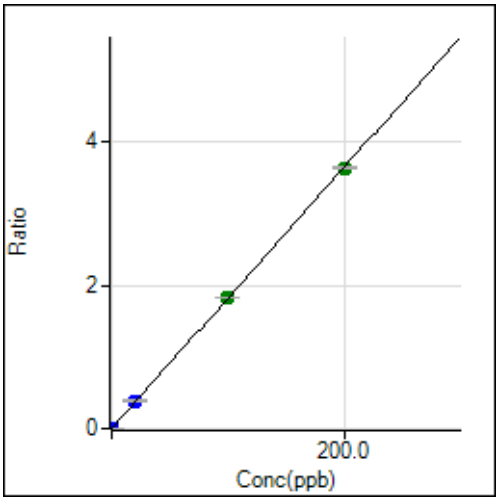
R	1.0000
DL	0.006127
BEC	0.08178



232 Th [NoGas] / ISTD: 209 Bi

y = 1.944E-2 x + 5.999E-5

R	1.0000
DL	0.0008423
BEC	0.003086



238 U [NoGas] / ISTD: 209 Bi

y = 1.825E-2 x + 3.299E-5

R	1.0000
DL	0.001609
BEC	0.001807

EPA 6020 Tune Check Report

Acq/Data Batch C:\Agilent\ICPMH\1\DATA\6020AMU-18_Dec_2019-10_26_45.b

Acq. Date-Time 12/18/2019 10:59:35 AM

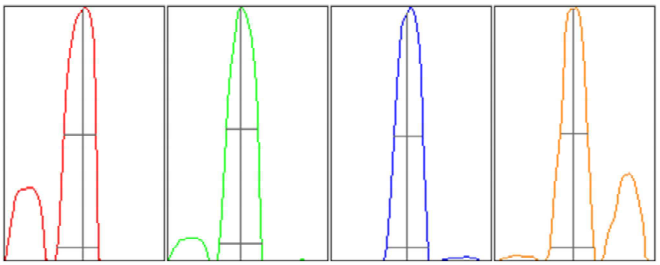
Instrument Name G8403A JP16281462

Mass	Conc. [ug/l]	Count	CPS	RSD%	RSD% (Required)	RSD% (Flag)
7		4866	48660.19	2.150	5.000	
59		13596	135963.25	1.848	5.000	
115		29029	290289.96	2.517	5.000	
205		12174	121741.97	2.255	5.000	

Oxide 156 / 140 1.153 %

Doubly Charged 70 / 140 6.208 %

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)
7	4921.30	7.00	6.90 - 7.10	
59	14349.68	58.90	58.90 - 59.10	
115	27041.36	114.95	114.90 - 115.10	
205	12306.40	205.00	204.90 - 205.10	

Mass	W-50%	W-5%	W-5% (Required)	W-5% (Flag)
7	0.62	0.768	0.900	
59	0.59	0.788	0.900	
115	0.55	0.777	0.900	
205	0.53	0.820	0.900	

Integration Time [sec] 0.1

Acquisition Time [sec] 30.02

Calibration Standards

6020/200.8 Stock #1: MS191209-1 SCN
6020/200.8 Stock #2: MS191209-2 SCN
6020/200.8 Stock #3: MS191209-3 SCN

PQV STD: MS191014-4
Exp. 12/31/19

ICPMS5/6 INT STD: MS190612-2
Exp. 1/26/2020

ICPMS7 INT STD: MS190613-1
Exp. 1/26/2020

Nitric Acid: 60320

Hydrochloric Acid: 59570

VERIFIED: bsu 12/18/19

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG488444 **ICPMS MWMT**

Sample	Date	SCN	Ag	Al	As	B	Ba	Be	Cd	Co	Cr	Cs	Cu	Fe	Mn	Mo	Ni	Pb	Sb	Se	Sn	Te	Th	Tl	U	V	Zn
WG488444ICV	12/18/19 14:25	MS191014-8											X		X												
WG488444ICB	12/18/19 14:27												X		X												
WG488444PQV	12/18/19 14:29	MS191014-4											X		X												
WG488444ICSA	12/18/19 14:31												X		X												
WG488444ICSAB	12/18/19 14:32	MS191119-7											X		X												
WG488444CCV1	12/18/19 15:05	MS191209-4											X		X												
WG488444CCB1	12/18/19 15:07		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487250PBS	12/18/19 15:09		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487250LFB2	12/18/19 15:11	MS191119-5											X		X												
L56147-07	12/18/19 15:12														X												
L56147-07MS	12/18/19 15:14	MS191119-5											X		X												
L56147-07MSD	12/18/19 15:16	MS191119-5											X		X												
L56147-08	12/18/19 15:18																										
L56147-09	12/18/19 15:20												X		X												
L56147-09SDL	12/18/19 15:21												X		X												
L56147-10	12/18/19 15:23												X														
L56147-11	12/18/19 15:25												X														
WG488444CCV2	12/18/19 15:27	MS191209-4											X		X												
WG488444CCB2	12/18/19 15:29		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG488444CCV3	12/18/19 15:31	MS191209-4											X		X												
WG488444CCB3	12/18/19 15:32		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG488531

ACZ Laboratories, Inc

Instrument ID: ICPMS6
Analyst: Bin
ACZ Dept: 33
Create Date: 12/19/2019 10:59
Start Date/Time: 12/19/19 11am
End Date/Time: 1

L56147-200113 1042

template

moved up in

SE Q	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	CU MS M W MT	MN MS M W MT	Dilution	
1	WG488531ICV	MS191014-8			1			☑	☑	1	
2	WG488531ICB	NONE			1			☑	☑	1	
3	WG488531PQV	MS191014-4			1			☑	☑	1	
4	WG488531ICSA	MS191119-6			1			☑	☑	1	
5	WG488531ICSAB	MS191119-7			1			☑	☑	1	
6	WG488531ULRV	MS191209-5			1			☑	☑	1	
7	WG488531WASH	NONE			1			☑	☑	1	
8	WG487250PBS	NONE			1			☑	☑	1	
9	L56147-07	STSB29-FD_6-15			1		2430	☑	☐	50	↑ metals
10	L56147-07MS	MS191119-5			1			☑	☑	50	
11	L56147-07MSD	MS191119-5			1			☑	☑	50	
12	L56147-08	STSB30_0.5-3			1		2730	☑	☐	500	↑ Cu
13	L56147-11	STSB31_6-15			1		3740	☐	☑	200	↑ Mn
14	WG488531CCV1	MS191209-4			1			☑	☑	1	
15	WG488531CCB1	NONE			1			☑	☑	1	
16	L56147-11SDL	NONE			1			☑	☑	200	
17	WG487250LFB2	MS191119-5			1			☑	☑	1	
18	WG488531CCV2	MS191209-4			1			☑	☑	1	
19	WG488531CCB2	NONE			1			☑	☑	1	

Report Comments: ULRV not run, rule SXS > C5.

Internal Comments

AREV: Bin 12/19/19
Initials, Date

SREV: 12-20-19
Initials, Date

12/19/2019 10:59:54 AM 121719

ICPMS MWMT

QC List Type: QC-ICPMS-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICPMS-MWMT
QC Ref: MA-ICPMS-T-846
Group ID: MA-G-MS-MWMT
Method Ref: M6020
SOP Ref: SOPII022

WG488531

ACZ Laboratories, Inc

Instrument ID: ICPMS6
Analyst:
ACZ Dept: 33
Create Date: 12/19/2019 10:59
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/19/2019 10:59:54 AM 121719

ACZ Laboratories, Inc.

ICPMS DATA REVIEW CHECKLIST

AREV:	BW
Date:	12/19/19
SREV:	[illegible]
Date:	12-20-19

Workgroup:	488531
Sample Type:	MWMT
Analysis Date:	12/19/19
Analyst:	BW

	Yes	No	N/A
1) Is the instrument ID on the bench sheet correct?	✓		
2) Has a passing method tune been performed within 24 hours?	✓		
3) Was the low calibration point dropped? If yes, notify PM of change to PQLs.			✓
4) Is the linear regression ≥ 0.995 for the analytes of interest?	✓		
5) Was the PQV standard analyzed & evaluated for DW samples ? (Fail in LIMS if no DW sxs in WG.)			✓
6) Do the dilution factors on the benchsheet match the sequence in the raw data?	✓		
7) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal, EC, TDS)?			✓
8) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?			✓
9) Are the % Recoveries of the internal standards within the method limits?	✓		
10) Are all of the QC critera listed in LIMS within specified limits?		✓	
11) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?			✓
12) Are all errors properly crossed out (i.e. single-line, dated & initialed)?	✓		
13) Is a current standard/reagent form attached to the workgroup?	✓		
14) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
250PBS	↑ Cu	B7 flag
147602/MS/MSD	Mn = 58%, -72%	M3 flagged assoc. sx

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488531

Date Reported: 20-Dec-19
Run ID: R1765288
Date Analyzed: 19-Dec-19
ICAL Workgroup:
Instrument ID: ICPMS6

WG488531ICV

Tag: **Measured:** 12/19/2019 3:02:38 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.05284	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	106	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.05002	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	100	1		%	++	0.0004	0.002			

WG488531ICB

Tag: **Measured:** 12/19/2019 3:04:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

WG488531PQV

Tag: **Measured:** 12/19/2019 3:06:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.0018	1	B	mg/L	++	0.0008	0.002			
SREV	COPPER	REC	90	1	B	%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.00177	1	B	mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	88	1	B	%	++	0.0004	0.002			

WG488531ICSA

Tag: **Measured:** 12/19/2019 3:08:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.00044	1	B	mg/L	++	0.0004	0.002			

WG488531ICSAB

Tag: **Measured:** 12/19/2019 3:10:04 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.01779	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	89	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.01852	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	92	1		%	++	0.0004	0.002			

WG487250PBS

Tag: 2 **Measured:** 12/19/2019 3:13:50 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.00241	1		mg/L	ALRT	0.0008	0.002		B7	5x = 0.01205
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

All are above this level

WG487250LFB2

Tag: 2 **Measured:** 12/19/2019 3:15:41 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.05215	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	104	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.05021	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	100	1		%	++	0.0004	0.002			

L56147-07 Tag: 2 Measured: 12/19/2019 3:17:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	COPPER	REG	.48	50		mg/L	++	0.04	0.1			
NEED	MANGANESE	REG	5.11	50		mg/L	++	0.02	0.1			

L56147-07MS Tag: 2 Measured: 12/19/2019 3:19:25 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.539	50		mg/L	++	0.04	0.1			
SREV	COPPER	REC	118	50		%	++	0.04	0.1			
SREV	MANGANESE	FOUND	5.139	50		mg/L	++	0.02	0.1			
SREV	MANGANESE	REC	58	50		%	ALRT	0.02	0.1		M3 4x	

L56147-07MSD Tag: 2 Measured: 12/19/2019 3:21:17 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.526	50		mg/L	++	0.04	0.1			
SREV	COPPER	REC	92	50		%	++	0.04	0.1			
SREV	COPPER	RPD	2	50		%	++	0.04	0.1			
SREV	MANGANESE	FOUND	5.074	50		mg/L	++	0.02	0.1			
SREV	MANGANESE	REC	-72	50		%	ALRT	0.02	0.1		M3 4x	
SREV	MANGANESE	RPD	1	50		%	++	0.02	0.1			

L56147-08 Tag: 2 Measured: 12/19/2019 3:23:09 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	IS-MWMT	103	500		mg/L	++	0.4	1		B7	

L56147-11 Tag: 2 Measured: 12/19/2019 3:25:01 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	COPPER	REG	37.6	200		mg/L	++	0.2	0.4			
SREV	MANGANESE	IS-MWMT	19.8	200		mg/L	++	0.08	0.4		M3	

WG488531CCV1 Tag: Measured: 12/19/2019 3:26:52 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.26055	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	104	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.10169	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	101	1		%	++	0.0004	0.002			

WG488531CCB1 Tag: Measured: 12/19/2019 3:28:42 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

L56147-11SDL Tag: Measured: 12/19/2019 3:30:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	D	5	200		%	++	0.2	0.4			
SREV	COPPER	FOUND	7.12	200		mg/L	++	0.2	0.4			
SREV	COPPER	REG	35.6	200		mg/L	++	0.2	0.4			
SREV	MANGANESE	D	6	200		%	++	0.08	0.4			
SREV	MANGANESE	FOUND	3.739	200		mg/L	++	0.08	0.4			
SREV	MANGANESE	REG	18.695	200		mg/L	++	0.08	0.4			

This does not seem to be done correctly; or the form is incorrect

WG488531CCV2

Tag:

Measured: 12/19/2019 3:32:24 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND	0.25918	1		mg/L	++	0.0008	0.002			
SREV	COPPER	REC	103	1		%	++	0.0008	0.002			
SREV	MANGANESE	FOUND	0.10194	1		mg/L	++	0.0004	0.002			
SREV	MANGANESE	REC	102	1		%	++	0.0004	0.002			

WG488531CCB2

Tag:

Measured: 12/19/2019 3:34:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	COPPER	FOUND		1	U	mg/L	++	0.0008	0.002			
SREV	MANGANESE	FOUND		1	U	mg/L	++	0.0004	0.002			

Sample Name	WG487250PBS
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488531.b
Acq Time	12/19/2019 3:13:50 PM
Sample Type	Sample
Total Dilution	1.0000
Vial Location	4101

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	0.006	0.01	ppb	13.8	200	
11	B	6	NoGas	44.203	44.2	ppb	0.3	20	OCAL
27	Al	72	NoGas	4.612	4.61	ppb	15.2	1000	
51	V	45	He	-0.638	-0.64	ppb	1.0	200	
52	Cr	45	He	0.197	0.2	ppb	8.6	200	
55	Mn	72	NoGas	0.226	0.23	ppb	0.8	200	
56	Fe	45	H2	7.552	7.55	ppb	1.7	1000	
59	Co	72	NoGas	0.048	0.05	ppb	4.6	200	
60	Ni	45	He	0.123	0.12	ppb	9.0	500	
63	Cu	45	He	2.409	2.41	ppb	3.2	500	
66	Zn	72	NoGas	1.655	1.66	ppb	0.4	1000	
75	As	45	He	-0.027	-0.03	ppb	8.2	200	
78	Se	45	H2	-1.043	-1.04	ppb	7.7	500	
98	Mo	115	NoGas	0.050	0.05	ppb	17.2	200	
107	Ag	115	NoGas	0.386	0.39	ppb	12.1	50	
111	Cd	115	NoGas	0.005	0	ppb	27.9	200	
118	Sn	115	NoGas	-0.139	-0.14	ppb	4.6	200	
121	Sb	115	NoGas	0.007	0.01	ppb	23.1	25	
125	Te	115	NoGas	0.009	0.01	ppb	50.0	200	
133	Cs	115	NoGas	0.008	0.01	ppb	3.7	200	
137	Ba	115	NoGas	0.554	0.55	ppb	4.9	500	
205	Tl	209	NoGas	0.083	0.08	ppb	4.5	200	
208	Pb	209	NoGas	0.036	0.04	ppb	2.7	500	
232	Th	209	NoGas	0.008	0.01	ppb	72.7	200	
238	U	209	NoGas	-0.044	-0.04	ppb	8.8	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	575842.86	576868.83	0.9	100.18	60	120	
45	Sc	NoGas	2960397.87	3203353.83	2.7	108.21	60	120	
45	Sc	H2	1352982.62	1377804.14	4.5	101.83	60	120	
45	Sc	He	184585.63	189678.34	3.1	102.76	60	120	
72	Ge	NoGas	708449.09	728054.62	0.4	102.77	60	120	
72	Ge	H2	433192.03	436283.27	5.2	100.71	60	120	
72	Ge	He	129030.85	131982.88	3.5	102.29	60	120	
115	In	NoGas	1972821.16	2159161.15	2.2	109.45	60	120	
115	In	H2	1833952.01	1905180.83	4.7	103.88	60	120	
115	In	He	461009.18	477694.70	3.1	103.62	60	120	
159	Tb	NoGas	2169710.68	2368919.56	2.2	109.18	60	120	
209	Bi	NoGas	2200442.76	2387347.40	0.6	108.49	60	120	

Sample Name	WG487250LFB2
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488531.b
Acq Time	12/19/2019 3:15:41 PM
Sample Type	Sample
Total Dilution	1.0000
Vial Location	4102

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	49.658	49.66	ppb	0.6	200	
11	B	6	NoGas	55.336	55.34	ppb	0.6	20	OCAL
27	Al	72	NoGas	56.983	56.98	ppb	0.4	1000	
51	V	45	He	49.185	49.18	ppb	3.8	200	
52	Cr	45	He	48.570	48.57	ppb	2.8	200	
55	Mn	72	NoGas	50.214	50.21	ppb	1.0	200	
56	Fe	45	H2	55.694	55.69	ppb	3.6	1000	
59	Co	72	NoGas	50.313	50.31	ppb	0.1	200	
60	Ni	45	He	49.519	49.52	ppb	3.5	500	
63	Cu	45	He	52.149	52.15	ppb	3.1	500	
66	Zn	72	NoGas	51.128	51.13	ppb	0.4	1000	
75	As	45	He	50.459	50.46	ppb	3.1	200	
78	Se	45	H2	48.988	48.99	ppb	4.5	500	
98	Mo	115	NoGas	46.988	46.99	ppb	0.2	200	
107	Ag	115	NoGas	11.161	11.16	ppb	1.2	50	
111	Cd	115	NoGas	47.473	47.47	ppb	0.5	200	
118	Sn	115	NoGas	46.821	46.82	ppb	0.6	200	
121	Sb	115	NoGas	10.052	10.05	ppb	0.7	25	
125	Te	115	NoGas	47.950	47.95	ppb	0.3	200	
133	Cs	115	NoGas	47.744	47.74	ppb	0.2	200	
137	Ba	115	NoGas	49.111	49.11	ppb	0.1	500	
205	Tl	209	NoGas	49.427	49.43	ppb	0.6	200	
208	Pb	209	NoGas	49.725	49.72	ppb	0.4	500	
232	Th	209	NoGas	49.292	49.29	ppb	0.3	200	
238	U	209	NoGas	49.535	49.54	ppb	0.9	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	575842.86	588531.90	1.0	102.2	60	120	
45	Sc	NoGas	2960397.87	3181555.01	0.9	107.47	60	120	
45	Sc	H2	1352982.62	1359245.64	3.4	100.46	60	120	
45	Sc	He	184585.63	187717.42	3.4	101.7	60	120	
72	Ge	NoGas	708449.09	732262.92	1.4	103.36	60	120	
72	Ge	H2	433192.03	435332.27	3.0	100.49	60	120	
72	Ge	He	129030.85	133751.92	3.3	103.66	60	120	
115	In	NoGas	1972821.16	2157175.98	0.7	109.34	60	120	
115	In	H2	1833952.01	1906480.13	3.3	103.95	60	120	
115	In	He	461009.18	480472.12	3.5	104.22	60	120	
159	Tb	NoGas	2169710.68	2376928.17	0.9	109.55	60	120	
209	Bi	NoGas	2200442.76	2477811.15	1.3	112.61	60	120	

Sample Name	L56147-07
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488531.b
Acq Time	12/19/2019 3:17:33 PM
Sample Type	Sample
Total Dilution	50.0000
Vial Location	4103

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	1.027	0.02	ppb	7.1	200	
11	B	6	NoGas	61.162	1.22	ppb	2.7	20	
27	Al	72	NoGas	48.056	0.96	ppb	8.0	1000	
51	V	45	He	-60.654	-1.21	ppb	7.6	200	
52	Cr	45	He	-0.478	-0.01	ppb	11.1	200	
55	Mn	72	NoGas	5111.448	102.23	ppb	0.7	200	
56	Fe	45	H2	31.903	0.64	ppb	1.6	1000	
59	Co	72	NoGas	123.439	2.47	ppb	0.5	200	
60	Ni	45	He	46.395	0.93	ppb	5.3	500	
63	Cu	45	He	483.154	9.66	ppb	3.7	500	
66	Zn	72	NoGas	14.042	0.28	ppb	1.6	1000	
75	As	45	He	-2.951	-0.06	ppb	19.2	200	
78	Se	45	H2	29.904	0.6	ppb	3.3	500	
98	Mo	115	NoGas	15.623	0.31	ppb	7.6	200	
107	Ag	115	NoGas	-0.586	-0.01	ppb	8.5	50	
111	Cd	115	NoGas	1.064	0.02	ppb	24.0	200	
118	Sn	115	NoGas	-3.868	-0.08	ppb	5.2	200	
121	Sb	115	NoGas	0.124	0	ppb	8.1	25	
125	Te	115	NoGas	1.529	0.03	ppb	52.8	200	
133	Cs	115	NoGas	1.180	0.02	ppb	1.2	200	
137	Ba	115	NoGas	17.730	0.36	ppb	2.8	500	
205	Tl	209	NoGas	5.013	0.1	ppb	11.7	200	
208	Pb	209	NoGas	2.333	0.05	ppb	11.4	500	
232	Th	209	NoGas	2.981	0.06	ppb	11.0	200	
238	U	209	NoGas	20.503	0.41	ppb	1.6	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	575842.86	594549.92	0.7	103.25	60	120	
45	Sc	NoGas	2960397.87	3177470.99	0.3	107.33	60	120	
45	Sc	H2	1352982.62	1370332.93	1.5	101.28	60	120	
45	Sc	He	184585.63	191407.41	1.0	103.7	60	120	
72	Ge	NoGas	708449.09	735006.88	0.6	103.75	60	120	
72	Ge	H2	433192.03	436246.25	1.9	100.71	60	120	
72	Ge	He	129030.85	134113.88	1.5	103.94	60	120	
115	In	NoGas	1972821.16	2155691.08	0.2	109.27	60	120	
115	In	H2	1833952.01	1895705.76	1.9	103.37	60	120	
115	In	He	461009.18	487486.86	2.3	105.74	60	120	
159	Tb	NoGas	2169710.68	2370202.68	0.4	109.24	60	120	
209	Bi	NoGas	2200442.76	2378569.35	0.7	108.1	60	120	

Sample Name	L56147-07MS
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488531.b
Acq Time	12/19/2019 3:19:25 PM
Sample Type	Sample
Total Dilution	50.0000
Vial Location	4104

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	48.730	0.98	ppb	2.1	200	
11	B	6	NoGas	9.116	0.18	ppb	1.0	20	
27	Al	72	NoGas	79.568	1.59	ppb	2.0	1000	
51	V	45	He	-10.940	-0.22	ppb	3.9	200	
52	Cr	45	He	48.337	0.97	ppb	2.9	200	
55	Mn	72	NoGas	5138.624	102.77	ppb	0.9	200	
56	Fe	45	H2	69.584	1.39	ppb	3.9	1000	
59	Co	72	NoGas	173.336	3.47	ppb	0.8	200	
60	Ni	45	He	96.556	1.93	ppb	3.4	500	
63	Cu	45	He	538.564	10.77	ppb	2.8	500	
66	Zn	72	NoGas	59.564	1.19	ppb	1.0	1000	
75	As	45	He	48.094	0.96	ppb	2.4	200	
78	Se	45	H2	74.484	1.49	ppb	2.7	500	
98	Mo	115	NoGas	62.190	1.24	ppb	1.3	200	
107	Ag	115	NoGas	7.455	0.15	ppb	0.8	50	
111	Cd	115	NoGas	48.220	0.96	ppb	3.1	200	
118	Sn	115	NoGas	42.772	0.86	ppb	1.6	200	
121	Sb	115	NoGas	9.919	0.2	ppb	1.4	25	
125	Te	115	NoGas	48.972	0.98	ppb	9.7	200	
133	Cs	115	NoGas	48.262	0.96	ppb	0.7	200	
137	Ba	115	NoGas	66.665	1.33	ppb	2.5	500	
205	Tl	209	NoGas	59.915	1.2	ppb	3.3	200	
208	Pb	209	NoGas	52.959	1.06	ppb	1.6	500	
232	Th	209	NoGas	48.800	0.98	ppb	0.8	200	
238	U	209	NoGas	71.311	1.43	ppb	1.6	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	575842.86	597339.75	0.5	103.73	60	120	
45	Sc	NoGas	2960397.87	3170966.33	0.4	107.11	60	120	
45	Sc	H2	1352982.62	1376142.17	2.5	101.71	60	120	
45	Sc	He	184585.63	191467.45	3.2	103.73	60	120	
72	Ge	NoGas	708449.09	736907.97	0.5	104.02	60	120	
72	Ge	H2	433192.03	439390.14	3.5	101.43	60	120	
72	Ge	He	129030.85	135545.46	2.8	105.05	60	120	
115	In	NoGas	1972821.16	2125574.41	0.5	107.74	60	120	
115	In	H2	1833952.01	1899299.44	2.8	103.56	60	120	
115	In	He	461009.18	488485.28	3.1	105.96	60	120	
159	Tb	NoGas	2169710.68	2330119.90	1.1	107.39	60	120	
209	Bi	NoGas	2200442.76	2352721.51	0.5	106.92	60	120	

Sample Name	L56147-07MSD
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488531.b
Acq Time	12/19/2019 3:21:17 PM
Sample Type	Sample
Total Dilution	50.0000
Vial Location	4105

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	46.648	0.93	ppb	2.2	200	
11	B	6	NoGas	-27.803	-0.56	ppb	0.4	20	
27	Al	72	NoGas	78.824	1.58	ppb	7.7	1000	
51	V	45	He	-11.372	-0.23	ppb	2.9	200	
52	Cr	45	He	47.069	0.94	ppb	4.9	200	
55	Mn	72	NoGas	5073.732	101.48	ppb	0.6	200	
56	Fe	45	H2	73.540	1.47	ppb	2.0	1000	
59	Co	72	NoGas	174.208	3.48	ppb	0.3	200	
60	Ni	45	He	94.518	1.89	ppb	2.1	500	
63	Cu	45	He	525.909	10.52	ppb	2.9	500	
66	Zn	72	NoGas	60.156	1.2	ppb	2.8	1000	
75	As	45	He	46.232	0.92	ppb	3.3	200	
78	Se	45	H2	73.572	1.47	ppb	2.1	500	
98	Mo	115	NoGas	60.596	1.21	ppb	1.4	200	
107	Ag	115	NoGas	6.864	0.14	ppb	0.9	50	
111	Cd	115	NoGas	48.495	0.97	ppb	4.5	200	
118	Sn	115	NoGas	40.925	0.82	ppb	2.5	200	
121	Sb	115	NoGas	9.933	0.2	ppb	2.0	25	
125	Te	115	NoGas	45.560	0.91	ppb	5.2	200	
133	Cs	115	NoGas	47.954	0.96	ppb	0.8	200	
137	Ba	115	NoGas	65.548	1.31	ppb	1.4	500	
205	Tl	209	NoGas	61.754	1.24	ppb	3.0	200	
208	Pb	209	NoGas	52.240	1.04	ppb	0.4	500	
232	Th	209	NoGas	48.239	0.96	ppb	0.5	200	
238	U	209	NoGas	70.002	1.4	ppb	1.2	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	575842.86	588993.88	0.3	102.28	60	120	
45	Sc	NoGas	2960397.87	3143510.29	0.2	106.19	60	120	
45	Sc	H2	1352982.62	1372946.92	3.0	101.48	60	120	
45	Sc	He	184585.63	191908.24	1.9	103.97	60	120	
72	Ge	NoGas	708449.09	729146.50	0.6	102.92	60	120	
72	Ge	H2	433192.03	438879.51	3.5	101.31	60	120	
72	Ge	He	129030.85	134407.99	3.4	104.17	60	120	
115	In	NoGas	1972821.16	2111024.78	0.5	107.01	60	120	
115	In	H2	1833952.01	1891252.56	3.9	103.12	60	120	
115	In	He	461009.18	483219.86	3.3	104.82	60	120	
159	Tb	NoGas	2169710.68	2323383.31	0.7	107.08	60	120	
209	Bi	NoGas	2200442.76	2305940.19	0.2	104.79	60	120	

Sample Name	L56147-08
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488531.b
Acq Time	12/19/2019 3:23:09 PM
Sample Type	Sample
Total Dilution	500.0000
Vial Location	4106

QC Analyte Table

Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	3.254	0.01	ppb	15.8	200	
11	B	6	NoGas	-1708.146	-3.42	ppb	0.9	20	
27	Al	72	NoGas	9432.101	18.86	ppb	0.7	1000	
51	V	45	He	-588.529	-1.18	ppb	5.7	200	
52	Cr	45	He	-6.657	-0.01	ppb	4.9	200	
55	Mn	72	NoGas	3811.517	7.62	ppb	0.9	200	
56	Fe	45	H2	665.439	1.33	ppb	3.9	1000	
59	Co	72	NoGas	195.600	0.39	ppb	5.3	200	
60	Ni	45	He	143.908	0.29	ppb	6.5	500	
63	Cu	45	He	102723.511	205.45	ppb	2.4	500	
66	Zn	72	NoGas	157.806	0.32	ppb	0.5	1000	
75	As	45	He	-34.547	-0.07	ppb	26.2	200	
78	Se	45	H2	-641.692	-1.28	ppb	3.2	500	
98	Mo	115	NoGas	-1.827	0	ppb	33.4	200	
107	Ag	115	NoGas	-26.794	-0.05	ppb	4.3	50	
111	Cd	115	NoGas	2.129	0	ppb	36.7	200	
118	Sn	115	NoGas	-2.551	0	ppb	1.7	200	
121	Sb	115	NoGas	0.047	0	ppb	10.5	25	
125	Te	115	NoGas	-0.264	0	ppb	44.6	200	
133	Cs	115	NoGas	2.552	0	ppb	6.3	200	
137	Ba	115	NoGas	30.648	0.06	ppb	11.0	500	
205	Tl	209	NoGas	121.966	0.24	ppb	9.9	200	
208	Pb	209	NoGas	11.970	0.02	ppb	14.0	500	
232	Th	209	NoGas	4.136	0.01	ppb	1.0	200	
238	U	209	NoGas	-2.738	0	ppb	2.5	200	

QC ISTD Table

Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	575842.86	568078.07	0.4	98.65	60	120	
45	Sc	NoGas	2960397.87	3036432.31	0.3	102.57	60	120	
45	Sc	H2	1352982.62	1355630.68	4.2	100.2	60	120	
45	Sc	He	184585.63	185572.28	3.1	100.53	60	120	
72	Ge	NoGas	708449.09	706478.53	0.7	99.72	60	120	
72	Ge	H2	433192.03	433975.85	4.0	100.18	60	120	
72	Ge	He	129030.85	131856.29	3.7	102.19	60	120	
115	In	NoGas	1972821.16	2040932.08	0.5	103.45	60	120	
115	In	H2	1833952.01	1848201.52	4.8	100.78	60	120	
115	In	He	461009.18	472569.48	3.1	102.51	60	120	
159	Tb	NoGas	2169710.68	2237824.91	0.6	103.14	60	120	
209	Bi	NoGas	2200442.76	2256399.49	0.3	102.54	60	120	

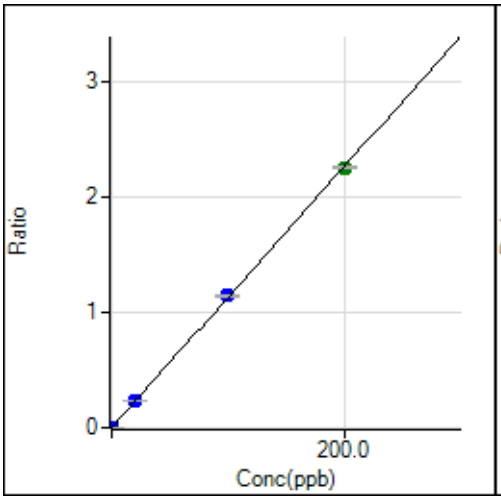
Sample Name	L56147-11
Data Path Name	C:\Agilent\ICPMH\1\DATA\wg488531.b
Acq Time	12/19/2019 3:25:01 PM
Sample Type	Sample
Total Dilution	200.0000
Vial Location	4107

QC Analyte Table

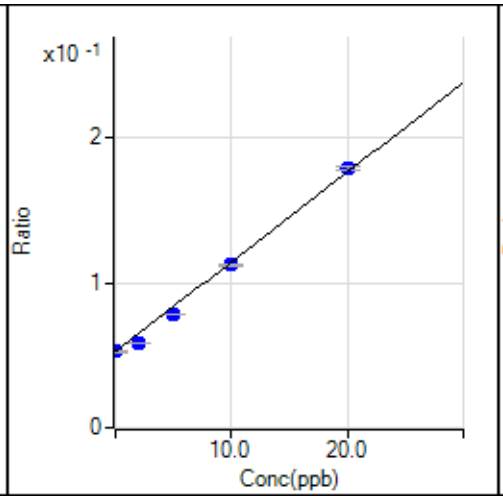
Mass	Name	ISTD	Tune Mode	Corrected Conc.	Raw Concentration	Units	CPS RSD	LDR	QC Flag
9	Be	6	NoGas	3.096	0.02	ppb	19.9	200	
11	B	6	NoGas	-507.460	-2.54	ppb	2.3	20	
27	Al	72	NoGas	6212.022	31.06	ppb	0.6	1000	
51	V	45	He	-239.451	-1.2	ppb	7.9	200	
52	Cr	45	He	-2.193	-0.01	ppb	21.8	200	
55	Mn	72	NoGas	19786.519	98.93	ppb	0.6	200	
56	Fe	45	H2	40.800	0.2	ppb	4.0	1000	
59	Co	72	NoGas	1273.912	6.37	ppb	0.8	200	
60	Ni	45	He	507.193	2.54	ppb	1.7	500	
63	Cu	45	He	37556.277	187.78	ppb	2.9	500	
66	Zn	72	NoGas	743.358	3.72	ppb	1.0	1000	
75	As	45	He	-14.799	-0.07	ppb	37.3	200	
78	Se	45	H2	-222.386	-1.11	ppb	0.9	500	
98	Mo	115	NoGas	0.319	0	ppb	27.3	200	
107	Ag	115	NoGas	-10.982	-0.06	ppb	2.4	50	
111	Cd	115	NoGas	8.791	0.04	ppb	8.8	200	
118	Sn	115	NoGas	-17.452	-0.09	ppb	4.7	200	
121	Sb	115	NoGas	-0.086	0	ppb	5.0	25	
125	Te	115	NoGas	-0.856	0	ppb	41.7	200	
133	Cs	115	NoGas	1.474	0.01	ppb	5.0	200	
137	Ba	115	NoGas	6.551	0.03	ppb	16.0	500	
205	Tl	209	NoGas	50.955	0.26	ppb	9.7	200	
208	Pb	209	NoGas	4.747	0.02	ppb	11.9	500	
232	Th	209	NoGas	0.017	0	ppb	12.2	200	
238	U	209	NoGas	39.006	0.2	ppb	0.7	200	

QC ISTD Table

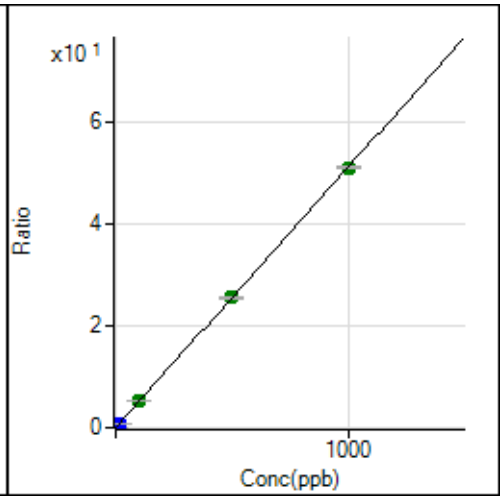
Mass	Name	Tune Mode	Reference CPS	CPS	CPS RSD	% Rec	%QC Low	%QC High	QC Flag
6	Li	NoGas	575842.86	572675.15	0.5	99.45	60	120	
45	Sc	NoGas	2960397.87	3096533.42	0.2	104.6	60	120	
45	Sc	H2	1352982.62	1351668.10	4.4	99.9	60	120	
45	Sc	He	184585.63	190219.17	2.2	103.05	60	120	
72	Ge	NoGas	708449.09	720937.06	0.3	101.76	60	120	
72	Ge	H2	433192.03	433329.22	4.2	100.03	60	120	
72	Ge	He	129030.85	133764.12	2.7	103.67	60	120	
115	In	NoGas	1972821.16	2078457.79	0.3	105.35	60	120	
115	In	H2	1833952.01	1846743.26	4.6	100.7	60	120	
115	In	He	461009.18	478448.28	2.3	103.78	60	120	
159	Tb	NoGas	2169710.68	2276489.22	0.3	104.92	60	120	
209	Bi	NoGas	2200442.76	2267752.76	0.3	103.06	60	120	



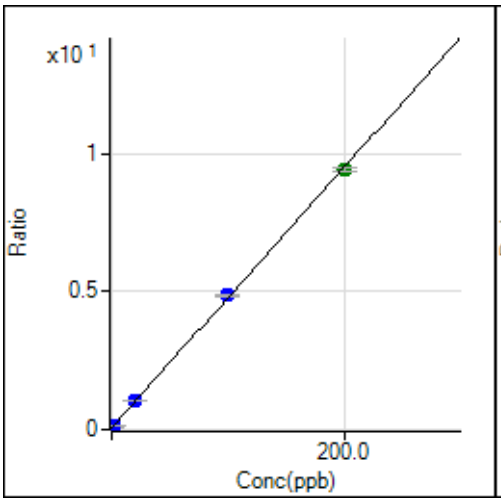
9 Be [NoGas] / ISTD: 6 Li
y = 1.131E-2 x + 9.656E-5
R 1.0000
DL 0.006491
BEC 0.008536



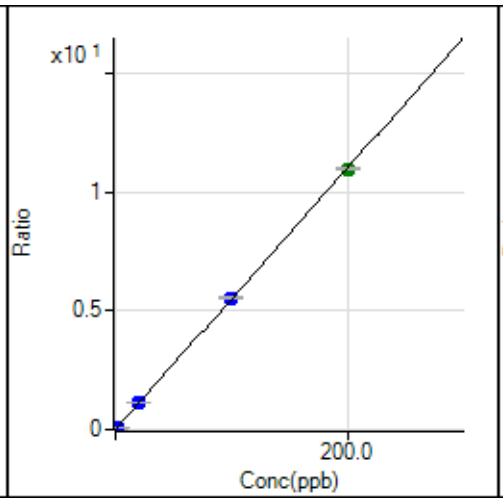
11 B [NoGas] / ISTD: 6 Li
y = 6.194E-3 x + 5.268E-2
R 0.9982
DL 0.4096
BEC 8.506



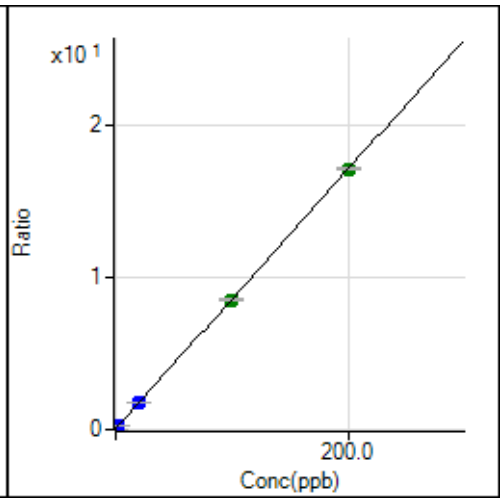
27 Al [NoGas] / ISTD: 72 Ge
y = 5.109E-2 x + 1.985E-2
R 1.0000
DL 0.02362
BEC 0.3884



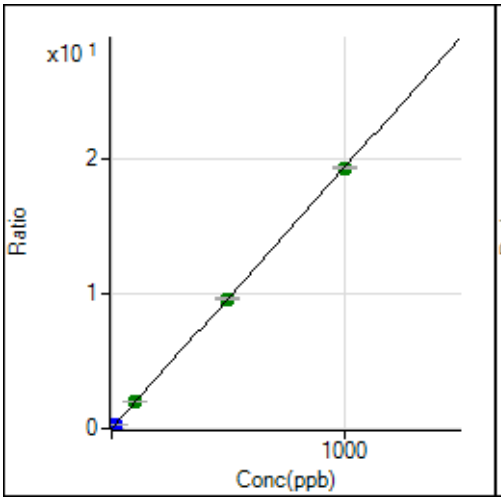
51 V [He] / ISTD: 45 Sc
y = 4.709E-2 x + 6.368E-2
R 0.9999
DL 0.03826
BEC 1.352



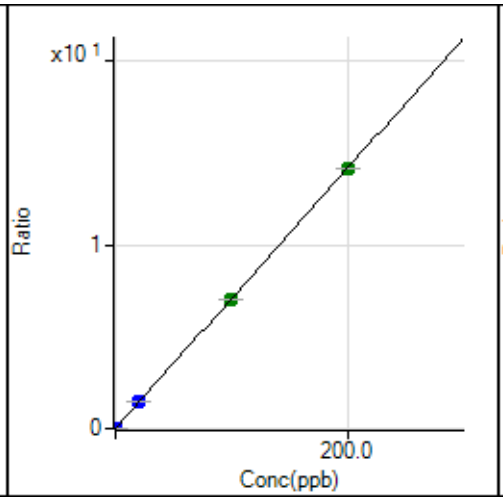
52 Cr [He] / ISTD: 45 Sc
y = 5.513E-2 x + 2.987E-3
R 1.0000
DL 0.01783
BEC 0.05418



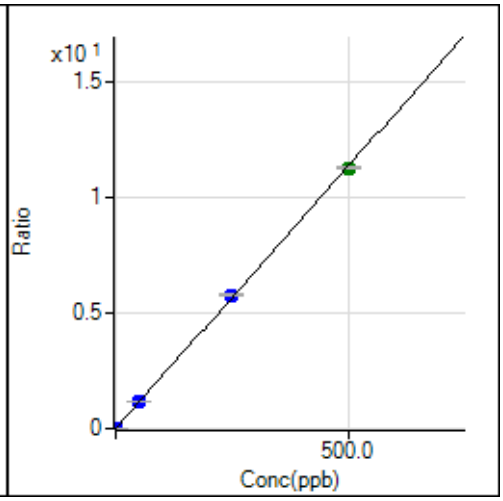
55 Mn [NoGas] / ISTD: 72 Ge
y = 8.528E-2 x + 5.481E-2
R 1.0000
DL 0.007332
BEC 0.6428



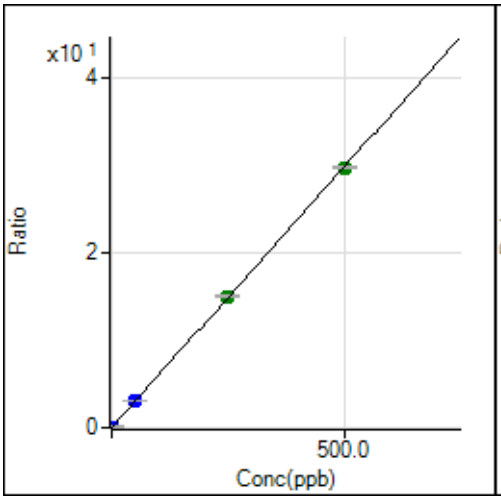
56 Fe [H2] / ISTD: 45 Sc
y = 1.927E-2 x + 3.874E-3
R 1.0000
DL 0.004438
BEC 0.201



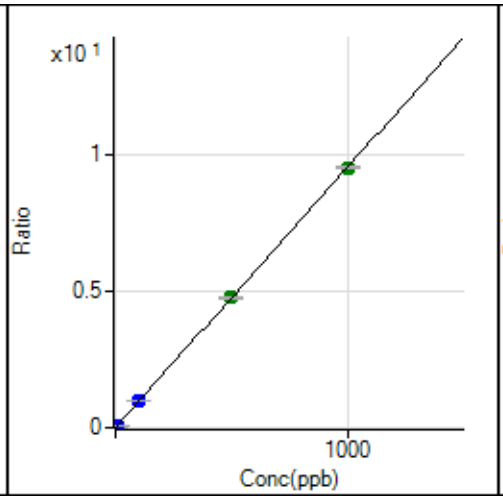
59 Co [NoGas] / ISTD: 72 Ge
y = 7.081E-2 x + 2.601E-3
R 1.0000
DL 0.006637
BEC 0.03673



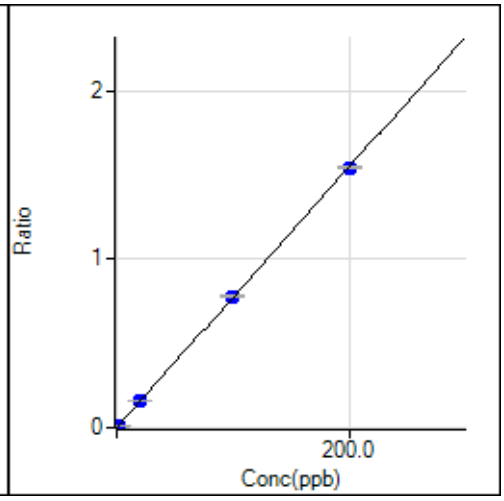
60 Ni [He] / ISTD: 45 Sc
y = 2.270E-2 x + 1.807E-4
R 0.9999
DL 0.004173
BEC 0.007958



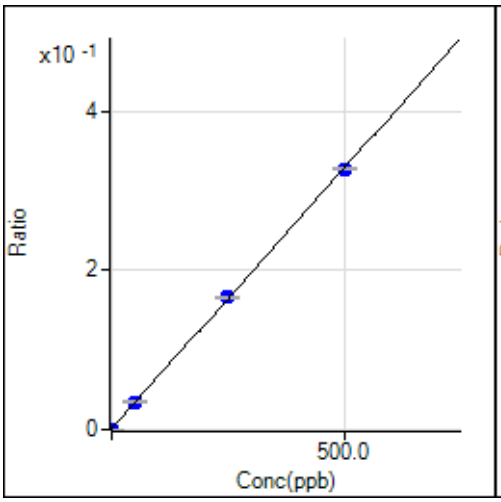
63 Cu [He] / ISTD: 45 Sc
y = 5.959E-2 x + 4.865E-3
R 1.0000
DL 0.02459
BEC 0.08165



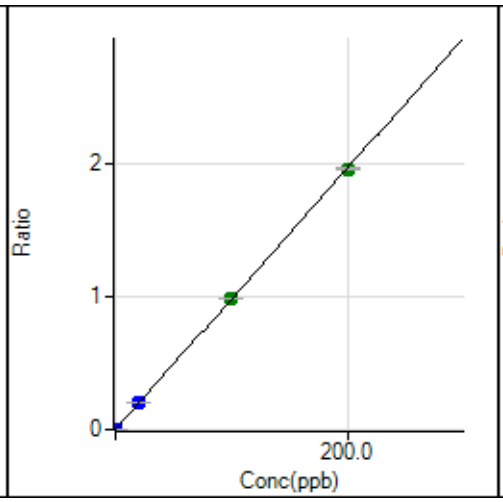
66 Zn [NoGas] / ISTD: 72 Ge
y = 9.526E-3 x + 3.467E-3
R 1.0000
DL 0.04709
BEC 0.3639



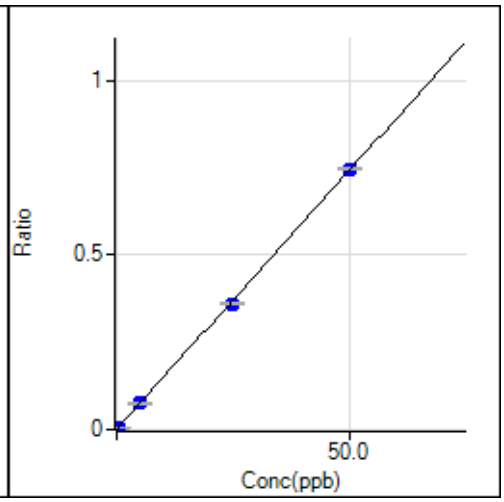
75 As [He] / ISTD: 45 Sc
y = 7.728E-3 x + 6.666E-4
R 1.0000
DL 0.0266
BEC 0.08626



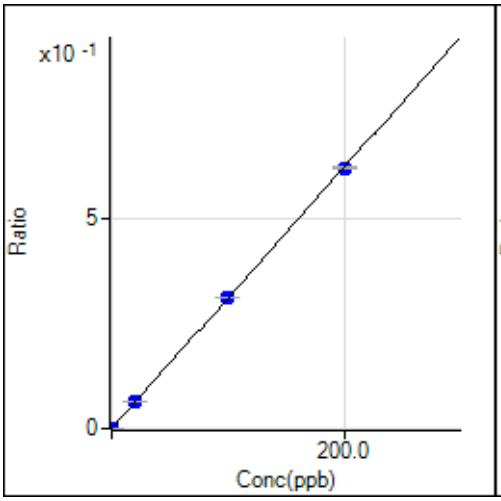
78 Se [H2] / ISTD: 45 Sc
y = 6.546E-4 x + 1.069E-3
R 1.0000
DL 0.08532
BEC 1.633



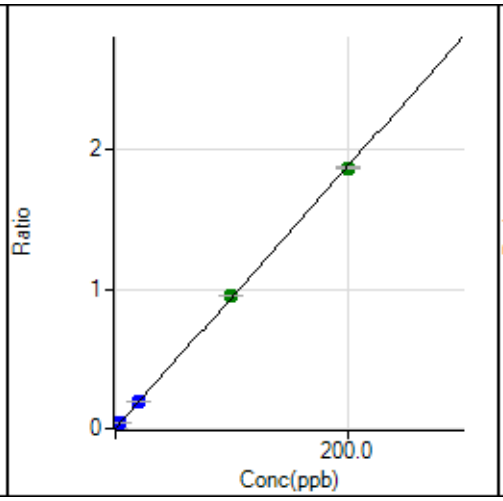
98 Mo [NoGas] / ISTD: 115 In
y = 9.794E-3 x + 1.094E-4
R 1.0000
DL 0.009488
BEC 0.01117



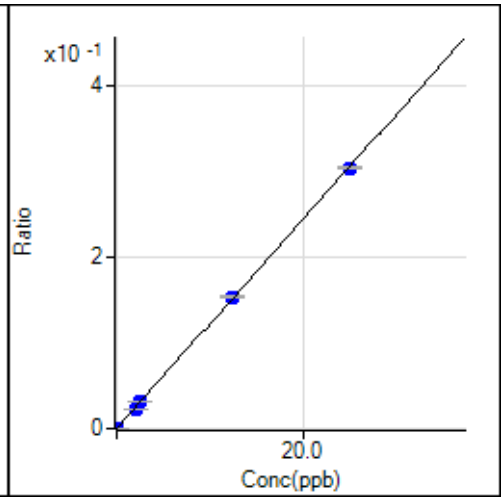
107 Ag [NoGas] / ISTD: 115 In
y = 1.478E-2 x + 1.460E-3
R 0.9998
DL 0.00625
BEC 0.0988



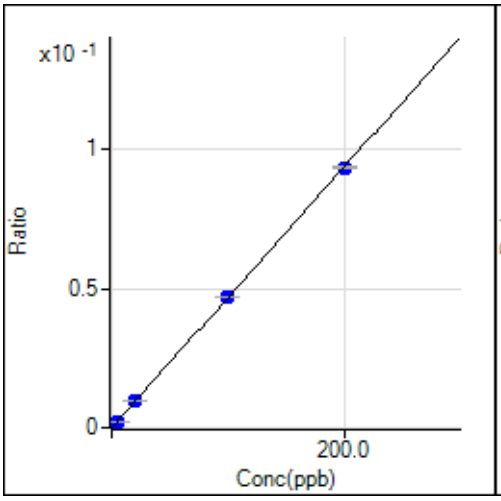
111 Cd [NoGas] / ISTD: 115 In
y = 3.116E-3 x + 3.170E-6
R 1.0000
DL 0.005889
BEC 0.001017



118 Sn [NoGas] / ISTD: 115 In
y = 9.375E-3 x + 2.423E-3
R 1.0000
DL 0.008899
BEC 0.2584



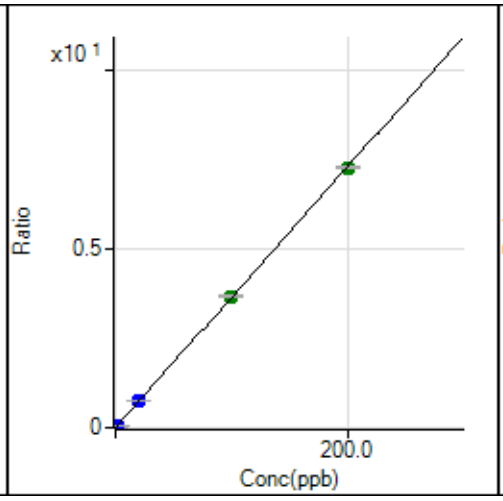
121 Sb [NoGas] / ISTD: 115 In
y = 1.221E-2 x + 2.058E-4
R 1.0000
DL 0.007454
BEC 0.01685



125 Te [NoGas] / ISTD: 115 In

y = 4.674E-4 x + 7.877E-6

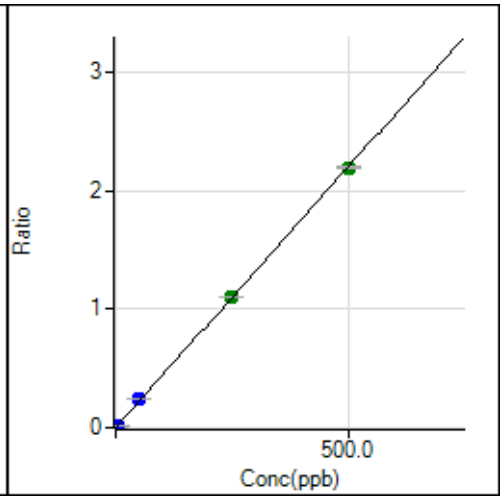
R	1.0000
DL	0.03113
BEC	0.01685



133 Cs [NoGas] / ISTD: 115 In

y = 3.650E-2 x + 4.217E-4

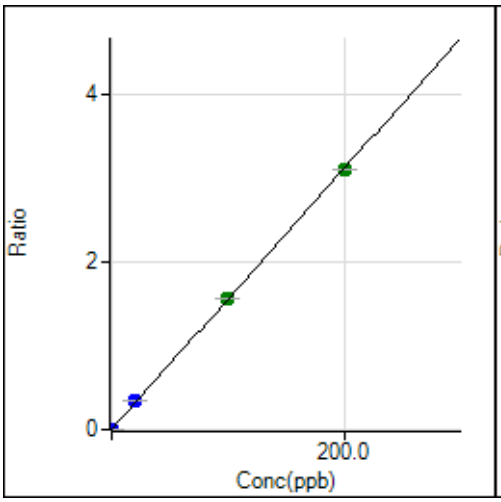
R	1.0000
DL	0.002066
BEC	0.01155



137 Ba [NoGas] / ISTD: 115 In

y = 4.408E-3 x + 4.170E-5

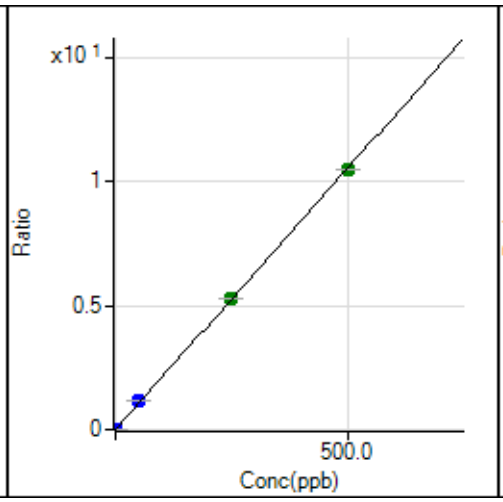
R	1.0000
DL	0.004897
BEC	0.009461



205 Tl [NoGas] / ISTD: 209 Bi

y = 1.557E-2 x + 3.524E-3

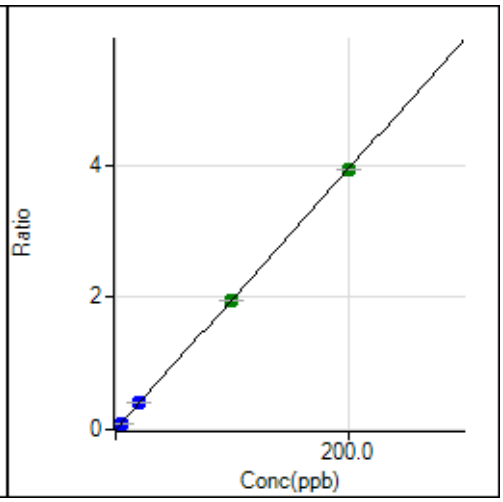
R	1.0000
DL	0.02577
BEC	0.2263



208 Pb [NoGas] / ISTD: 209 Bi

y = 2.104E-2 x + 1.271E-3

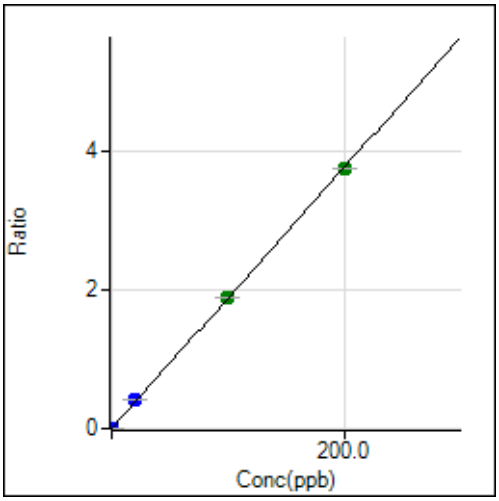
R	1.0000
DL	0.005489
BEC	0.0604



232 Th [NoGas] / ISTD: 209 Bi

y = 1.969E-2 x + 1.414E-4

R	1.0000
DL	0.001612
BEC	0.007181



238 U [NoGas] / ISTD: 209 Bi

y = 1.876E-2 x + 9.709E-4

R	1.0000
DL	0.01166
BEC	0.05175

EPA 6020 Tune Check Report

Acq/Data Batch C:\Agilent\ICPMH\1\DATA\6020AMU-19_Dec_2019-10_49_02.b

Acq. Date-Time 12/19/2019 10:55:26 AM

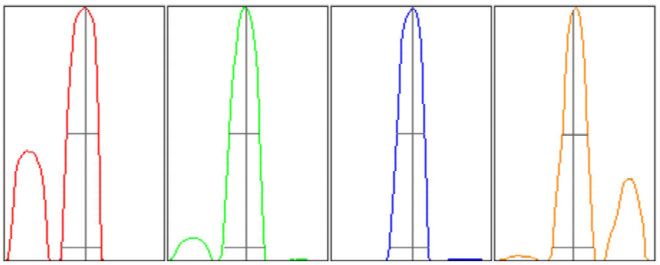
Instrument Name G8403A JP16281462

Mass	Conc. [ug/l]	Count	CPS	RSD%	RSD% (Required)	RSD% (Flag)
7		5589	55894.18	2.478	5.000	
59		11132	111317.83	2.266	5.000	
115		24103	241025.39	3.230	5.000	
205		8444	84444.19	1.938	5.000	

Oxide 156 / 140 1.109 %

Doubly Charged 70 / 140 7.745 %

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)
7	5561.60	7.05	6.90 - 7.10	
59	11388.83	59.00	58.90 - 59.10	
115	22453.27	115.05	114.90 - 115.10	
205	8684.22	205.00	204.90 - 205.10	

Mass	W-50%	W-5%	W-5% (Required)	W-5% (Flag)
7	0.61	0.738	0.900	
59	0.58	0.781	0.900	
115	0.53	0.732	0.900	
205	0.49	0.776	0.900	

Integration Time [sec] 0.1

Acquisition Time [sec] 30.02

Calibration Standards

6020/200.8 Stock #1: MS191209-1 SCN
6020/200.8 Stock #2: MS191209-2 SCN
6020/200.8 Stock #3: MS191209-3 SCN

PQV STD: MS191014-4
Exp. 12/31/19

ICPMS5/6 INT STD: MS190612-2
Exp. 1/26/2020

ICPMS7 INT STD: MS190613-1
Exp. 1/26/2020

Nitric Acid: 60320

Hydrochloric Acid: 59570

VERIFIED: bsu 12/18/19

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG488531 **ICPMS MWMT**

Sample	Date	SCN	Ag	Al	As	B	Ba	Be	Cd	Co	Cr	Cs	Cu	Fe	Mn	Mo	Ni	Pb	Sb	Se	Sn	Te	Th	Tl	U	V	Zn
WG488531ICV	12/19/19 15:02	MS191014-8											X		X												
WG488531ICB	12/19/19 15:04												X		X												
WG488531PQV	12/19/19 15:06	MS191014-4											X		X												
WG488531ICSA	12/19/19 15:08												X		X												
WG488531ICSAB	12/19/19 15:10	MS191119-7											X		X												
WG487250PBS	12/19/19 15:13		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487250LFB2	12/19/19 15:15	MS191119-5											X		X												
L56147-07	12/19/19 15:17																										
L56147-07MS	12/19/19 15:19	MS191119-5											X		X												
L56147-07MSD	12/19/19 15:21	MS191119-5											X		X												
L56147-08	12/19/19 15:23												X														
L56147-11	12/19/19 15:25														X												
WG488531CCV1	12/19/19 15:26	MS191209-4											X		X												
WG488531CCB1	12/19/19 15:28		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L56147-11SDL	12/19/19 15:30												X		X												
WG488531CCV2	12/19/19 15:32	MS191209-4											X		X												
WG488531CCB2	12/19/19 15:34		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

L56147-2001131042

MS Total Hot Plate

QC List Type: I-X-THP
QCListMatClass: LIQUID
Bench Sheet List: I-X-THP
QC Ref: NOQC
Group ID: IP-G-DIG-THP-MS-MWMT
Method Ref: M6020 ICP-MS
SOP Ref: SOPII021

WG487571

ACZ Laboratories, Inc

Instrument ID: METALSDIG
Analyst: mfm
ACZ Dept: 30
Create Date: 12/06/2019 10:50
Start Date/Time: 12/06/2019 11:30
End Date/Time: 12/06/2019 16:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	AG MS MWMT	AS MS MWMT	BE MS MWMT	CD MS MWMT	CO MS MWMT	CR MS MWMT	CU MS MWMT	MN MS MWMT	MO MS MWMT	NI MS MWMT	PB MS MWMT	SB MS MWMT	SE MS MWMT	TH MS MWMT	TL MS MWMT	U MS MWMT	V MS MWMT	ZN MS MWMT	SCN Volume (mL)	Sample Volume (mL)	Final Volume (mL)	Comments
1	WG487361PBS	NONE	mwmt		12/06/19 11:30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
2	L56147-01	STSB27_0.5-3	mwmt		12/06/19 12:00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
3	L56147-02	STSB27_6-15	mwmt		12/06/19 12:30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
4	L56147-03	STSB28_0.5-3	mwmt		12/06/19 13:00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
5	L56147-04	STSB28_6-15	mwmt		12/06/19 13:30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
6	L56147-05	STSB29_0.5-3	mwmt		12/06/19 14:00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
7	L56147-05MS1	MS191119-5	mwmt		12/06/19 14:30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.25	50	50	
8	L56147-05MSD1	MS191119-5	mwmt		12/06/19 15:00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.25	50	50	
9	L56147-05DUP	NONE	mwmt		12/06/19 15:30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
10	WG487361LFB2	MS191119-5	mwmt		12/06/19 16:00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.25	50	50	

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MSD1	ICPMS Spike
WG487361LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: MFM 12/9/19
Initials, Date

SREV: JEH 12/9/19
Initials, Date

12/9/2019 9:49:29 AM 121719

ACZ Laboratories, Inc.

METALS PREP REVIEW CHECKLIST

AREV:	MFM
Date:	12/9/2019

Work Group:	487571
Sample Type:	MWMT
Prep Date:	12/6/2019
Analyst:	MFM

SREV:	JEH
Date:	12/9/19

		N/A	Yes	No
1.) Are all dilutions correct in LIMS and documented on the bench sheet ?	✓		✓	
2.) Is any sample prepared on dilution appropriately "D" qualified?	✓	✓		
3.) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?	✓	✓		
4.) Are all initial and final sample volumes correct in LIMS ?	✓		✓	
5.) Is the correct SCN entered for each spike and control standard (LFB or LCSW) ?	✓		✓	
6.) Are all SCN volumes correct in LIMS ?	✓		✓	
7.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed) ?	✓		✓	
8.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS ?			✓	

For any item listed above that is checked "No" state the problem and corrective action / resolution in the sections below.

QC/Sample ID	Problem	Corrective action

Disposable Vessel Lot #*: 1906257

Nitric acid PCN: 60323

Hydrochloric acid PCN: 59898

Digest Temp: 94 °C

Hot Block ID: DEENA 2

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMII014.05.18.11

L56147-2001131042

MS Total Hot Plate

QC List Type: I-X-THP
QCListMatClass: LIQUID
Bench Sheet List: I-X-THP
QC Ref: NOQC
Group ID: IP-G-DIG-THP-MS-MWMT
Method Ref: M6020 ICP-MS
SOP Ref: SOPII021

WG487571

ACZ Laboratories, Inc

Instrument ID: METALSDIG
Analyst: MFM
ACZ Dept: 30
Create Date: 12/06/2019 10:50
Start Date/Time: 1 11:30
End Date/Time: 1 4:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	AG MS MMW MT	AS MS MMW MT	BE MS MMW MT	CD MS MMW MT	CO MS MMW MT	CR MS MMW MT	CU MS MMW MT	MN MS MMW MT	MO MS MMW MT	NI MS MMW MT	PB MS MMW MT	SB MS MMW MT	SE MS MMW MT	TH MS MMW MT	TL MS MMW MT	U MS MMW MT	V MS MMW MT	ZN MS MMW MT	SCN Volume (mL)	Sample Volume (mL)	Final Volume (mL)	Comments
1	WG487361PBS	NONE				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
2	L56147-01	STSB27_0.5-3				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
3	L56147-02	STSB27_6-15				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
4	L56147-03	STSB28_0.5-3				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
5	L56147-04	STSB28_6-15				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6	L56147-05	STSB29_0.5-3				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
7	L56147-05MS1	MS191119-5				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
8	L56147-05MSD1	MS191119-5				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
9	L56147-05DUP	NONE				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
10	WG487361LFB2	MS191119-5				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MSD1	ICPMS Spike
WG487361LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 10:50:38 AM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487571

Date Reported: 09-Dec-19
Run ID: R1763380
Date Analyzed: 06-Dec-19
ICAL Workgroup:
Instrument ID: METALSDIG

WG487361PBS

Tag: 1 Measured: 12/6/2019 11:30:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-01

Tag: 1 Measured: 12/6/2019 12:00:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-02

Tag: 1 Measured: 12/6/2019 12:30:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-03

Tag: 1 Measured: 12/6/2019 1:00:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-04

Tag: 1 Measured: 12/6/2019 1:30:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-05

Tag: 1 Measured: 12/6/2019 2:00:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-05MS1

Tag: Measured: 12/6/2019 2:30:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-05MSD1

Tag: Measured: 12/6/2019 3:00:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-05DUP

Tag: 1 Measured: 12/6/2019 3:30:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

WG487361LFB2

Tag: Measured: 12/6/2019 4:00:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-2001131042

MS Total Hot Plate

QC List Type: I-X-THP
QCListMatClass: LIQUID
Bench Sheet List: I-X-THP
QC Ref: NOQC
Group ID: IP-G-DIG-THP-MS-MWMT
Method Ref: M6020 ICP-MS
SOP Ref: SOPII021

WG488188

ACZ Laboratories, Inc

Instrument ID: METALSDIG
Analyst: mfm
ACZ Dept: 30
Create Date: 12/16/2019 10:15
Start Date/Time: 12/16/2019 11:25
End Date/Time: 12/16/2019 16:30

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	AG MS MMWMT	AS MS MMWMT	BE MS MMWMT	CD MS MMWMT	CO MS MMWMT	CR MS MMWMT	CU MS MMWMT	MN MS MMWMT	MO MS MMWMT	NI MS MMWMT	PB MS MMWMT	SB MS MMWMT	SE MS MMWMT	TH MS MMWMT	TL MS MMWMT	U MS MMWMT	V MS MMWMT	ZN MS MMWMT	SCN Volume (mL)	Sample Volume (mL)	Final Volume (mL)	Comments
1	WG487250PBS	NONE	mwmt		12/16/19 11:25	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
2	L56147-06	STSB29_6-15	mwmt		12/16/19 11:41	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
3	L56147-07	STSB29-FD_6-15	mwmt		12/16/19 11:58	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
4	L56147-07MS	MS191119-5	mwmt		12/16/19 12:15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.25	50	50	
5	L56147-07MSD	MS191119-5	mwmt		12/16/19 12:32	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.25	50	50	
6	L56147-08	STSB30_0.5-3	mwmt		12/16/19 12:49	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
7	L56147-09	STSB30_6-15	mwmt		12/16/19 13:06	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
8	L56147-10	STSB31_0.5-3	mwmt		12/16/19 13:23	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
9	L56147-11	STSB31_6-15	mwmt		12/16/19 13:40	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		50	50	
10	WG487250LFB2	MS191119-5	mwmt		12/16/19 13:57	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.25	50	50	
11	WG487687PBS	NONE	mwmt		12/16/19 14:14	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓				50	50	
12	L56019-02	TOP01	mwmt		12/16/19 14:31	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓				50	50	
13	L56019-02MS1	MS191119-5	mwmt		12/16/19 14:48	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓			0.25	50	50	
14	L56019-02MSD1	MS191119-5	mwmt		12/16/19 15:05	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓			0.25	50	50	
15	L56019-04	SLOPE-01	mwmt		12/16/19 15:22	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓				50	50	
16	L56019-06	SLOPE-02	mwmt		12/16/19 15:39	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓				50	50	
17	L56019-08	SLOPE-03	mwmt		12/16/19 15:56	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓				50	50	
18	L56019-10	SLOPE-SE	mwmt		12/16/19 16:13	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓				50	50	
19	WG487687LFB2	MS191119-5	mwmt		12/16/19 16:30	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓			0.25	50	50	

Report Comments: _____

Internal Comments _____

AREV: MFM 12/17/19
Initials, Date

SREV: USEL 12/18/19
Initials, Date

12/17/2019 9:34:54 AM 112519

MS Total Hot Plate

QC List Type: I-X-THP
QCListMatClass: LIQUID
Bench Sheet List: I-X-THP
QC Ref: NOQC
Group ID: IP-G-DIG-THP-MS-MWMT
Method Ref: M6020 ICP-MS
SOP Ref: SOPII021

WG488188

ACZ Laboratories, Inc

Instrument ID: METALSDIG
Analyst: mfm
ACZ Dept: 30
Create Date: 12/16/2019 10:15
Start Date/Time: 12/16/2019 11:25
End Date/Time: 12/16/2019 16:30

Sample	Login Comments
L56019-02	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-02MS1	ICPMS Spike
L56019-02MSD1	ICPMS Spike
L56019-04	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-06	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-08	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-10	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250LFB2	ICPMS LFB
WG487687LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/17/2019 9:34:54 AM 112519

ACZ Laboratories, Inc.

METALS PREP REVIEW CHECKLIST

AREV:	MFM
Date:	12/17/2019
SREV:	LJEH
Date:	12/18/19

Work Group:	488188
Sample Type:	MWMT
Prep Date:	12/16/2019
Analyst:	MFM

		N/A	Yes	No
1.) Are all dilutions correct in LIMS and documented on the bench sheet ?	✓		✓	
2.) Is any sample prepared on dilution appropriately "D" qualified?	✓	✓		
3.) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?	✓	✓		
4.) Are all initial and final sample volumes correct in LIMS ?	✓		✓	
5.) Is the correct SCN entered for each spike and control standard (LFB or LCSW) ?	✓		✓	
6.) Are all SCN volumes correct in LIMS ?	✓		✓	
7.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed) ?	✓		✓	
8.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS ?			✓	

For any item listed above that is checked "No" state the problem and corrective action / resolution in the sections below.

QC/Sample ID	Problem	Corrective action

Disposable Vessel Lot #*: 1906257

Nitric acid PCN: 60323

Hydrochloric acid PCN: 59898

Digest Temp: 93 °C

Hot Block ID: DEENA 2

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

MS Total Hot Plate

QC List Type: I-X-THP
QCListMatClass: LIQUID
Bench Sheet List: I-X-THP
QC Ref: NOQC
Group ID: IP-G-DIG-THP-MS-MWMT
Method Ref: M6020 ICP-MS
SOP Ref: SOPII021

WG488188

ACZ Laboratories, Inc

Instrument ID: METALSDIG
Analyst: MFM
ACZ Dept: 30
Create Date: 12/16/2019 10:15
Start Date/Time: 1 11:25
End Date/Time: 1 4:30

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	AG MS MMWMT	AS MS MMWMT	BE MS MMWMT	CD MS MMWMT	CO MS MMWMT	CR MS MMWMT	CU MS MMWMT	MN MS MMWMT	MO MS MMWMT	NI MS MMWMT	PB MS MMWMT	SB MS MMWMT	SE MS MMWMT	TH MS MMWMT	TL MS MMWMT	U MS MMWMT	V MS MMWMT	ZN MS MMWMT	SCN Volume (mL)	Sample Volume (mL)	Final Volume (mL)	Comments
1	WG487250PBS	NONE				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
2	L56147-06	STSB29_6-15				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
3	L56147-07	STSB29-FD_6-15				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
4	L56147-07MS	MS191119-5				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
5	L56147-07MSD	MS191119-5				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6	L56147-08	STSB30_0.5-3				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
7	L56147-09	STSB30_6-15				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
8	L56147-10	STSB31_0.5-3				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
9	L56147-11	STSB31_6-15				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
10	WG487250LFB2	MS191119-5				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
11	WG487687PBS	NONE				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						
12	L56019-02	TOP01				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						
13	L56019-02MS1	MS191119-5				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						
14	L56019-02MSD1	MS191119-5				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						
15	L56019-04	SLOPE-01				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						
16	L56019-06	SLOPE-02				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						
17	L56019-08	SLOPE-03				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						
18	L56019-10	SLOPE-SE				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						
19	WG487687LFB2	MS191119-5				✓	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓						

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/16/2019 10:16:22 AM 112519

MS Total Hot Plate

QC List Type: I-X-THP
QCListMatClass: LIQUID
Bench Sheet List: I-X-THP
QC Ref: NOQC
Group ID: IP-G-DIG-THP-MS-MWMT
Method Ref: M6020 ICP-MS
SOP Ref: SOPII021

WG488188

ACZ Laboratories, Inc

Instrument ID: METALSDIG
Analyst:
ACZ Dept: 30
Create Date: 12/16/2019 10:15
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56019-02	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-02MS1	ICPMS Spike
L56019-02MSD1	ICPMS Spike
L56019-04	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-06	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-08	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-10	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250LFB2	ICPMS LFB
WG487687LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/16/2019 10:16:23 AM 112519

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488188

Date Reported: 18-Dec-19
Run ID: R1764776
Date Analyzed: 16-Dec-19
ICAL Workgroup:
Instrument ID: METALSDIG

WG487250PBS

Tag: 1 Measured: 12/16/2019 11:25:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-06

Tag: 1 Measured: 12/16/2019 11:41:57 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-07

Tag: 1 Measured: 12/16/2019 11:58:54 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-07MS

Tag: Measured: 12/16/2019 12:15:51 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-07MSD

Tag: Measured: 12/16/2019 12:32:48 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-08

Tag: 1 Measured: 12/16/2019 12:49:45 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-09

Tag: 1 Measured: 12/16/2019 1:06:42 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-10

Tag: 1 Measured: 12/16/2019 1:23:39 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56147-11 Tag: 1 Measured: 12/16/2019 1:40:36 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

WG487250LFB2 Tag: Measured: 12/16/2019 1:57:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

WG487687PBS Tag: 1 Measured: 12/16/2019 2:14:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56019-02 Tag: 1 Measured: 12/16/2019 2:31:27 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56019-02MS1 Tag: Measured: 12/16/2019 2:48:24 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56019-02MSD1 Tag: Measured: 12/16/2019 3:05:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56019-04 Tag: 1 Measured: 12/16/2019 3:22:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56019-06 Tag: 1 Measured: 12/16/2019 3:39:15 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56019-08 Tag: 1 Measured: 12/16/2019 3:56:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

L56019-10

Tag: 1 Measured: 12/16/2019 4:13:09 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IS-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IS-MWMT	50	1		mL	++					

WG487687LFB2

Tag: Measured: 12/16/2019 4:30:06 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.25	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-2001131042

ICP MWMT

QC List Type: QC-ICP-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICP-6010
QC Ref: MA-ICP-SOIL-6010
Group ID: MA-G-ICP_-MWMT
Method Ref: M6010B
SOP Ref: SOPII012

WG487738

ACZ Laboratories, Inc

Instrument ID: ICP7
Analyst: KJA
ACZ Dept: 33
Create Date: 12/09/2019 14:45
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	AL MW MT	BA MW MT	B MW MT	CA MW MT	FE MW MT	K MW MT	LI MW MT	MG MW MT	NA MW MT	P MW MT	SN MW MT	SR MW MT	TI MW MT	Dilution
1	WG487738ICV	II191122-1			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
2	WG487738ICB	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
3	WG487738PQV	II191202-2			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
4	WG487738ICSAB	II191127-4			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
5	WG487738ULRV	II191113-1			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
6	WG487361PBS	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
7	L56147-01	STSB27_0.5-3			1		2940	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2 =
8	L56147-02	STSB27_6-15			1		2760	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2 =
9	L56147-03	STSB28_0.5-3			1		2750	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2 =
10	L56147-04	STSB28_6-15			1		3050	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2 =
11	L56147-04SDL	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2 =
12	L56147-05	STSB29_0.5-3			1		3540	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2 =
13	WG487738CCV1	II191204-1			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
14	WG487738CCB1	NONE	II191127-2		1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
15	L56147-05MS2	~~II191127-2~~ II2XS01C			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~~1~~ 2 = KJA 12/10/19
16	L56147-05MSD2	~~II191127-2~~ 1			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~~1~~ 1 =
17	L56147-05DUP	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~~1~~ 1 =
18	WG487361LFB1	II191127-2			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
19	WG487738CCV2	II191204-1			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
20	WG487738CCB2	NONE			1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1

Report Comments:

Internal Comments

AREV: KJA 12/10/19
Initials, Date

SREV: USEH 12/10/19
Initials, Date

12/9/2019 2:46:24 PM 121719

ICP MWMT

QC List Type: QC-ICP-846
QCListMatClass: LIQUID
Bench Sheet List: I-ICP-6010
QC Ref: MA-ICP-SOIL-6010
Group ID: MA-G-ICP_-MWMT
Method Ref: M6010B
SOP Ref: SOPII012

WG487738

ACZ Laboratories, Inc

Instrument ID: ICP7
Analyst:
ACZ Dept: 33
Create Date: 12/09/2019 14:45
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS2	ICP Spike
L56147-05MSD2	ICP Spike
WG487361LFB1	ICP LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 2:46:24 PM 121719

ACZ Laboratories, Inc.
ICP DATA REVIEW CHECKLIST

Work Group:	487738
Sample Type:	MWMT
Analysis Date:	12/10/19
Analyst:	KJA

Reviewed By:	KJA
Date:	12/10/19
Approved By:	AEH
Date:	12/10/19

Instrument Checklist

		Yes	No	N/A
1) Is the correct run date associated with the workgroup?	✓	✓		
2) Are all of the QC critera listed in LIMS within specified limits? **	✓		✓	
3) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?	AEH 12/10/19	✗		✓
4) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓	✓		
5) Is a current standard/reagent form attached to the workgroup?	✓	✓		
6) Have all dilutions performed at the bench been checked off on the benchsheet?	✓	✓		
7) Has any sample on a 2x dilution been checked for proper mixing (review raw data)?	✓	✓		
8) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal, EC, TDS)?	✓			✓
9) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?	✓	✓		
10) Are any samples that have recoveries outside of limits for the Yttrium Internal Standard set to REDO?	✓			✓
11) FOR SREV: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?		✓		

For any item listed above that is checked "No" state the problem and corrective action / resolution in the sections below.

QC/Sample ID	Analytical Problem	Corrective action
ULRV	Na	✓ OK
PBS	B	KJA 12/10/19 ~~Redo~~ B1
LFB	B ↑	~~Redo~~ B1
147-04 SDL	B	AEH 12/10/19 ~~Redo~~ ZG
	Ti	ZG
147-05 Dup	Fe	RA
147-05 MS	Al ↑ MSD ↑	M3

FRMII009.06.13.14

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487738

Date Reported: 10-Dec-19
Run ID: R1763786
Date Analyzed: 10-Dec-19
ICAL Workgroup:
Instrument ID: ICP7

WG487738ICV

Tag:

Measured: 12/10/2019 9:03:30 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	2.006	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	100	1		%	++	0.05	0.3			
SREV	ALUMINUM	RSD	1.165	1		mg/L	++	0.05	0.25			
SREV	ANTIMONY	FOUND	3.972	1		mg/L	++	0.03	0.2			
SREV	ANTIMONY	REC	99	1		%	++	0.03	0.2			
SREV	ANTIMONY	RSD	1.865	1		mg/L	++	0.03	0.15			
SREV	BARIUM	FOUND	1.989	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	99	1		%	++	0.007	0.04			
SREV	BARIUM	RSD	1.399	1		mg/L	++	0.007	0.035			
SREV	BORON	FOUND	2.001	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	100	1		%	++	0.02	0.1			
SREV	BORON	RSD	0.8018	1		mg/L	++	0.02	0.1			
SREV	CALCIUM	FOUND	98.8	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	99	1		%	++	0.1	0.5			
SREV	CALCIUM	RSD	0.914	1		mg/L	++	0.1	0.5			
FAIL	IRON	FOUND	1.957	1		mg/L	++	0.03	0.08			
SREV	IRON	FOUND	1.944	1		mg/L	++	0.03	0.08			
SREV	IRON	REC	97	1		%	++	0.03	0.08			
FAIL	IRON	REC	98	1		%	++	0.03	0.08			
FAIL	IRON	RSD	1.862	1		mg/L	++	0.03	0.075			
SREV	IRON	RSD	1.449	1		mg/L	++	0.03	0.075			
SREV	LITHIUM	FOUND	2.031	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	102	1		%	++	0.008	0.04			
SREV	LITHIUM	RSD	1.342	1		mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	96.85	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	97	1		%	++	0.2	1			
SREV	MAGNESIUM	RSD	1.086	1		mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND	4.91	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	98	1		%	++	0.1	0.5			
SREV	PHOSPHORUS	RSD	1.12	1		mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND	19.99	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	100	1		%	++	0.2	1			
SREV	POTASSIUM	RSD	1.109	1		mg/L	++	0.2	1			
SREV	SODIUM	FOUND	99.04	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	99	1		%	++	0.2	1			
SREV	SODIUM	RSD	1.329	1		mg/L	++	0.2	1			
SREV	STRONTIUM	FOUND	1.963	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	98	1		%	++	0.009	0.05			
SREV	STRONTIUM	RSD	1.464	1		mg/L	++	0.009	0.045			
SREV	TIN	FOUND	2.069	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	103	1		%	++	0.04	0.2			
SREV	TIN	RSD	0.8997	1		mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND	2.02	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	101	1		%	++	0.005	0.03			
SREV	TITANIUM	RSD	1.285	1		mg/L	++	0.005	0.025			

SREV	YTTRIUM	REC	99.09	1		%	++	0.001	0.005

WG487738ICB

Tag:

Measured: 12/10/2019 9:07:06 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND		1	U	mg/L	++	0.05	0.3			
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.03	0.2			
SREV	BARIUM	FOUND		1	U	mg/L	++	0.007	0.04			
SREV	BORON	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	CALCIUM	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
FAIL	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	SODIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	STRONTIUM	FOUND		1	U	mg/L	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND		1	U	mg/L	++	0.005	0.03			
SREV	YTTRIUM	REC	101.2	1		%	++	0.001	0.005			

WG487738PQV

Tag:

Measured: 12/10/2019 9:10:54 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	0.262	1	B	mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	105	1	B	%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.0353	1	B	mg/L	++	0.007	0.04			
SREV	BARIUM	REC	101	1	B	%	++	0.007	0.04			
SREV	BORON	FOUND	0.129	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	129	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	0.5	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	100	1		%	++	0.1	0.5			
FAIL	IRON	FOUND	0.063	1	B	mg/L	++	0.03	0.08			
SREV	IRON	FOUND	0.065	1	B	mg/L	++	0.03	0.08			
SREV	IRON	REC	87	1	B	%	++	0.03	0.08			
FAIL	IRON	REC	84	1	B	%	++	0.03	0.08			
SREV	LITHIUM	FOUND	0.0392	1	B	mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	98	1	B	%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	0.98	1	B	mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	98	1	B	%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	0.55	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	110	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	1.03	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	103	1		%	++	0.2	1			
SREV	SODIUM	FOUND	1.07	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	107	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.0463	1	B	mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	103	1	B	%	++	0.009	0.05			
SREV	TIN	FOUND	0.236	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	118	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	0.024	1	B	mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	96	1	B	%	++	0.005	0.03			
SREV	YTTRIUM	REC	100.21	1		%	++	0.001	0.005			

WG487738ICSAB

Tag:

Measured: 12/10/2019 9:14:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	256.1	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	102	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.2458	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	98	1		%	++	0.007	0.04			
SREV	BORON	FOUND	0.535	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	107	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	248.1	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	99	1		%	++	0.1	0.5			
SREV	IRON	FOUND	95.36	1		mg/L	++	0.03	0.08			
FAIL	IRON	FOUND	103.2	1		mg/L	++	0.03	0.08			
FAIL	IRON	REC	103	1		%	++	0.03	0.08			
SREV	IRON	REC	95	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND	0.5498	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	110	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	248.8	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	100	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	4.87	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	97	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	25.92	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	104	1		%	++	0.2	1			
SREV	SODIUM	FOUND	26.25	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	105	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.4945	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	99	1		%	++	0.009	0.05			
SREV	TIN	FOUND	2.519	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	101	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	0.5204	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	104	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	99.38	1		%	++	0.001	0.005			

WG487738ULRV

Tag:

Measured: 12/10/2019 9:22:07 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	275.1	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	110	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	25.06	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	100	1		%	++	0.007	0.04			
SREV	BORON	FOUND	26.51	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	106	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	505.4	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	101	1		%	++	0.1	0.5			
FAIL	IRON	FOUND	534.6	1		mg/L	++	0.03	0.08			
SREV	IRON	FOUND	489	1		mg/L	++	0.03	0.08			
SREV	IRON	REC	98	1		%	++	0.03	0.08			
FAIL	IRON	REC	107	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	260	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	104	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	99.42	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	99	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
FAIL	SODIUM	FOUND	556.9	1		mg/L	++	0.2	1			
FAIL	SODIUM	REC	111	1		%	ALRT	0.2	1			
SREV	STRONTIUM	FOUND	10.19	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	102	1		%	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND	25.9	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	104	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	96.06	1		%	++	0.001	0.005			

WG487361PBS

Tag:

Measured: 12/10/2019 9:30:01 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND		1	U	mg/L	++	0.05	0.3			
SREV	BARIUM	FOUND		1	U	mg/L	++	0.007	0.04			
SREV	BORON	FOUND	0.077	1	B	mg/L	ALRT	0.02	0.1		B1 5x = 0.385	
SREV	CALCIUM	FOUND	0.24	1	B	mg/L	++	0.1	0.5		5x = 1.2	
SREV	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
FAIL	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	SODIUM	FOUND	0.36	1	B	mg/L	++	0.2	1		5x = 1.8	
SREV	STRONTIUM	FOUND		1	U	mg/L	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND		1	U	mg/L	++	0.005	0.03			
SREV	YTTRIUM	REC	100.76	1		%	++	0.001	0.005			

Samples 1,2,3,4, and 5 are qualified for Boron

WG487361LFB1

Tag:

Measured: 12/10/2019 9:33:49 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.03	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	103	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.4966	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	99	1		%	++	0.007	0.04			
SREV	BORON	FOUND	0.608	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	121	1		%	ALRT	0.02	0.1		B1	
SREV	CALCIUM	FOUND	69.62	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	102	1		%	++	0.1	0.5			
SREV	IRON	FOUND	1.014	1		mg/L	++	0.03	0.08			
FAIL	IRON	FOUND	1.085	1		mg/L	++	0.03	0.08			
SREV	IRON	REC	101	1		%	++	0.03	0.08			
FAIL	IRON	REC	108	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND	1.044	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	104	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	49.49	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	99	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	1.09	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	109	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	101.4	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	101	1		%	++	0.2	1			
SREV	SODIUM	FOUND	101	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	101	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.508	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	101	1		%	++	0.009	0.05			
SREV	TIN	FOUND	1.053	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	105	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	1.037	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	104	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	99.83	1		%	++	0.001	0.005			

No qualification; all results are blank qualified for B

L56147-01

Tag:

Measured: 12/10/2019 9:37:29 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT		2	U	mg/L	++	0.1	0.5		M3	
SREV	BARIUM	BA-MWMT	.03	2	B	mg/L	++	0.01	0.07		RA	
SREV	BORON	B-MWMT	.22	2		mg/L	++	0.04	0.2		B1 RA ZG	
SREV	CALCIUM	CA-MWMT	551	2		mg/L	++	0.2	1			
FAIL	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2		RA	
SREV	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2		RA	
SREV	LITHIUM	LI-MWMT	.33	2		mg/L	++	0.02	0.08		RA	
SREV	MAGNESIUM	MG-MWMT	72.0	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT	.3	2	B	mg/L	++	0.2	1		RA	
SREV	POTASSIUM	K-MWMT	7.0	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	133	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	1.68	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4		RA	
SREV	TITANIUM	TI-MWMT	.07	2		mg/L	++	0.01	0.05		RA ZG	
NEED	YTTRIUM	REC	99.00	2		%	++	0.001	0.005			

L56147-02

Tag: Measured: 12/10/2019 9:41:12 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT		2	U	mg/L	++	0.1	0.5		M3	
SREV	BARIUM	BA-MWMT	.02	2	B	mg/L	++	0.01	0.07		RA	
SREV	BORON	B-MWMT	.23	2		mg/L	++	0.04	0.2		B1 RA ZG	
SREV	CALCIUM	CA-MWMT	561	2		mg/L	++	0.2	1			
FAIL	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2		RA	
SREV	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2		RA	
SREV	LITHIUM	LI-MWMT	.05	2	B	mg/L	++	0.02	0.08		RA	
SREV	MAGNESIUM	MG-MWMT	101	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1		RA	
SREV	POTASSIUM	K-MWMT	32.3	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	36.2	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	3.12	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4		RA	
SREV	TITANIUM	TI-MWMT	.07	2		mg/L	++	0.01	0.05		RA ZG	
NEED	YTTRIUM	REC	100	2		%	++	0.001	0.005			

L56147-03

Tag: Measured: 12/10/2019 9:44:53 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT	6.6	2		mg/L	++	0.1	0.5		M3	
SREV	BARIUM	BA-MWMT		2	U	mg/L	++	0.01	0.07		RA	
SREV	BORON	B-MWMT	.15	2	B	mg/L	++	0.04	0.2		B1 RA ZG	
SREV	CALCIUM	CA-MWMT	556	2		mg/L	++	0.2	1			
FAIL	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2		RA	
SREV	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2		RA	
SREV	LITHIUM	LI-MWMT		2	U	mg/L	++	0.02	0.08		RA	
SREV	MAGNESIUM	MG-MWMT	65.6	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1		RA	
SREV	POTASSIUM	K-MWMT	7.4	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	10.6	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	.91	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4		RA	
SREV	TITANIUM	TI-MWMT	.07	2		mg/L	++	0.01	0.05		RA ZG	
NEED	YTTRIUM	REC	101	2		%	++	0.001	0.005			

L56147-04

Tag: Measured: 12/10/2019 9:48:35 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT		2	U	mg/L	++	0.1	0.5		M3	
SREV	BARIUM	BA-MWMT		2	U	mg/L	++	0.01	0.07		RA	
SREV	BORON	B-MWMT	.28	2		mg/L	++	0.04	0.2		B1 RA ZG	
SREV	CALCIUM	CA-MWMT	514	2		mg/L	++	0.2	1			
SREV	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2		RA	
FAIL	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2		RA	
SREV	LITHIUM	LI-MWMT	.12	2		mg/L	++	0.02	0.08		RA	
SREV	MAGNESIUM	MG-MWMT	161	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1		RA	
SREV	POTASSIUM	K-MWMT	37.4	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	92.3	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	3.07	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4		RA	
SREV	TITANIUM	TI-MWMT	.07	2		mg/L	++	0.01	0.05		RA ZG	
NEED	YTTRIUM	REC	98.1	2		%	++	0.001	0.005			

L56147-04SDL Tag: Measured: 12/10/2019 9:52:17 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	D		2	U	%	++	0.1	0.5			
SREV	ALUMINUM	FOUND		2	U	mg/L	++	0.1	0.5			
SREV	ALUMINUM	REG	0	2	U	mg/L	++	0.1	0.5			
SREV	BARIUM	D		2	U	%	++	0.01	0.07			
SREV	BARIUM	FOUND		2	U	mg/L	++	0.01	0.07			
SREV	BARIUM	REG	0	2	U	mg/L	++	0.01	0.07			
SREV	BORON	D	43	2	B	%	ALRT	0.04	0.2		ZG	The original result is not 50x MDL
SREV	BORON	FOUND	0.08	2	B	mg/L	++	0.04	0.2			
SREV	BORON	REG	0.4	2	B	mg/L	++	0.04	0.2			
SREV	CALCIUM	D	0	2		%	++	0.2	1			
SREV	CALCIUM	FOUND	102.58	2		mg/L	++	0.2	1			
SREV	CALCIUM	REG	512.9 ✓	2		mg/L	++	0.2	1			
SREV	IRON	D	0	2		%	++	0.06	0.2			
FAIL	IRON	D	0	2		%	++	0.06	0.2			
FAIL	IRON	FOUND		2	U	mg/L	++	0.06	0.2			
SREV	IRON	FOUND		2	U	mg/L	++	0.06	0.2			
SREV	IRON	REG	0	2	U	mg/L	++	0.06	0.2			
FAIL	IRON	REG	0	2	U	mg/L	++	0.06	0.2			
SREV	LITHIUM	D		2	U	%	++	0.02	0.08			
SREV	LITHIUM	FOUND		2	U	mg/L	++	0.02	0.08			
SREV	LITHIUM	REG	0	2	U	mg/L	++	0.02	0.08			
SREV	MAGNESIUM	D	1	2		%	++	0.4	2			
SREV	MAGNESIUM	FOUND	31.76	2		mg/L	++	0.4	2			
SREV	MAGNESIUM	REG	158.8 ✓	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	D		2	U	%	++	0.2	1			
SREV	PHOSPHORUS	FOUND		2	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	REG	0	2	U	mg/L	++	0.2	1			
SREV	POTASSIUM	D	3	2		%	++	0.4	2			
SREV	POTASSIUM	FOUND	7.24	2		mg/L	++	0.4	2			
SREV	POTASSIUM	REG	36.2	2		mg/L	++	0.4	2			
SREV	SODIUM	D	2	2		%	++	0.4	2			
SREV	SODIUM	FOUND	18.05	2		mg/L	++	0.4	2			
SREV	SODIUM	REG	90.25	2		mg/L	++	0.4	2			
SREV	STRONTIUM	D	1	2		%	++	0.02	0.09			
SREV	STRONTIUM	FOUND	0.608	2		mg/L	++	0.02	0.09			
SREV	STRONTIUM	REG	3.04	2		mg/L	++	0.02	0.09			
SREV	TIN	D		2	U	%	++	0.08	0.4			
SREV	TIN	FOUND		2	U	mg/L	++	0.08	0.4			
SREV	TIN	REG	0	2	U	mg/L	++	0.08	0.4			
SREV	TITANIUM	D	36	2	B	%	ALRT	0.01	0.05		ZG	The original result is not 50x MDL
SREV	TITANIUM	FOUND	0.019	2	B	mg/L	++	0.01	0.05			
SREV	TITANIUM	REG	0.095	2	B	mg/L	++	0.01	0.05			
SREV	YTTRIUM	REC	98.79	2		%	++	0.001	0.005			

L56147-05

Tag: Measured: 12/10/2019 9:56:03 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT	14.3	2		mg/L	++	0.1	0.5		M3	
SREV	BARIUM	BA-MWMT		2	U	mg/L	++	0.01	0.07		RA	
SREV	BORON	B-MWMT	.15	2	B	mg/L	++	0.04	0.2		B1 RA ZG	
SREV	CALCIUM	CA-MWMT	560	2		mg/L	++	0.2	1			
SREV	IRON	FE-MWMT	.21	2		mg/L	++	0.06	0.2		RA	
FAIL	IRON	FE-MWMT	.27	2		mg/L	++	0.06	0.2		RA	
SREV	LITHIUM	LI-MWMT	.03	2	B	mg/L	++	0.02	0.08		RA	
SREV	MAGNESIUM	MG-MWMT	67.7	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1		RA	
SREV	POTASSIUM	K-MWMT	9.1	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	19.6	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	.90	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4		RA	
SREV	TITANIUM	TI-MWMT	.08	2		mg/L	++	0.01	0.05		RA ZG	
NEED	YTTRIUM	REC	97.5	2		%	++	0.001	0.005			

L56147-05MS2

Tag: Measured: 12/10/2019 9:59:45 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	15.78	2		mg/L	++	0.1	0.5			
SREV	ALUMINUM	REC	148	2		%	ALRT	0.1	0.5		M3 4x	
SREV	BARIUM	FOUND	0.513	2		mg/L	++	0.01	0.07			
SREV	BARIUM	REC	102	2		%	++	0.01	0.07			
SREV	BORON	FOUND	0.713	2		mg/L	++	0.04	0.2			
SREV	BORON	REC	112	2		%	++	0.04	0.2			
SREV	CALCIUM	FOUND	636.8	2		mg/L	++	0.2	1			
SREV	CALCIUM	REC	113	2		%	++	0.2	1			
FAIL	IRON	FOUND	1.421	2		mg/L	++	0.06	0.2			
SREV	IRON	FOUND	1.251	2		mg/L	++	0.06	0.2			
SREV	IRON	REC	104	2		%	++	0.06	0.2			
FAIL	IRON	REC	115	2		%	++	0.06	0.2			
SREV	LITHIUM	FOUND	1.137	2		mg/L	++	0.02	0.08			
SREV	LITHIUM	REC	110	2		%	++	0.02	0.08			
SREV	MAGNESIUM	FOUND	119.96	2		mg/L	++	0.4	2			
SREV	MAGNESIUM	REC	105	2		%	++	0.4	2			
SREV	PHOSPHORUS	FOUND	0.97	2	B	mg/L	++	0.2	1			
SREV	PHOSPHORUS	REC	97	2	B	%	++	0.2	1			
SREV	POTASSIUM	FOUND	114.8	2		mg/L	++	0.4	2			
SREV	POTASSIUM	REC	106	2		%	++	0.4	2			
SREV	SODIUM	FOUND	125.42	2		mg/L	++	0.4	2			
SREV	SODIUM	REC	106	2		%	++	0.4	2			
SREV	STRONTIUM	FOUND	1.436	2		mg/L	++	0.02	0.09			
SREV	STRONTIUM	REC	107	2		%	++	0.02	0.09			
SREV	TIN	FOUND	1.067	2		mg/L	++	0.08	0.4			
SREV	TIN	REC	106	2		%	++	0.08	0.4			
SREV	TITANIUM	FOUND	1.12	2		mg/L	++	0.01	0.05			
SREV	TITANIUM	REC	104	2		%	++	0.01	0.05			
SREV	YTTRIUM	REC	96.77	2		%	++	0.001	0.005			

L56147-05MSD2 Tag: Measured: 12/10/2019 10:03:25 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	15.61	2		mg/L	++	0.1	0.5			
SREV	ALUMINUM	REC	131	2		%	ALRT	0.1	0.5		M3 4x	
SREV	ALUMINUM	RPD	1	2		%	++	0.1	0.5			
SREV	BARIUM	FOUND	0.508	2		mg/L	++	0.01	0.07			
SREV	BARIUM	REC	101	2		%	++	0.01	0.07			
SREV	BARIUM	RPD	1	2		%	++	0.01	0.07			
SREV	BORON	FOUND	0.704	2		mg/L	++	0.04	0.2			
SREV	BORON	REC	111	2		%	++	0.04	0.2			
SREV	BORON	RPD	1	2		%	++	0.04	0.2			
SREV	CALCIUM	FOUND	628.8	2		mg/L	++	0.2	1			
SREV	CALCIUM	REC	101	2		%	++	0.2	1			
SREV	CALCIUM	RPD	1	2		%	++	0.2	1			
SREV	IRON	FOUND	1.236	2		mg/L	++	0.06	0.2			
FAIL	IRON	FOUND	1.405	2		mg/L	++	0.06	0.2			
FAIL	IRON	REC	113	2		%	++	0.06	0.2			
SREV	IRON	REC	102	2		%	++	0.06	0.2			
FAIL	IRON	RPD	1	2		%	++	0.06	0.2			
SREV	IRON	RPD	1	2		%	++	0.06	0.2			
SREV	LITHIUM	FOUND	1.122	2		mg/L	++	0.02	0.08			
SREV	LITHIUM	REC	109	2		%	++	0.02	0.08			
SREV	LITHIUM	RPD	1	2		%	++	0.02	0.08			
SREV	MAGNESIUM	FOUND	118.26	2		mg/L	++	0.4	2			
SREV	MAGNESIUM	REC	101	2		%	++	0.4	2			
SREV	MAGNESIUM	RPD	1	2		%	++	0.4	2			
SREV	PHOSPHORUS	FOUND	0.97	2	B	mg/L	++	0.2	1			
SREV	PHOSPHORUS	REC	97	2	B	%	++	0.2	1			
SREV	PHOSPHORUS	RPD	0	2		%	++	0.2	1			
SREV	POTASSIUM	FOUND	112.98	2		mg/L	++	0.4	2			
SREV	POTASSIUM	REC	104	2		%	++	0.4	2			
SREV	POTASSIUM	RPD	2	2		%	++	0.4	2			
SREV	SODIUM	FOUND	123.42	2		mg/L	++	0.4	2			
SREV	SODIUM	REC	104	2		%	++	0.4	2			
SREV	SODIUM	RPD	2	2		%	++	0.4	2			
SREV	STRONTIUM	FOUND	1.414	2		mg/L	++	0.02	0.09			
SREV	STRONTIUM	REC	102	2		%	++	0.02	0.09			
SREV	STRONTIUM	RPD	2	2		%	++	0.02	0.09			
SREV	TIN	FOUND	1.042	2		mg/L	++	0.08	0.4			
SREV	TIN	REC	104	2		%	++	0.08	0.4			
SREV	TIN	RPD	2	2		%	++	0.08	0.4			
SREV	TITANIUM	FOUND	1.106	2		mg/L	++	0.01	0.05			
SREV	TITANIUM	REC	103	2		%	++	0.01	0.05			
SREV	TITANIUM	RPD	1	2		%	++	0.01	0.05			
SREV	YTTRIUM	REC	98.33	2		%	++	0.001	0.005			

WG487738CCV1

Tag:

Measured: 12/10/2019 10:07:03 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.024	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	102	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.9949	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	99	1		%	++	0.007	0.04			
SREV	BORON	FOUND	1.062	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	106	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	49.99	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	100	1		%	++	0.1	0.5			
FAIL	IRON	FOUND	1.11	1		mg/L	++	0.03	0.08			
SREV	IRON	FOUND	0.982	1		mg/L	++	0.03	0.08			
FAIL	IRON	REC	111	1		%	ALRT	0.03	0.08			
SREV	IRON	REC	98	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND	1.013	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	101	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	49.01	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	98	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	2.48	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	99	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	9.99	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	100	1		%	++	0.2	1			
SREV	SODIUM	FOUND	49.61	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	99	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.9914	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	99	1		%	++	0.009	0.05			
SREV	TIN	FOUND	1.071	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	107	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	1.028	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	103	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	97.65	1		%	++	0.001	0.005			

Samples were calculated using the bracketed iron

WG487738CCB1

Tag:

Measured: 12/10/2019 10:10:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND		1	U	mg/L	++	0.05	0.3			
SREV	BARIUM	FOUND		1	U	mg/L	++	0.007	0.04			
SREV	BORON	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	CALCIUM	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
FAIL	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	SODIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	STRONTIUM	FOUND		1	U	mg/L	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND		1	U	mg/L	++	0.005	0.03			
SREV	YTTRIUM	REC	97.7	1		%	++	0.001	0.005			

L56147-05DUP

Tag:

Measured: 12/10/2019 10:14:29 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	14.99	2		mg/L	++	0.1	0.5			
SREV	ALUMINUM	RPD	5	2		%	++	0.1	0.5			
SREV	BARIUM	FOUND		2	U	mg/L	++	0.01	0.07			
SREV	BARIUM	RPD	0	2		%	++	0.01	0.07		RA	
SREV	BORON	FOUND	0.17	2	B	mg/L	++	0.04	0.2			
SREV	BORON	RPD	13	2		%	++	0.04	0.2		RA	
SREV	CALCIUM	FOUND	572.4	2		mg/L	++	0.2	1			
SREV	CALCIUM	RPD	2	2		%	++	0.2	1			
FAIL	IRON	FOUND	0.161	2	B	mg/L	++	0.06	0.2	Diff = 0.068 < 0.2 (QL)		
SREV	IRON	FOUND	0.142	2	B	mg/L	++	0.06	0.2			
FAIL	IRON	RPD	51	2	B	%	ALRT	0.06	0.2		RA	
SREV	IRON	RPD	39	2	B	%	ALRT	0.06	0.2		RA	
SREV	LITHIUM	FOUND	0.033	2	B	mg/L	++	0.02	0.08			
SREV	LITHIUM	RPD	10	2		%	++	0.02	0.08		RA	
SREV	MAGNESIUM	FOUND	67.66	2		mg/L	++	0.4	2			
SREV	MAGNESIUM	RPD	0	2		%	++	0.4	2			
SREV	PHOSPHORUS	FOUND		2	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	RPD	0	2		%	++	0.2	1		RA	
SREV	POTASSIUM	FOUND	7.82	2		mg/L	++	0.4	2			
SREV	POTASSIUM	RPD	15	2		%	++	0.4	2			
SREV	SODIUM	FOUND	19.98	2		mg/L	++	0.4	2			
SREV	SODIUM	RPD	2	2		%	++	0.4	2			
SREV	STRONTIUM	FOUND	0.83	2		mg/L	++	0.02	0.09			
SREV	STRONTIUM	RPD	8	2		%	++	0.02	0.09			
SREV	TIN	FOUND		2	U	mg/L	++	0.08	0.4			
SREV	TIN	RPD	0	2		%	++	0.08	0.4		RA	
SREV	TITANIUM	FOUND	0.078	2		mg/L	++	0.01	0.05			
SREV	TITANIUM	RPD	3	2		%	++	0.01	0.05		RA	
SREV	YTTRIUM	REC	96.94	2		%	++	0.001	0.005			

WG487738CCV2

Tag:

Measured: 12/10/2019 10:18:10 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.023	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	102	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.9965	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	100	1		%	++	0.007	0.04			
SREV	BORON	FOUND	1.071	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	107	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	50.14	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	100	1		%	++	0.1	0.5			
SREV	IRON	FOUND	0.981	1		mg/L	++	0.03	0.08			
FAIL	IRON	FOUND	1.107	1		mg/L	++	0.03	0.08			
SREV	IRON	REC	98	1		%	++	0.03	0.08			
FAIL	IRON	REC	111	1		%	ALRT	0.03	0.08			
SREV	LITHIUM	FOUND	1.022	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	102	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	49.01	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	98	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	2.5	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	100	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	10.05	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	101	1		%	++	0.2	1			
SREV	SODIUM	FOUND	49.94	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	100	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.9973	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	100	1		%	++	0.009	0.05			
SREV	TIN	FOUND	1.065	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	107	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	1.029	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	103	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	96.89	1		%	++	0.001	0.005			

WG487738CCB2

Tag:

Measured: 12/10/2019 10:21:49 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND		1	U	mg/L	++	0.05	0.3			
SREV	BARIUM	FOUND		1	U	mg/L	++	0.007	0.04			
SREV	BORON	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	CALCIUM	FOUND		1	U	mg/L	++	0.1	0.5			
FAIL	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	SODIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	STRONTIUM	FOUND		1	U	mg/L	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND		1	U	mg/L	++	0.005	0.03			
SREV	YTTRIUM	REC	97.89	1		%	++	0.001	0.005			

WG487738 Extended Qualifiers with Case Narratives

L56147-01	BORON	B1	Boron detected in method blank (PBS) and laboratory fortified blank (LFB) above the method reporting limit. The MWMT fluid is passed through the analytical column as part of the preparation procedure, resulting in trace contamination of some analytes.
L56147-02	BORON		
L56147-03	BORON		
L56147-04	BORON		
L56147-05	BORON		
WG487361PBS	BORON		

Element, Wavelength and Order	Date of Fit	Date of Cal.	Type of Fit	Weighting	A0	A1	A2	n (Exponent)
Ag 328.068 {103}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000059	0.062480	0.000000	1.000000
Al 396.152 { 85}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000170	0.025265	0.000000	1.000000
As 189.042 {478}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000073	0.001004	0.000000	1.000000
B 208.959 {461}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000009	0.004691	0.000000	1.000000
Ba 455.403 { 74}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.012420	2.759174	0.000000	1.000000
Be 313.042 {108}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.009222	0.937006	0.000000	1.000000
Bi 223.061 {451}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000305	0.002978	0.000000	1.000000
Ca 315.887 {107}	12/10/2019 9:03:26	12/10/2019 9:03:26	Linear	None	-0.009564	0.015510	0.000000	1.000000
Cd 214.438 {457}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000384	0.071878	0.000000	1.000000
Cd 226.502 {449}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000446	0.056813	0.000000	1.000000
Co 228.616 {447}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000505	0.011223	0.000000	1.000000
Cr 205.560 {464}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000125	0.020431	0.000000	1.000000
Cr 267.716 {126}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000438	0.031346	0.000000	1.000000
Cu 324.754 {104}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000976	0.051820	0.000000	1.000000
Fe 240.488 {140}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000165	0.006532	0.000000	1.000000
Fe 259.940 {130}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000496	0.029082	0.000000	1.000000
Ga 294.364 {114}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000077	0.002778	0.000000	1.000000
K 766.490 { 44}	12/10/2019 9:03:26	12/10/2019 9:03:26	Linear	None	0.002187	0.020750	0.000000	1.000000
Li 670.784 { 50}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.003435	0.564232	0.000000	1.000000
Mg 279.079 {121}	12/10/2019 9:03:26	12/10/2019 9:03:26	Linear	None	0.000659	0.003491	0.000000	1.000000
Mn 257.610 {131}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.001177	0.207301	0.000000	1.000000
Mo 202.030 {467}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000248	0.010533	0.000000	1.000000
Na 589.592 { 57}	12/10/2019 9:03:26	12/10/2019 9:03:26	Linear	None	0.011068	0.101722	0.000000	1.000000
Ni 231.604 {446}	12/10/2019 9:03:26	12/10/2019 9:03:26	Linear	None	0.000489	0.010014	0.000000	1.000000
P 214.914 {457}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.001057	0.001407	0.000000	1.000000
Pb 220.353 {453}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000357	0.004485	0.000000	1.000000
S 182.034 {485}	12/10/2019 9:03:26	12/10/2019 9:03:26	Linear	None	0.000074	0.000449	0.000000	1.000000
Sb 206.833 {463}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000308	0.002608	0.000000	1.000000
Sc 361.384 { 93}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000119	0.231956	0.000000	1.000000
Se 196.090 {472}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000044	0.001726	0.000000	1.000000
Si 251.611 {134}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000188	0.012254	0.000000	1.000000
Si 251.611 {134}2	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000188	0.012254	0.000000	1.000000
Sn 189.989 {477}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000040	0.002500	0.000000	1.000000
Sr 421.552 { 80}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.002039	2.476070	0.000000	1.000000
Ti 334.941 {101}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.000571	0.111137	0.000000	1.000000
Tl 190.856 {477}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000210	0.001343	0.000000	1.000000
V 292.402 {115}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000078	0.026193	0.000000	1.000000
Y 371.030 { 91}*	12/10/2019 9:03:26	12/10/2019 9:03:26	Linear	None	13169.235	-68.636334	0.000000	1.000000
Zn 206.200 {463}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	-0.000081	0.021729	0.000000	1.000000
Zn 213.856 {457}	12/10/2019 8:59:40	12/10/2019 8:59:40	Linear	None	0.001194	0.017464	0.000000	1.000000

Element, Wavelength and Order	Correlation	Std Error of Est	Predicted MDL	Predicted MQL	Status	Reslope		QC Norm	
						Slope	Y-int	Slope factor	Offset
Ag 328.068 {103}	0.999995	0.000142	0.004208	0.014025	OK.	1.000000	0.000000	1	0
Al 396.152 { 85}	0.999999	0.000279	0.013837	0.046122	OK.	1.000000	0.000000	1	0
As 189.042 {478}	0.999996	0.000010	0.022171	0.073902	OK.	1.000000	0.000000	1	0
B 208.959 {461}	0.999997	0.000044	0.006570	0.021901	OK.	1.000000	0.000000	1	0
Ba 455.403 { 74}	1.000000	0.001231	0.000211	0.000703	OK.	1.000000	0.000000	1	0
Be 313.042 {108}	1.000000	0.001302	0.000407	0.001357	OK.	1.000000	0.000000	1	0
Bi 223.061 {451}	1.000000	0.000000	0.014591	0.048638	OK.	1.000000	0.000000	1	0
Ca 315.887 {107}	1.000000	0.000838	0.019405	0.064684	OK.	1.000000	0.000000	1	0
Cd 214.438 {457}	1.000000	0.000016	0.000610	0.002032	OK.	1.000000	0.000000	1	0
Cd 226.502 {449}	0.999996	0.000239	0.000876	0.002920	OK.	1.000000	0.000000	1	0
Co 228.616 {447}	0.999999	0.000024	0.004538	0.015125	OK.	1.000000	0.000000	1	0
Cr 205.560 {464}	0.999997	0.000187	0.002021	0.006738	OK.	1.000000	0.000000	1	0
Cr 267.716 {126}	0.999973	0.000811	0.005174	0.017245	OK.	1.000000	0.000000	1	0
Cu 324.754 {104}	0.999972	0.000543	0.004054	0.013515	OK.	1.000000	0.000000	1	0
Fe 240.488 {140}	0.999988	0.000114	0.023281	0.077603	OK.	1.000000	0.000000	1	0
Fe 259.940 {130}	0.999990	0.000461	0.004619	0.015397	OK.	1.000000	0.000000	1	0
Ga 294.364 {114}	0.999943	0.000042	0.065974	0.219914	OK.	1.000000	0.000000	1	0
K 766.490 { 44}	1.000000	0.000593	0.039176	0.130587	OK.	1.000000	0.000000	1	0
Li 670.784 { 50}	0.999989	0.003801	0.001503	0.005009	OK.	1.000000	0.000000	1	0
Mg 279.079 {121}	0.999998	0.000366	0.046682	0.155607	OK.	1.000000	0.000000	1	0
Mn 257.610 {131}	0.999979	0.001906	0.000758	0.002526	OK.	1.000000	0.000000	1	0
Mo 202.030 {467}	0.999998	0.000029	0.003053	0.010175	OK.	1.000000	0.000000	1	0
Na 589.592 { 57}	1.000000	0.002914	0.008056	0.026854	OK.	1.000000	0.000000	1	0
Ni 231.604 {446}	1.000000	0.000000	0.004269	0.014232	OK.	1.000000	0.000000	1	0
P 214.914 {457}	0.999990	0.000022	0.033349	0.111164	OK.	1.000000	0.000000	1	0
Pb 220.353 {453}	1.000000	0.000006	0.010745	0.035817	OK.	1.000000	0.000000	1	0
S 182.034 {485}	1.000000	0.000009	0.074004	0.246681	OK.	1.000000	0.000000	1	0
Sb 206.833 {463}	0.999992	0.000015	0.013365	0.044551	OK.	1.000000	0.000000	1	0
Sc 361.384 { 93}	1.000000	0.000049	0.001209	0.004031	OK.	1.000000	0.000000	1	0
Se 196.090 {472}	0.999997	0.000015	0.018812	0.062707	OK.	1.000000	0.000000	1	0
Si 251.611 {134}	0.999997	0.000098	0.011805	0.039351	OK.	1.000000	0.000000	1	0
Si 251.611 {134}2	0.999997	0.000098	0.011805	0.039351	OK.	1.000000	0.000000	1	0
Sn 189.989 {477}	0.999993	0.000033	0.010639	0.035462	OK.	1.000000	0.000000	1	0
Sr 421.552 { 80}	0.999999	0.005582	0.000171	0.000569	OK.	1.000000	0.000000	1	0
Ti 334.941 {101}	0.999990	0.000352	0.001938	0.006460	OK.	1.000000	0.000000	1	0
Tl 190.856 {477}	1.000000	0.000006	0.021905	0.073018	OK.	1.000000	0.000000	1	0
V 292.402 {115}	0.999998	0.000035	0.006969	0.023229	OK.	1.000000	0.000000	1	0
Y 371.030 { 91}*	0.310634	128.61354	-1.000000	-1.000000	Warnin	1.000000	0.000000	1	0
Zn 206.200 {463}	0.999996	0.000090	0.001620	0.005401	OK.	1.000000	0.000000	1	0
Zn 213.856 {457}	0.999998	0.000049	0.001890	0.006300	OK.	1.000000	0.000000	1	0

CALIBRATION REAGENTS

6010/200.7 Reagent Sheet

1% Calibration Standards			10% Calibration Standards		
CLPSTD1:	**	SCN	CLPTSTD1:	**	SCN
CLPSTD2:	II191120-2	SCN	CLPTSTD2:	II191121-1	SCN
CLPSTD3:	II191209-1	SCN	CLPTSTD3:	II191127-3	SCN

Yttrium (Internal Standard) = PCN59951 EXP: 12/30/20

**=CALSTD1 is a 2X dilution on CALSTD2 using either 1% or 10% Blank as the dilutent.

Blank Solutions:

Nitric acid:	60299	PCN	Nitric acid:	60299	PCN
Hydrochloric acid:	60374	PCN	Hydrochloric acid:	60176	PCN

VERIFIED BY: KJA 12/10/19

ICPSTD

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG487738 **ICP MWMT**

Sample	Date	SCN	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Cd	Co	Cr	Cr	Cu	Fe	Fe	Ga	K	Li	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Se	Si	SiO2	Sn	Sr	Ti	Tl	V
WG487738ICV	12/10/19 09:03	II191122-1		X		X	X			X							X	X		X	X	X			X		X			X					X	X	X		
WG487738ICB	12/10/19 09:07			X		X	X			X							X	X		X	X	X			X		X			X					X	X	X		
WG487738PQV	12/10/19 09:10	II191202-2		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487738ICSAB	12/10/19 09:14	II191127-4		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487738ULRV	12/10/19 09:22	II191113-1		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487361PBS	12/10/19 09:30		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487361LFB1	12/10/19 09:33	II191127-2		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-01	12/10/19 09:37			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-02	12/10/19 09:41			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-03	12/10/19 09:44			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-04	12/10/19 09:48			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-04SDL	12/10/19 09:52			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-05	12/10/19 09:56			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-05MS2	12/10/19 09:59	II191127-2		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-05MSD2	12/10/19 10:03	II191127-2		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487738CCV1	12/10/19 10:07	II191204-1		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487738CCB1	12/10/19 10:10		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L56147-05DUP	12/10/19 10:14			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487738CCV2	12/10/19 10:18	II191204-1		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487738CCB2	12/10/19 10:21		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

L56147-2001131042

ICP Total 200

QC List Type: QC-ICP-200
QCListMatClass: LIQUID
Bench Sheet List: I-ICP
QC Ref: MA-ICP-T-200
Group ID: MA-G-ICP_-T-200
Method Ref: M200.7
SOP Ref: SOPII012

WG487888

ACZ Laboratories, Inc

Instrument ID: ICP7 8 JLW 12/12/19
Analyst: KJA
ACZ Dept: 33
Create Date: 12/11/2019 10:09
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	VT200	Dilution
1	WG487888ICV	II191209-2			1			☑	1
2	WG487888ICB	NONE			1			☑	1
3	WG487888PQV	II191202-2			1			☑	1
4	WG487888SIC	II191112-2			1			☑	1
5	WG487674LRB	NONE			1			☑	1
6	WG487674LFB	II191204-3			1			☑	1
7	L56161-05	368			1		70	☑	1
8	L56161-05LFM	II191204-3			1			☑	1
9	L56161-05LFMD	II191204-3			1			☑	1
10	L56171-01	RMIN-191003-1200			1			☑	~~1~~ 2.) KJA 12/11/19
11	L56171-02	RMOUT-191003-1200			1			☑	~~1~~ 2.)
12	WG487888CCV	II191204-1			1			☑	1
12	WG487888CCB	NONE			1			☑	1

Sample	Login Comments
L56171-01	W(2),RPC(2) ||
L56171-02	W(3),RPC(3) ||

Report Comments: Dilutions corrected and re-uploaded JLW 12/12/19

Internal Comments

AREV: JLW 12/12/19
Initials, Date

SREV: VEH 12/12/19
Initials, Date

12/11/2019 10:10:04 AM 121319

ACZ Laboratories, Inc.

ICP DATA REVIEW CHECKLIST

Reviewed By:	JLW
Date:	12/12/19
Approved By:	JEH
Date:	12/12/19

Work Group:	457918
Sample Type:	T-200
Analysis Date:	12/11/19
Analyst:	KJH

Instrument Checklist

		Yes	No	N / A
1) Is the correct run date associated with the workgroup?	✓	✓		
2) Are all of the QC critera listed in LIMS within specified limits? **	✓	✓		
3) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?	✓			✓
4) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓	✓		
5) Is a current standard/reagent form attached to the workgroup?	✓	✓		
6) Have all dilutions performed at the bench been checked off on the benchsheet?	✓	✓		
7) Has any sample on a 2x dilution been checked for proper mixing (review raw data)?	✓	✓		
8) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal, EC, TDS)?	✓			✓
9) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?	✓	✓		
10) Are any samples that have recoveries outside of limits for the Yttrium Internal Standard set to REDO?	✓			✓
11) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?		✓		

For any item listed above that is checked "No" state the problem and corrective action / resolution in the sections below.

QC/Sample ID	Analytical Problem	Corrective action
	All Passed	

FRMII009.06.13.14

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487888

Date Reported: 12-Dec-19
Run ID: R1763961
Date Analyzed: 11-Dec-19
ICAL Workgroup:
Instrument ID: ICP7

WG487888ICV

Tag:

Measured: 12/11/2019 1:43:48 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.999	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	100	1		%	++	0.05	0.3			
SREV	ALUMINUM	RSD	1.324	1		mg/L	++	0.05	0.25			
SREV	ANTIMONY	FOUND	3.979	1		mg/L	++	0.03	0.2			
SREV	ANTIMONY	REC	99	1		%	++	0.03	0.2			
SREV	ANTIMONY	RSD	0.7113	1		mg/L	++	0.03	0.15			
SREV	BARIUM	FOUND	2.002 ✓	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	100	1		%	++	0.007	0.04			
SREV	BARIUM	RSD	0.7241	1		mg/L	++	0.007	0.035			
SREV	BORON	FOUND	1.986	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	99	1		%	++	0.02	0.1			
SREV	BORON	RSD	0.5832	1		mg/L	++	0.02	0.1			
SREV	CALCIUM	FOUND	100.5	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	101	1		%	++	0.1	0.5			
SREV	CALCIUM	RSD	0.4286	1		mg/L	++	0.1	0.5			
FAIL	IRON	FOUND	1.883	1		mg/L	++	0.03	0.08			
SREV	IRON	FOUND	1.948	1		mg/L	++	0.03	0.08			
FAIL	IRON	REC	94	1		%	++	0.03	0.08			
SREV	IRON	REC	97	1		%	++	0.03	0.08			
SREV	IRON	RSD	0.6634	1		mg/L	++	0.03	0.075			
FAIL	IRON	RSD	0.9749	1		mg/L	++	0.03	0.075			
SREV	LITHIUM	FOUND	2.027	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	101	1		%	++	0.008	0.04			
SREV	LITHIUM	RSD	0.5544	1		mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	98.58	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	99	1		%	++	0.2	1			
SREV	MAGNESIUM	RSD	0.559	1		mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND	5.04	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	101	1		%	++	0.1	0.5			
SREV	PHOSPHORUS	RSD	0.959	1		mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND	20.27	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	101	1		%	++	0.2	1			
SREV	POTASSIUM	RSD	0.3839	1		mg/L	++	0.2	1			
SREV	SODIUM	FOUND	100.9 ✓	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	101	1		%	++	0.2	1			
SREV	SODIUM	RSD	0.4423	1		mg/L	++	0.2	1			
SREV	STRONTIUM	FOUND	1.964	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	98	1		%	++	0.009	0.05			
SREV	STRONTIUM	RSD	0.6248	1		mg/L	++	0.009	0.045			
SREV	TIN	FOUND	1.953	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	98	1		%	++	0.04	0.2			
SREV	TIN	RSD	2.545	1		mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND	1.984	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	99	1		%	++	0.005	0.03			
SREV	TITANIUM	RSD	0.8686	1		mg/L	++	0.005	0.025			

SREV	YTTRIUM	REC	97.95	1		%	++	0.001	0.005

WG487888ICB

Tag:

Measured: 12/11/2019 1:47:25 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND		1	U	mg/L	++	0.05	0.3			
SREV	ANTIMONY	FOUND		1	U	mg/L	++	0.03	0.2			
SREV	BARIUM	FOUND		1	U	mg/L	++	0.007	0.04			
SREV	BORON	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	CALCIUM	FOUND		1	U	mg/L	++	0.1	0.5			
FAIL	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	SODIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	STRONTIUM	FOUND		1	U	mg/L	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND		1	U	mg/L	++	0.005	0.03			
SREV	YTTRIUM	REC	100.2	1		%	++	0.001	0.005			

WG487888PQV

Tag:

Measured: 12/11/2019 1:51:15 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	0.262	1	B	mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	105	1	B	%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.0402	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	115	1		%	++	0.007	0.04			
SREV	BORON	FOUND	0.104	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	104	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	0.46	1	B	mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	92	1	B	%	++	0.1	0.5			
FAIL	IRON	FOUND	0.064	1	B	mg/L	++	0.03	0.08			
SREV	IRON	FOUND	0.074	1	B	mg/L	++	0.03	0.08			
SREV	IRON	REC	98	1	B	%	++	0.03	0.08			
FAIL	IRON	REC	85	1	B	%	++	0.03	0.08			
SREV	LITHIUM	FOUND	0.0418	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	104	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	0.88	1	B	mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	88	1	B	%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	0.55	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	110	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	0.94	1	B	mg/L	++	0.2	1			
SREV	POTASSIUM	REC	94	1	B	%	++	0.2	1			
SREV	SODIUM	FOUND	1.04	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	104	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.0488	1	B	mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	108	1	B	%	++	0.009	0.05			
SREV	TIN	FOUND	0.214	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	107	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	0.0267	1	B	mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	107	1	B	%	++	0.005	0.03			
SREV	YTTRIUM	REC	99.87	1		%	++	0.001	0.005			

WG487888ICSAB

Tag:

Measured: 12/11/2019 1:55:02 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	251.6	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	101	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.2518	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	101	1		%	++	0.007	0.04			
SREV	BORON	FOUND	0.492	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	98	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	249.7	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	100	1		%	++	0.1	0.5			
SREV	IRON	FOUND	94.48	1		mg/L	++	0.03	0.08			
FAIL	IRON	FOUND	90.64	1		mg/L	++	0.03	0.08			
SREV	IRON	REC	94	1		%	++	0.03	0.08			
FAIL	IRON	REC	90	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND	0.539	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	108	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	250.8	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	100	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	4.87	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	97	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	26.15	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	105	1		%	++	0.2	1			
SREV	SODIUM	FOUND	26.38	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	106	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.4896	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	98	1		%	++	0.009	0.05			
SREV	TIN	FOUND	2.352	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	94	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	0.5181	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	104	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	99.84	1		%	++	0.001	0.005			

WG487888ULRV

Tag:

Measured: 12/11/2019 2:02:27 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	ALUMINUM	FOUND	279.7	1		mg/L	++	0.05	0.3			
FAIL	ALUMINUM	REC	112	1		%	ALRT	0.05	0.3			
SREV	BARIUM	FOUND	25.83	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	103	1		%	++	0.007	0.04			
SREV	BORON	FOUND	26.26	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	105	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	533.9	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	107	1		%	++	0.1	0.5			
FAIL	IRON	FOUND	485.6	1		mg/L	++	0.03	0.08			
SREV	IRON	FOUND	499.2	1		mg/L	++	0.03	0.08			
SREV	IRON	REC	100	1		%	++	0.03	0.08			
FAIL	IRON	REC	97	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	272.8	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	109	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	105.6	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	105	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
FAIL	SODIUM	FOUND	586.1	1		mg/L	++	0.2	1			
FAIL	SODIUM	REC	117	1		%	ALRT	0.2	1			
SREV	STRONTIUM	FOUND	10.54	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	105	1		%	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND	26.64	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	107	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	96.18	1		%	++	0.001	0.005			

WG487250PBS

Tag:

Measured: 12/11/2019 2:10:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND		1	U	mg/L	++	0.05	0.3			
SREV	BARIUM	FOUND		1	U	mg/L	++	0.007	0.04			
SREV	BORON	FOUND	0.056	1	B	mg/L	++	0.02	0.1	5x = 0.28		
SREV	CALCIUM	FOUND	0.14	1	B	mg/L	++	0.1	0.5	5x= 0.7		
FAIL	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	SODIUM	FOUND	0.28	1	B	mg/L	++	0.2	1	5x = 1.4		
SREV	STRONTIUM	FOUND		1	U	mg/L	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND		1	U	mg/L	++	0.005	0.03			
SREV	YTTRIUM	REC	100.62	1		%	++	0.001	0.005			

WG487250LFB1

Tag:

Measured: 12/11/2019 2:14:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.023	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	102	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.4991	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	100	1		%	++	0.007	0.04			
SREV	BORON	FOUND	0.57	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	114	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	71.28	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	105	1		%	++	0.1	0.5			
SREV	IRON	FOUND	1.022	1		mg/L	++	0.03	0.08			
FAIL	IRON	FOUND	1.041	1		mg/L	++	0.03	0.08			
SREV	IRON	REC	102	1		%	++	0.03	0.08			
FAIL	IRON	REC	104	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND	1.036	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	103	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	50.25	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	101	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	1.04	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	104	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	103.9	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	104	1		%	++	0.2	1			
SREV	SODIUM	FOUND	102.7	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	103	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.5111	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	102	1		%	++	0.009	0.05			
SREV	TIN	FOUND	1.032	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	103	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	1.032	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	103	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	98.92	1		%	++	0.001	0.005			

L56147-06

Tag:

Measured: 12/11/2019 2:17:51 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT		2	U	mg/L	++	0.1	0.5			
SREV	BARIUM	BA-MWMT	.03	2	B	mg/L	++	0.01	0.07			
SREV	BORON	B-MWMT	.16	2	B	mg/L	++	0.04	0.2			
SREV	CALCIUM	CA-MWMT	492	2		mg/L	++	0.2	1			
FAIL	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2			
SREV	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2			
SREV	LITHIUM	LI-MWMT	.11	2		mg/L	++	0.02	0.08			
SREV	MAGNESIUM	MG-MWMT	75.3	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1			
SREV	POTASSIUM	K-MWMT	41.3	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	59.3	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	2.89	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4			
SREV	TITANIUM	TI-MWMT	.07	2		mg/L	++	0.01	0.05		ZG	
NEED	YTTRIUM	REC	99.4	2		%	++	0.001	0.005			

L56147-06MS Tag: Measured: 12/11/2019 2:21:35 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.07	2		mg/L	++	0.1	0.5			
SREV	ALUMINUM	REC	107	2		%	++	0.1	0.5			
SREV	BARIUM	FOUND	0.526	2		mg/L	++	0.01	0.07			
SREV	BARIUM	REC	99	2		%	++	0.01	0.07			
SREV	BORON	FOUND	0.656	2		mg/L	++	0.04	0.2			
SREV	BORON	REC	99	2		%	++	0.04	0.2			
SREV	CALCIUM	FOUND	573.6	2		mg/L	++	0.2	1			
SREV	CALCIUM	REC	120	2		%	++	0.2	1			
FAIL	IRON	FOUND	1.004	2		mg/L	++	0.06	0.2			
SREV	IRON	FOUND	1.007	2		mg/L	++	0.06	0.2			
SREV	IRON	REC	101	2		%	++	0.06	0.2			
FAIL	IRON	REC	100	2		%	++	0.06	0.2			
SREV	LITHIUM	FOUND	1.176	2		mg/L	++	0.02	0.08			
SREV	LITHIUM	REC	106	2		%	++	0.02	0.08			
SREV	MAGNESIUM	FOUND	127.66	2		mg/L	++	0.4	2			
SREV	MAGNESIUM	REC	105	2		%	++	0.4	2			
SREV	PHOSPHORUS	FOUND	1.03	2		mg/L	++	0.2	1			
SREV	PHOSPHORUS	REC	103	2		%	++	0.2	1			
SREV	POTASSIUM	FOUND	148.22	2		mg/L	++	0.4	2			
SREV	POTASSIUM	REC	107	2		%	++	0.4	2			
SREV	SODIUM	FOUND	165.14	2		mg/L	++	0.4	2			
SREV	SODIUM	REC	106	2		%	++	0.4	2			
SREV	STRONTIUM	FOUND	3.482	2		mg/L	++	0.02	0.09			
SREV	STRONTIUM	REC	118	2		%	++	0.02	0.09			
SREV	TIN	FOUND	0.977	2		mg/L	++	0.08	0.4			
SREV	TIN	REC	98	2		%	++	0.08	0.4			
SREV	TITANIUM	FOUND	1.092	2		mg/L	++	0.01	0.05			
SREV	TITANIUM	REC	102	2		%	++	0.01	0.05			
SREV	YTTRIUM	REC	99.11	2		%	++	0.001	0.005			

L56147-06MSD

Tag:

Measured: 12/11/2019 2:25:15 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.05	2		mg/L	++	0.1	0.5			
SREV	ALUMINUM	REC	105	2		%	++	0.1	0.5			
SREV	ALUMINUM	RPD	2	2		%	++	0.1	0.5			
SREV	BARIUM	FOUND	0.53	2		mg/L	++	0.01	0.07			
SREV	BARIUM	REC	100	2		%	++	0.01	0.07			
SREV	BARIUM	RPD	1	2		%	++	0.01	0.07			
SREV	BORON	FOUND	0.661	2		mg/L	++	0.04	0.2			
SREV	BORON	REC	100	2		%	++	0.04	0.2			
SREV	BORON	RPD	1	2		%	++	0.04	0.2			
SREV	CALCIUM	FOUND	568.8	2		mg/L	++	0.2	1			
SREV	CALCIUM	REC	113	2		%	++	0.2	1			
SREV	CALCIUM	RPD	1	2		%	++	0.2	1			
FAIL	IRON	FOUND	0.991	2		mg/L	++	0.06	0.2			
SREV	IRON	FOUND	1.014	2		mg/L	++	0.06	0.2			
FAIL	IRON	REC	99	2		%	++	0.06	0.2			
SREV	IRON	REC	101	2		%	++	0.06	0.2			
SREV	IRON	RPD	1	2		%	++	0.06	0.2			
FAIL	IRON	RPD	1	2		%	++	0.06	0.2			
SREV	LITHIUM	FOUND	1.168	2		mg/L	++	0.02	0.08			
SREV	LITHIUM	REC	106	2		%	++	0.02	0.08			
SREV	LITHIUM	RPD	1	2		%	++	0.02	0.08			
SREV	MAGNESIUM	FOUND	126.84	2		mg/L	++	0.4	2			
SREV	MAGNESIUM	REC	103	2		%	++	0.4	2			
SREV	MAGNESIUM	RPD	1	2		%	++	0.4	2			
SREV	PHOSPHORUS	FOUND	1.04	2		mg/L	++	0.2	1			
SREV	PHOSPHORUS	REC	104	2		%	++	0.2	1			
SREV	PHOSPHORUS	RPD	1	2		%	++	0.2	1			
SREV	POTASSIUM	FOUND	147.7	2		mg/L	++	0.4	2			
SREV	POTASSIUM	REC	106	2		%	++	0.4	2			
SREV	POTASSIUM	RPD	0	2		%	++	0.4	2			
SREV	SODIUM	FOUND	164.66	2		mg/L	++	0.4	2			
SREV	SODIUM	REC	105	2		%	++	0.4	2			
SREV	SODIUM	RPD	0	2		%	++	0.4	2			
SREV	STRONTIUM	FOUND	3.452	2		mg/L	++	0.02	0.09			
SREV	STRONTIUM	REC	112	2		%	++	0.02	0.09			
SREV	STRONTIUM	RPD	1	2		%	++	0.02	0.09			
SREV	TIN	FOUND	1.006	2		mg/L	++	0.08	0.4			
SREV	TIN	REC	100	2		%	++	0.08	0.4			
SREV	TIN	RPD	3	2		%	++	0.08	0.4			
SREV	TITANIUM	FOUND	1.098	2		mg/L	++	0.01	0.05			
SREV	TITANIUM	REC	103	2		%	++	0.01	0.05			
SREV	TITANIUM	RPD	1	2		%	++	0.01	0.05			
SREV	YTTRIUM	REC	99.59	2		%	++	0.001	0.005			

L56147-07

Tag: Measured: 12/11/2019 2:28:55 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT		2	U	mg/L	++	0.1	0.5			
SREV	BARIUM	BA-MWMT	.03	2	B	mg/L	++	0.01	0.07			
SREV	BORON	B-MWMT	.14	2	B	mg/L	++	0.04	0.2			
SREV	CALCIUM	CA-MWMT	477	2		mg/L	++	0.2	1			
SREV	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2			
FAIL	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2			
SREV	LITHIUM	LI-MWMT	.08	2		mg/L	++	0.02	0.08			
SREV	MAGNESIUM	MG-MWMT	90.4	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1			
SREV	POTASSIUM	K-MWMT	40.8	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	54.1	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	2.85	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4			
SREV	TITANIUM	TI-MWMT	.06	2		mg/L	++	0.01	0.05		ZG	
NEED	YTTRIUM	REC	99.9	2		%	++	0.001	0.005			

L56147-08

Tag: Measured: 12/11/2019 2:32:38 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT	10.3	2		mg/L	++	0.1	0.5			
SREV	BARIUM	BA-MWMT	.04	2	B	mg/L	++	0.01	0.07			
SREV	BORON	B-MWMT	.14	2	B	mg/L	++	0.04	0.2			
SREV	CALCIUM	CA-MWMT	512	2		mg/L	++	0.2	1			
SREV	IRON	FE-MWMT	.74	2		mg/L	++	0.06	0.2			
FAIL	IRON	FE-MWMT	.73	2		mg/L	++	0.06	0.2			
SREV	LITHIUM	LI-MWMT	.03	2	B	mg/L	++	0.02	0.08			
SREV	MAGNESIUM	MG-MWMT	72.0	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1			
SREV	POTASSIUM	K-MWMT	12.3	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	19.4	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	2.23	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT	.19	2	B	mg/L	++	0.08	0.4			
SREV	TITANIUM	TI-MWMT	.07	2		mg/L	++	0.01	0.05		ZG	
NEED	YTTRIUM	REC	102	2		%	++	0.001	0.005			

L56147-09

Tag: Measured: 12/11/2019 2:36:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT	8.1	2		mg/L	++	0.1	0.5			
SREV	BARIUM	BA-MWMT	.03	2	B	mg/L	++	0.01	0.07			
SREV	BORON	B-MWMT	.17	2	B	mg/L	++	0.04	0.2			
SREV	CALCIUM	CA-MWMT	574	2		mg/L	++	0.2	1			
SREV	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2			
FAIL	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2			
SREV	LITHIUM	LI-MWMT	.15	2		mg/L	++	0.02	0.08			
SREV	MAGNESIUM	MG-MWMT	194	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1			
SREV	POTASSIUM	K-MWMT	48.2	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	80.2	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	3.98	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4			
SREV	TITANIUM	TI-MWMT	.07	2		mg/L	++	0.01	0.05		ZG	
NEED	YTTRIUM	REC	102	2		%	++	0.001	0.005			

L56147-10

Tag: Measured: 12/11/2019 2:40:02 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT	40.0	5		mg/L	++	0.3	1			
SREV	BARIUM	BA-MWMT		5	U	mg/L	++	0.04	0.2			
SREV	BORON	B-MWMT	.1	5	B	mg/L	++	0.1	0.5			
SREV	CALCIUM	CA-MWMT	505	5		mg/L	++	0.5	3			
FAIL	IRON	FE-MWMT	1.7	5		mg/L	++	0.2	0.4			
SREV	IRON	FE-MWMT	1.8	5		mg/L	++	0.2	0.4			
SREV	LITHIUM	LI-MWMT	.10	5	B	mg/L	++	0.04	0.2			
SREV	MAGNESIUM	MG-MWMT	239	5		mg/L	++	1	5			
SREV	PHOSPHORUS	P-MWMT		5	U	mg/L	++	0.5	3			
SREV	POTASSIUM	K-MWMT	17	5		mg/L	++	1	5			
SREV	SODIUM	NA-MWMT	38	5		mg/L	++	1	5			
SREV	STRONTIUM	SR-MWMT	.62	5		mg/L	++	0.05	0.2			
SREV	TIN	SN-MWMT		5	U	mg/L	++	0.2	1			
SREV	TITANIUM	TI-MWMT	.11	5		mg/L	++	0.03	0.1		ZG	
NEED	YTTRIUM	REC	104	5		%	++	0.001	0.005			

L56147-11

Tag: Measured: 12/11/2019 2:43:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	AL-MWMT	6.8	2		mg/L	++	0.1	0.5			
SREV	BARIUM	BA-MWMT	.02	2	B	mg/L	++	0.01	0.07			
SREV	BORON	B-MWMT	.22	2		mg/L	++	0.04	0.2			
SREV	CALCIUM	CA-MWMT	534	2		mg/L	++	0.2	1			
SREV	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2			
FAIL	IRON	FE-MWMT		2	U	mg/L	++	0.06	0.2			
SREV	LITHIUM	LI-MWMT	.12	2		mg/L	++	0.02	0.08			
SREV	MAGNESIUM	MG-MWMT	246	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	P-MWMT		2	U	mg/L	++	0.2	1			
SREV	POTASSIUM	K-MWMT	37.8	2		mg/L	++	0.4	2			
SREV	SODIUM	NA-MWMT	68.1	2		mg/L	++	0.4	2			
SREV	STRONTIUM	SR-MWMT	2.63	2		mg/L	++	0.02	0.09			
SREV	TIN	SN-MWMT		2	U	mg/L	++	0.08	0.4			
SREV	TITANIUM	TI-MWMT	.07	2		mg/L	++	0.01	0.05		ZG	
NEED	YTTRIUM	REC	102	2		%	++	0.001	0.005			

WG487888CCV1

Tag:

Measured: 12/11/2019 2:47:25 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.004	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	100	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.9908	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	99	1		%	++	0.007	0.04			
SREV	BORON	FOUND	1.008	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	101	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	50.62	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	101	1		%	++	0.1	0.5			
SREV	IRON	FOUND	0.981	1		mg/L	++	0.03	0.08			
FAIL	IRON	FOUND	1.006	1		mg/L	++	0.03	0.08			
FAIL	IRON	REC	101	1		%	++	0.03	0.08			
SREV	IRON	REC	98	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND	0.9974	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	100	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	49.06	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	98	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	2.57	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	103	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	10.12	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	101	1		%	++	0.2	1			
SREV	SODIUM	FOUND	50.05	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	100	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.989	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	99	1		%	++	0.009	0.05			
SREV	TIN	FOUND	1.054	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	105	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	1.012	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	101	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	101.3	1		%	++	0.001	0.005			

WG487888CCB1

Tag:

Measured: 12/11/2019 2:51:04 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND		1	U	mg/L	++	0.05	0.3			
SREV	BARIUM	FOUND		1	U	mg/L	++	0.007	0.04			
SREV	BORON	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	CALCIUM	FOUND		1	U	mg/L	++	0.1	0.5			
FAIL	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	SODIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	STRONTIUM	FOUND		1	U	mg/L	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND		1	U	mg/L	++	0.005	0.03			
SREV	YTTRIUM	REC	101.62	1		%	++	0.001	0.005			

L56147-11SDL Tag: Measured: 12/11/2019 2:54:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	D	0	2		%	++	0.1	0.5			
SREV	ALUMINUM	FOUND	1.36	2		mg/L	++	0.1	0.5			
SREV	ALUMINUM	REG	6.8	2		mg/L	++	0.1	0.5			
SREV	BARIUM	D		2	U	%	++	0.01	0.07			
SREV	BARIUM	FOUND		2	U	mg/L	++	0.01	0.07			
SREV	BARIUM	REG	0	2	U	mg/L	++	0.01	0.07			
SREV	BORON	D		2	U	%	++	0.04	0.2			
SREV	BORON	FOUND		2	U	mg/L	++	0.04	0.2			
SREV	BORON	REG	0	2	U	mg/L	++	0.04	0.2			
SREV	CALCIUM	D	1	2		%	++	0.2	1			
SREV	CALCIUM	FOUND	107.94	2		mg/L	++	0.2	1			
SREV	CALCIUM	REG	539.7	2		mg/L	++	0.2	1			
FAIL	IRON	D	0	2		%	++	0.06	0.2			
SREV	IRON	D	0	2		%	++	0.06	0.2			
SREV	IRON	FOUND		2	U	mg/L	++	0.06	0.2			
FAIL	IRON	FOUND		2	U	mg/L	++	0.06	0.2			
SREV	IRON	REG	0	2	U	mg/L	++	0.06	0.2			
FAIL	IRON	REG	0	2	U	mg/L	++	0.06	0.2			
SREV	LITHIUM	D	4	2		%	++	0.02	0.08			
SREV	LITHIUM	FOUND	0.023	2	B	mg/L	++	0.02	0.08			
SREV	LITHIUM	REG	0.115	2	B	mg/L	++	0.02	0.08			
SREV	MAGNESIUM	D	0	2		%	++	0.4	2			
SREV	MAGNESIUM	FOUND	49.02	2		mg/L	++	0.4	2			
SREV	MAGNESIUM	REG	245.1	2		mg/L	++	0.4	2			
SREV	PHOSPHORUS	D		2	U	%	++	0.2	1			
SREV	PHOSPHORUS	FOUND		2	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	REG	0	2	U	mg/L	++	0.2	1			
SREV	POTASSIUM	D	4	2		%	++	0.4	2			
SREV	POTASSIUM	FOUND	7.26	2		mg/L	++	0.4	2			
SREV	POTASSIUM	REG	36.3	2		mg/L	++	0.4	2			
SREV	SODIUM	D	2	2		%	++	0.4	2			
SREV	SODIUM	FOUND	13.38	2		mg/L	++	0.4	2			
SREV	SODIUM	REG	66.9	2		mg/L	++	0.4	2			
SREV	STRONTIUM	D	1	2		%	++	0.02	0.09			
SREV	STRONTIUM	FOUND	0.53	2		mg/L	++	0.02	0.09			
SREV	STRONTIUM	REG	2.65	2		mg/L	++	0.02	0.09			
SREV	TIN	D		2	U	%	++	0.08	0.4			
SREV	TIN	FOUND		2	U	mg/L	++	0.08	0.4			
SREV	TIN	REG	0	2	U	mg/L	++	0.08	0.4			
SREV	TITANIUM	D	71	2	B	%	ALRT	0.01	0.05		ZG	the original result is not 50x MDL; no qualification
SREV	TITANIUM	FOUND	0.024	2	B	mg/L	++	0.01	0.05			
SREV	TITANIUM	REG	0.12	2	B	mg/L	++	0.01	0.05			
SREV	YTTRIUM	REC	101.64	2		%	++	0.001	0.005			

WG487888CCV2

Tag:

Measured: 12/11/2019 2:58:35 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND	1.003	1		mg/L	++	0.05	0.3			
SREV	ALUMINUM	REC	100	1		%	++	0.05	0.3			
SREV	BARIUM	FOUND	0.9958	1		mg/L	++	0.007	0.04			
SREV	BARIUM	REC	100	1		%	++	0.007	0.04			
SREV	BORON	FOUND	0.985	1		mg/L	++	0.02	0.1			
SREV	BORON	REC	99	1		%	++	0.02	0.1			
SREV	CALCIUM	FOUND	50.14	1		mg/L	++	0.1	0.5			
SREV	CALCIUM	REC	100	1		%	++	0.1	0.5			
FAIL	IRON	FOUND	0.974	1		mg/L	++	0.03	0.08			
SREV	IRON	FOUND	0.972	1		mg/L	++	0.03	0.08			
SREV	IRON	REC	97	1		%	++	0.03	0.08			
FAIL	IRON	REC	97	1		%	++	0.03	0.08			
SREV	LITHIUM	FOUND	0.9878	1		mg/L	++	0.008	0.04			
SREV	LITHIUM	REC	99	1		%	++	0.008	0.04			
SREV	MAGNESIUM	FOUND	48.83	1		mg/L	++	0.2	1			
SREV	MAGNESIUM	REC	98	1		%	++	0.2	1			
SREV	PHOSPHORUS	FOUND	2.54	1		mg/L	++	0.1	0.5			
SREV	PHOSPHORUS	REC	101	1		%	++	0.1	0.5			
SREV	POTASSIUM	FOUND	9.99	1		mg/L	++	0.2	1			
SREV	POTASSIUM	REC	100	1		%	++	0.2	1			
SREV	SODIUM	FOUND	49.67	1		mg/L	++	0.2	1			
SREV	SODIUM	REC	99	1		%	++	0.2	1			
SREV	STRONTIUM	FOUND	0.9779	1		mg/L	++	0.009	0.05			
SREV	STRONTIUM	REC	98	1		%	++	0.009	0.05			
SREV	TIN	FOUND	1.012	1		mg/L	++	0.04	0.2			
SREV	TIN	REC	101	1		%	++	0.04	0.2			
SREV	TITANIUM	FOUND	1.015	1		mg/L	++	0.005	0.03			
SREV	TITANIUM	REC	102	1		%	++	0.005	0.03			
SREV	YTTRIUM	REC	101.02	1		%	++	0.001	0.005			

WG487888CCB2

Tag:

Measured: 12/11/2019 3:02:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALUMINUM	FOUND		1	U	mg/L	++	0.05	0.3			
SREV	BARIUM	FOUND		1	U	mg/L	++	0.007	0.04			
SREV	BORON	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	CALCIUM	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
FAIL	IRON	FOUND		1	U	mg/L	++	0.03	0.08			
SREV	LITHIUM	FOUND		1	U	mg/L	++	0.008	0.04			
SREV	MAGNESIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	PHOSPHORUS	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	POTASSIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	SODIUM	FOUND		1	U	mg/L	++	0.2	1			
SREV	STRONTIUM	FOUND		1	U	mg/L	++	0.009	0.05			
SREV	TIN	FOUND		1	U	mg/L	++	0.04	0.2			
SREV	TITANIUM	FOUND		1	U	mg/L	++	0.005	0.03			
SREV	YTTRIUM	REC	101.29	1		%	++	0.001	0.005			

Element, Wavelength and Order	Date of Fit	Date of Cal.	Type of Fit	Weighting	A0	A1	A2	n (Exponent)
Ag 328.068 {103}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000275	0.067535	0.000000	1.000000
Al 396.152 { 85}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000421	0.027762	0.000000	1.000000
As 189.042 {478}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000074	0.001111	0.000000	1.000000
B 208.959 {461}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000123	0.005137	0.000000	1.000000
Ba 455.403 { 74}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.001896	2.951252	0.000000	1.000000
Be 313.042 {108}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.014234	1.026516	0.000000	1.000000
Bi 223.061 {451}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000266	0.003108	0.000000	1.000000
Ca 315.887 {107}	12/11/2019 13:43:44	12/11/2019 13:43:44	Linear	None	-0.008583	0.015702	0.000000	1.000000
Cd 214.438 {457}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000189	0.024252	0.000000	1.000000
Cd 226.502 {449}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000187	0.055007	0.000000	1.000000
Co 228.616 {447}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000522	0.012858	0.000000	1.000000
Cr 205.560 {464}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000264	0.006030	0.000000	1.000000
Cr 267.716 {126}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000129	0.032310	0.000000	1.000000
Cu 324.754 {104}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000341	0.054062	0.000000	1.000000
Fe 240.488 {140}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000155	0.007980	0.000000	1.000000
Fe 259.940 {130}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000267	0.030744	0.000000	1.000000
Ga 294.364 {114}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000018	0.003318	0.000000	1.000000
K 766.490 { 44}	12/11/2019 13:43:44	12/11/2019 13:43:44	Linear	None	0.004949	0.021423	0.000000	1.000000
Li 670.784 { 50}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.001216	0.595321	0.000000	1.000000
Mg 279.079 {121}	12/11/2019 13:43:44	12/11/2019 13:43:44	Linear	None	0.001057	0.003644	0.000000	1.000000
Mn 257.610 {131}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000895	0.217980	0.000000	1.000000
Mo 202.030 {467}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000129	0.011081	0.000000	1.000000
Na 589.592 { 57}	12/11/2019 13:43:44	12/11/2019 13:43:44	Linear	None	0.012304	0.104675	0.000000	1.000000
Ni 231.604 {446}	12/11/2019 13:43:44	12/11/2019 13:43:44	Linear	None	0.000478	0.006860	0.000000	1.000000
P 214.914 {457}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.001036	0.001416	0.000000	1.000000
Pb 220.353 {453}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000386	0.004795	0.000000	1.000000
S 182.034 {485}	12/11/2019 13:43:44	12/11/2019 13:43:44	Linear	None	0.000511	0.000342	0.000000	1.000000
Sb 206.833 {463}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000264	0.002737	0.000000	1.000000
Sc 361.384 { 93}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000524	0.299645	0.000000	1.000000
Se 196.090 {472}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000040	0.000550	0.000000	1.000000
Si 251.611 {134}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000077	0.007702	0.000000	1.000000
Si 251.611 {134}2	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000077	0.007702	0.000000	1.000000
Sn 189.989 {477}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000042	0.001383	0.000000	1.000000
Sr 421.552 { 80}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.007372	2.604103	0.000000	1.000000
Ti 334.941 {101}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.000357	0.119715	0.000000	1.000000
Tl 190.856 {477}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000234	0.001396	0.000000	1.000000
V 292.402 {115}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000205	0.031525	0.000000	1.000000
Y 371.030 { 91}*	12/11/2019 13:43:44	12/11/2019 13:43:44	Linear	None	12739.183	-59.561096	0.000000	1.000000
Zn 206.200 {463}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	-0.000032	0.008042	0.000000	1.000000
Zn 213.856 {457}	12/11/2019 13:39:58	12/11/2019 13:39:58	Linear	None	0.001025	0.003578	0.000000	1.000000

Element, Wavelength and Order	Correlation	Std Error of Est	Predicted MDL	Predicted MQL	Status	Reslope		QC Norm	
						Slope	Y-int	Slope factor	Offset
Ag 328.068 {103}	0.999997	0.000116	0.003987	0.013290	OK.	1.000000	0.000000	1	0
Al 396.152 { 85}	0.999997	0.000458	0.012993	0.043309	OK.	1.000000	0.000000	1	0
As 189.042 {478}	0.999994	0.000014	0.020678	0.068927	OK.	1.000000	0.000000	1	0
B 208.959 {461}	0.999997	0.000049	0.006080	0.020266	OK.	1.000000	0.000000	1	0
Ba 455.403 { 74}	0.999972	0.031207	0.000202	0.000675	OK.	1.000000	0.000000	1	0
Be 313.042 {108}	0.999965	0.012157	0.000382	0.001274	OK.	1.000000	0.000000	1	0
Bi 223.061 {451}	1.000000	0.000001	0.014241	0.047469	OK.	1.000000	0.000000	1	0
Ca 315.887 {107}	0.999999	0.001486	0.019408	0.064694	OK.	1.000000	0.000000	1	0
Cd 214.438 {457}	0.999998	0.000069	0.001790	0.005967	OK.	1.000000	0.000000	1	0
Cd 226.502 {449}	1.000000	0.000022	0.000926	0.003086	OK.	1.000000	0.000000	1	0
Co 228.616 {447}	1.000000	0.000016	0.004035	0.013452	OK.	1.000000	0.000000	1	0
Cr 205.560 {464}	0.999990	0.000097	0.006970	0.023235	OK.	1.000000	0.000000	1	0
Cr 267.716 {126}	1.000000	0.000003	0.005107	0.017023	OK.	1.000000	0.000000	1	0
Cu 324.754 {104}	0.999992	0.000300	0.003919	0.013063	OK.	1.000000	0.000000	1	0
Fe 240.488 {140}	1.000000	0.000017	0.019671	0.065569	OK.	1.000000	0.000000	1	0
Fe 259.940 {130}	1.000000	0.000031	0.004548	0.015159	OK.	1.000000	0.000000	1	0
Ga 294.364 {114}	1.000000	0.000004	0.057320	0.191068	OK.	1.000000	0.000000	1	0
K 766.490 { 44}	0.999996	0.003319	0.038728	0.129093	OK.	1.000000	0.000000	1	0
Li 670.784 { 50}	0.999999	0.000960	0.001456	0.004853	OK.	1.000000	0.000000	1	0
Mg 279.079 {121}	0.999991	0.000886	0.046091	0.153636	OK.	1.000000	0.000000	1	0
Mn 257.610 {131}	1.000000	0.000100	0.000720	0.002401	OK.	1.000000	0.000000	1	0
Mo 202.030 {467}	1.000000	0.000013	0.002993	0.009978	OK.	1.000000	0.000000	1	0
Na 589.592 { 57}	1.000000	0.002307	0.008020	0.026734	OK.	1.000000	0.000000	1	0
Ni 231.604 {446}	1.000000	0.000000	0.006401	0.021338	OK.	1.000000	0.000000	1	0
P 214.914 {457}	1.000000	0.000002	0.033624	0.112080	OK.	1.000000	0.000000	1	0
Pb 220.353 {453}	0.999998	0.000030	0.010173	0.033910	OK.	1.000000	0.000000	1	0
S 182.034 {485}	0.998936	0.000461	0.100397	0.334655	OK.	1.000000	0.000000	1	0
Sb 206.833 {463}	1.000000	0.000003	0.013018	0.043395	OK.	1.000000	0.000000	1	0
Sc 361.384 { 93}	0.999998	0.000794	0.001003	0.003345	OK.	1.000000	0.000000	1	0
Se 196.090 {472}	0.999854	0.000033	0.060990	0.203299	OK.	1.000000	0.000000	1	0
Si 251.611 {134}	0.999988	0.000133	0.019586	0.065287	OK.	1.000000	0.000000	1	0
Si 251.611 {134}2	0.999988	0.000133	0.019586	0.065287	OK.	1.000000	0.000000	1	0
Sn 189.989 {477}	0.999999	0.000005	0.019162	0.063873	OK.	1.000000	0.000000	1	0
Sr 421.552 { 80}	0.999991	0.015795	0.000166	0.000553	OK.	1.000000	0.000000	1	0
Ti 334.941 {101}	0.999988	0.000424	0.001857	0.006190	OK.	1.000000	0.000000	1	0
Tl 190.856 {477}	0.999999	0.000012	0.021696	0.072320	OK.	1.000000	0.000000	1	0
V 292.402 {115}	0.999987	0.000106	0.006039	0.020129	OK.	1.000000	0.000000	1	0
Y 371.030 { 91}*	0.323334	106.74528	-1.000000	-1.000000	Warnin	1.000000	0.000000	1	0
Zn 206.200 {463}	0.999908	0.000154	0.004452	0.014839	OK.	1.000000	0.000000	1	0
Zn 213.856 {457}	0.999991	0.000022	0.009678	0.032260	OK.	1.000000	0.000000	1	0

CALIBRATION REAGENTS

6010/200.7 Reagent Sheet

1% Calibration Standards			10% Calibration Standards		
CLPSTD1:	**	SCN	CLPTSTD1:	**	SCN
CLPSTD2:	II191120-2	SCN	CLPTSTD2:	II191209-3	SCN
CLPSTD3:	II191209-1	SCN	CLPTSTD3:	II191127-3	SCN

Yttrium (Internal Standard) = PCN59951 EXP: 12/30/20

**=CALSTD1 is a 2X dilution on CALSTD2 using either 1% or 10% Blank as the dilutent.

Blank Solutions:

Nitric acid:	60299	PCN	Nitric acid:	60422	PCN
Hydrochloric acid:	60374	PCN	Hydrochloric acid:	60374	PCN

VERIFIED BY: KJA 12/11/19

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG487888 **ICP MWMT**

Sample	Date	SCN	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Cd	Co	Cr	Cr	Cu	Fe	Fe	Ga	K	Li	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Se	Si	SiO2	Sn	Sr	Ti	Tl	V
WG487888ICV	12/11/19 13:43	II191209-2		X		X	X			X							X	X		X	X	X			X		X			X					X	X	X		
WG487888ICB	12/11/19 13:47			X		X	X			X							X	X		X	X	X			X		X			X					X	X	X		
WG487888PQV	12/11/19 13:51	II191202-2		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487888ICSAB	12/11/19 13:55	II191127-4		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487888ULRV	12/11/19 14:02	II191113-1		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487250PBS	12/11/19 14:10		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG487250LFB1	12/11/19 14:14	II191127-2		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-06	12/11/19 14:17			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-06MS	12/11/19 14:21	II191127-2		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-06MSD	12/11/19 14:25	II191127-2		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-07	12/11/19 14:28			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-08	12/11/19 14:32			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-09	12/11/19 14:36			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-10	12/11/19 14:40			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
L56147-11	12/11/19 14:43			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487888CCV1	12/11/19 14:47	II191204-1		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487888CCB1	12/11/19 14:51		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L56147-11SDL	12/11/19 14:54			X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487888CCV2	12/11/19 14:58	II191204-1		X		X	X			X							X	X		X	X	X			X		X								X	X	X		
WG487888CCB2	12/11/19 15:02		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

L56147-2001131042

ICP Total Hot Plate

QC List Type: I-X-THP
QCListMatClass: LIQUID
Bench Sheet List: I-X-THP
QC Ref: NOQC
Group ID: IP-G-DIG-THP-MWMT
Method Ref: M6010B ICP
SOP Ref: SOPII018

WG487538

ACZ Laboratories, Inc

Instrument ID: METALSDIG
Analyst: kja
ACZ Dept: 30
Create Date: 12/06/2019 8:51
Start Date/Time: 12/06/2019 10:20
End Date/Time: 12/06/2019 15:20

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	SCN Volume (mL)	Sample Volume (mL)	Final Volume (mL)	Comments
1	WG487361PBS	NONE	mwmt		12/06/19 10:20		50	50	
2	L56147-01	STSB27_0.5-3	mwmt		12/06/19 10:53		50	50	
3	L56147-02	STSB27_6-15	mwmt		12/06/19 11:26		50	50	
4	L56147-03	STSB28_0.5-3	mwmt		12/06/19 12:00		50	50	
5	L56147-04	STSB28_6-15	mwmt		12/06/19 12:33		50	50	
6	L56147-05	STSB29_0.5-3	mwmt		12/06/19 13:06		50	50	
7	L56147-05MS2	II191127-2	mwmt		12/06/19 13:40	0.5	50	50	
8	L56147-05MSD2	II191127-2	mwmt		12/06/19 14:13	0.5	50	50	
9	L56147-05DUP	NONE	mwmt		12/06/19 14:46		50	50	
10	WG487361LFB1	II191127-2	mwmt		12/06/19 15:20	0.5	50	50	

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS2	ICP Spike
L56147-05MSD2	ICP Spike
WG487361LFB1	ICP LFB

Report Comments: _____

Internal Comments _____

AREV: KJA 12/6/19
Initials, Date

SREV: KEH 12/9/19
Initials, Date

12/6/2019 4:19:08 PM 121719

ACZ Laboratories, Inc.
METALS PREP REVIEW CHECKLIST

AREV: KJA
Date: 12/6/19

SREV: [illegible]
Date: 12/9/19

Work Group: 487538
Sample Type: THP MWMT
Prep Date: 12/6/19
Analyst: KJA

	N/A	Yes	No
1.) Are all dilutions correct in LIMS and documented on the bench sheet ?	✓	✓	
2.) Is any sample prepared on dilution appropriately "D" qualified?	✓		
3.) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?	✓	✓	
4.) Are all initial and final sample volumes correct in LIMS ?	✓	✓	
5.) Is the correct SCN entered for each spike and control standard (LFB or LCSW) ?	✓	✓	
6.) Are all SCN volumes correct in LIMS ?	✓	✓	
7.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed) ?	✓	✓	
8.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS ?		✓	

For any item listed above that is checked "No" state the problem and corrective action / resolution in the sections below.

QC/Sample ID	Problem	Corrective action

Disposable Vessel Lot #*: 19D6257

Nitric acid PCN: 60321

Hydrochloric acid PCN: 60372

Digest Temp: 94 °C

Hot Block ID: DEENA 1

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMII014.05.18.11

L56147-2001131042

ICP Total Hot Plate

QC List Type: I-X-THP
QCListMatClass: LIQUID
Bench Sheet List: I-X-THP
QC Ref: NOQC
Group ID: IP-G-DIG-THP-MWMT
Method Ref: M6010B ICP
SOP Ref: SOPII018

WG487538

ACZ Laboratories, Inc

Instrument ID: METALSDIG
Analyst: VJA
ACZ Dept: 30
Create Date: 12/06/2019 8:51
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	SCN Volume (mL)	Sample Volume (mL)	Final Volume (mL)	Comments
1	WG487361PBS	NONE							
2	L56147-01	STSB27_0.5-3							
3	L56147-02	STSB27_6-15							
4	L56147-03	STSB28_0.5-3							
5	L56147-04	STSB28_6-15							
6	L56147-05	STSB29_0.5-3							
7	L56147-05MS2	II191127-2							
8	L56147-05MSD2	II191127-2							
9	L56147-05DUP	NONE							
10	WG487361LFB1	II191127-2							

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS2	ICP Spike
L56147-05MSD2	ICP Spike
WG487361LFB1	ICP LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 8:51:54 AM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487538

Date Reported: 09-Dec-19
Run ID: R1763260
Date Analyzed: 06-Dec-19
ICAL Workgroup:
Instrument ID: METALSDIG

WG487361PBS

Tag: Measured: 12/6/2019 10:20:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-01

Tag: Measured: 12/6/2019 10:53:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-02

Tag: Measured: 12/6/2019 11:26:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-03

Tag: Measured: 12/6/2019 12:00:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-04

Tag: Measured: 12/6/2019 12:33:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-05

Tag: Measured: 12/6/2019 1:06:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-05MS2

Tag: Measured: 12/6/2019 1:40:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-05MSD2

Tag: Measured: 12/6/2019 2:13:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-05DUP

Tag:

Measured: 12/6/2019 2:46:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

WG487361LFB1

Tag:

Measured: 12/6/2019 3:20:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487751

Date Reported: 12-Dec-19
Run ID: R1763820
Date Analyzed: 10-Dec-19
ICAL Workgroup:
Instrument ID: METALSDIG

WG487250PBS

Tag: Measured: 12/10/2019 9:37:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-06

Tag: Measured: 12/10/2019 10:10:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-06MS

Tag: Measured: 12/10/2019 10:43:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-06MSD

Tag: Measured: 12/10/2019 11:17:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-07

Tag: Measured: 12/10/2019 11:50:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-08

Tag: Measured: 12/10/2019 12:23:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-09

Tag: Measured: 12/10/2019 12:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-10

Tag: Measured: 12/10/2019 1:30:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-11

Tag:

Measured: 12/10/2019 2:03:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

WG487250LFB1

Tag:

Measured: 12/10/2019 2:37:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487751

Date Reported: 11-Dec-19
Run ID: R1763820
Date Analyzed: 10-Dec-19
ICAL Workgroup:
Instrument ID: METALSDIG

WG487250PBS

Tag:

Measured: 12/10/2019 9:37:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-06

Tag:

Measured: 12/10/2019 10:10:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-06MS

Tag:

Measured: 12/10/2019 10:43:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-06MSD

Tag:

Measured: 12/10/2019 11:17:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-07

Tag:

Measured: 12/10/2019 11:50:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-08

Tag:

Measured: 12/10/2019 12:23:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-09

Tag:

Measured: 12/10/2019 12:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-10

Tag:

Measured: 12/10/2019 1:30:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

L56147-11

Tag:

Measured: 12/10/2019 2:03:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	IP-MWMT	50	1		mL	++					
SREV	VOLUME, SAMPLE	IP-MWMT	50	1		mL	++					

WG487250LFB1

Tag:

Measured: 12/10/2019 2:37:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FINAL VOLUME	PREP	50	1		mL	++					
SREV	SCN VOLUME	PREP	0.5	1		mL	++					
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-2001131042

HG-T-200

QC List Type: QC-CV-200
QCListMatClass: LIQUID
Bench Sheet List: I-CV-T
QC Ref: MA-HG-DW
Group ID: MA-G-HG-T-200
Method Ref: M245.1 CVAA
SOP Ref: SOPII005

WG487523

ACZ Laboratories, Inc

Instrument ID: M7600
Analyst: SLM
ACZ Dept: 33
Create Date: 12/05/2019 19:03
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Mercury (mg/L)	Dilution	Comments
1	WG487523ICV	HG190911-3					1	
2	WG487523ICB	NONE					1	
3	WG487523PQV	~~HG191125-2~~					1	HG191206-2
4	WG487523LRB	NONE					1	
5	WG487523LFB	~~HG191125~~-3					1	HG191206-3
6	L56194-21	AKC19094	SLM 12/6/19				1	
7	L56194-21LFM	~~HG191125-3~~					1	HG191206-3
8	L56194-21LFMD	~~HG191125~~-3					1	L
9	L56194-22	AKC19095					1	
10	L56194-23	AKC19096					1	
11	L56194-24	AKC19097					1	
12	L56194-25	AKC19098					1	
13	L56196-04	NPDES 020					1	
14	WG487523CCV1	HG190911-3					1	
15	WG487523CCB1	NONE					1	
16	L56210-01	AS-F-CDNOV002					1	
17	L56211-01	AS-TSFNOV008					1	
18	L56211-02	AS-TSFNOV009					1	
19	L56211-03	AS-TSFNOV010					1	
20	L56213-01	AS-PDNOV19					1	
21	L56213-01LFM	~~HG191125-3~~					1	HG191206-3
22	L56213-01LFMD	~~HG191125-3~~					1	L
23	L56213-02	AS-PDNOV20					1	
24	L56213-03	AS-PDNOV21					1	

Report Comments:

Internal Comments

AREV: SLM 12/6/19
Initials, Date

SREV: LEH 12/9/19
Initials, Date

12/5/2019 7:04:22 PM 121219

HG-T-200

WG487523

ACZ Laboratories, Inc

QC List Type: QC-CV-200
QCListMatClass: LIQUID
Bench Sheet List: I-CV-T
QC Ref: MA-HG-DW
Group ID: MA-G-HG-T-200
Method Ref: M245.1 CVAA
SOP Ref: SOPII005

Instrument ID: M7600
Analyst:
ACZ Dept: 33
Create Date: 12/05/2019 19:03
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Mercury (mg/L)	Dilution	Comments
25	L56213-04	AS-PDNOV22					1	
26	WG487523CCV2	HG190911-3					1	
27	WG487523CCB2	NONE					1	
28	L56214-01	AS-SWNOV014					1	
29	L56214-02	AS-SWNOV015					1	
30	L56214-03	AS-SWNOV018					1	
31	L56214-04	AS-SWNOV019					1	
32	WG487523CCV3	HG190911-3					1	
33	WG487523CCB3	NONE					1	

Sample	Login Comments
L56194-21	P,U,W,RPC,GPC,Y,T ||
L56194-22	P,U,W,RPC,GPC,Y,T ||
L56194-23	P,U,W,RPC,GPC,Y,T ||
L56194-24	P,U,W,RPC,GPC,Y,T ||
L56194-25	P,U,W,RPC,GPC,Y,T ||
L56196-04	LU,U,WF,RPC(2),GFA ||
L56210-01	P,W,RPC,GPC,VLUP(3) || O,P,W,RPC,GPC,VLUP(3) ||
L56211-01	P,U,W,RPC,GPC ||
L56211-02	P,U,W,RPC,GPC ||
L56211-03	P,U,W,RPC,GPC ||
L56213-01	P,W,RPC,GPC,Y ||
L56213-02	P,W,RPC,GPC,Y ||
L56213-03	P,W,RPC,GPC,Y ||
L56213-04	P,W,RPC,GPC,Y ||
L56214-01	P,W,RPC,GPC ||
L56214-02	P,W,RPC,GPC ||
L56214-03	P,W,RPC,GPC ||
L56214-04	P,W,RPC,GPC ||

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/5/2019 7:04:23 PM 121219

ACZ Laboratories, Inc.

HG-CVAA/SE-HY DATA REVIEW CHECKLIST

Data Reviewer: SLM
Date: 12/6/19

Approved: MEH
Date: 12/9/19

Work Group: 487523
Sample Type: Hg-T-200
Analysis Date: 12/6/19
Analyst: SLM

	Yes	No	N/A
1.) Does the instrument calibration meet the specified method criteria? ($r \geq 0.995$)	✓		
2.) Was the low calibration standard dropped? If Yes, notify PM of change to PQL.	✓		
3.) Are all of the QC critera listed in LIMS within the acceptance limits?	✓		
4.) Are "H" flags for missed hold time appropriate?	✓		
5.) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?	✓		
6.) Are all dilution factors correctly calculated and uploaded? (Soil, Sludge, Water)	✓		
7.) Is any sample prepped / analyzed on dilution appropriately "D" qualified (except o-cal)?	✓		
8.) Are dilutions for o-cals in the appropriate range? (explain if "B" or "U" is reported)	✓		
9.) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?	✓		
10.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
11.) Is a current standard/reagent sheet attached to the workgroup?	✓		
12.) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? no Cal WG#: — Digest Time In: 1044

Digest Date: 12/6/19 Digest Temp: 88°C Digest Time Out: 1244

Disposable Vessel Lot #*: —

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
L56213-1 LFMD	rec ↓ = 84%	MA

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMII011.10.16.12

ACZ Laboratories, Inc.

Report Generated By Teledyne Leeman QuickTrace

Analyst: ilab

Worksheet file: C:\Users\Public\Documents\Teledyne CETAC\QuickTrace\Worksheets\WG487527.wszf

Creation Date: 12/6/2019 2:41:31 PM

Comment:

Results

Sample Name	Type	Date/Time	Conc (ppb)	µAbs	%RSD	Residual	Flags	DF	% Recovery
Calibration Blank	STD	12/06/19 01:13:09 pm	0.000	2133	0.00	25.48		1.00	N/A
Replicates 2133.2									
Standard #1 (0.5 ppb)	STD	12/06/19 01:14:06 pm	0.500	75567	0.00	25.35		1.00	N/A
Replicates 75566.7									
Standard #2 (1.0 ppb)	STD	12/06/19 01:15:04 pm	1.000	147659	0.00	16.08		1.00	N/A
Replicates 147658.6									
Standard #3 (2.0 ppb)	STD	12/06/19 01:16:02 pm	2.000	287417	0.00	-32.57		1.00	N/A
Replicates 287417.1									
Standard #4 (5.0 ppb)	STD	12/06/19 01:17:00 pm	5.000	721760	0.00	-75.96		1.00	N/A
Replicates 721760.0									
Standard #5 (10.0ppb)	STD	12/06/19 01:17:59 pm	10.000	1473563	0.00	41.62		1.00	N/A
Replicates 1473562.6									

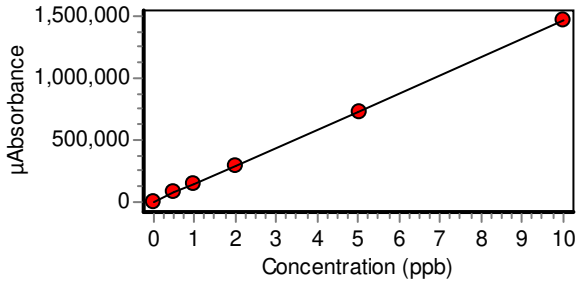
Calibration

Equation: Abs = 146905.846x + -1610.002

R2: 0.99986

SEE: 7386.8820

Flags:



CCV	CCV	12/06/19 02:58:55 pm	4.950	726032	0.00			1.00	99.06
Replicates 726031.5									
CCB	CCB	12/06/19 02:59:51 pm	0.014	454	0.00			1.00	N/A
Replicates 454.5									
WG487527PQV	UNK	12/06/19 03:00:47 pm	1.060	154108	0.00			1.00	N/A
Replicates 154108.1									
WG487361PBS	UNK	12/06/19 03:01:43 pm	0.041	4419	0.00			1.00	N/A
Replicates 4419.0									
L56147-01	UNK	12/06/19 03:02:40 pm	2.050	300026	0.00			1.00	N/A
Replicates 300026.2									
L56147-02	UNK	12/06/19 03:03:36 pm	0.050	5677	0.00			1.00	N/A
Replicates 5676.6									

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487523

Date Reported: 09-Dec-19
Run ID: R1763209
Date Analyzed: 06-Dec-19
ICAL Workgroup:
Instrument ID: M7600

WG487523ICV

Tag: **Measured:** 12/6/2019 1:23:50 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00503	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	101	1		%	++	0.0002	0.001			

WG487523ICB

Tag: **Measured:** 12/6/2019 1:24:46 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

WG487523PQV

Tag: **Measured:** 12/6/2019 1:25:42 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00102	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	102	1		%	++	0.0002	0.001			

WG487523LRB

Tag: **Measured:** 12/6/2019 1:26:39 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

WG487523LFB

Tag: **Measured:** 12/6/2019 1:27:35 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00199	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	99	1		%	++	0.0002	0.001			

L56194-21

Tag: **Measured:** 12/6/2019 1:28:31 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-T-200		1	U	mg/L	++	0.0002	0.001			

L56194-21LFM

Tag: **Measured:** 12/6/2019 1:29:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00201	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	100	1		%	++	0.0002	0.001			

L56194-21LFMD

Tag: **Measured:** 12/6/2019 1:30:25 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00198	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	99	1		%	++	0.0002	0.001			
SREV	MERCURY	RPD	2	1		%	++	0.0002	0.001			

[redacted]

QC List Type: QC-CV-SM
QCListMatClass: SOLID
Bench Sheet List: I-CV-MWMT
QC Ref: MA-HG-D-846
Group ID: MA-G-HG-MWMT
Method Ref: M7470A
SOP Ref: SOPII005

WG487527

ACZ Laboratories, Inc

Instrument ID: M7600
Analyst: SLM
ACZ Dept: 33
Create Date: 12/05/2019 19:09
Start Date/Time:
End Date/Time:

L56147-2001131042

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	HGMWMT	Dilution	Comments
1	WG487527ICV	HG190911-3			1	✔	1	
2	WG487527ICB	NONE			1	✔	1	
3	WG487527PQV	HG191125-2			1	✔	1	
4	WG487361PBS	NONE			1	✔	1	
5	L56147-01	STSB27_0.5-3			1	✔	1	
6	L56147-02	STSB27_6-15			1	✔	1	
7	L56147-03	STSB28_0.5-3			1	✔	1	
8	L56147-04	STSB28_6-15			1	✔	1	
9	L56147-05	STSB29_0.5-3			1	✔	1	
10	L56147-05MS2	HG191125-3			1	✔	1	
11	L56147-05MSD2	HG191125-3			1	✔	1	
12	L56147-05DUP	NONE			1	✔	1	
13	WG487361LFB1	HG191125-3			1	✔	1	
14	WG487527CCV	HG190911-3			1	✔	1	
15	WG487527CCB	NONE			1	✔	1	

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS2	ICP Spike
L56147-05MSD2	ICP Spike
WG487361LFB1	ICP LFB

Report Comments:

Internal Comments

AREV: SLM 12/6/19
Initials, Date

SREV: USH 12/9/19
Initials, Date

12/5/2019 7:09:40 PM 121719

ACZ Laboratories, Inc.
HG-CVAA/SE-HY DATA REVIEW CHECKLIST

Data Reviewer: SLM
Date: 12/6/19

Work Group: 487527
Sample Type: HG-MWMT
Analysis Date: 12/6/19
Analyst: SLM

Approved: JEH
Date: 12/9/19

	Yes	No	N/A
1.) Does the instrument calibration meet the specified method criteria? ($r \geq 0.995$)	✓	✓	
2.) Was the low calibration standard dropped? If Yes, notify PM of change to PQL.	✓	✓	
3.) Are all of the QC critera listed in LIMS within the acceptance limits?	✓	✓	
4.) Are "H" flags for missed hold time appropriate?	✓		✓
5.) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?	✓		✓
6.) Are all dilution factors correctly calculated and uploaded? (Soil, Sludge, Water)	✓		✓
7.) Is any sample prepped / analyzed on dilution appropriately "D" qualified (except o-cal)?	✓		✓
8.) Are dilutions for o-cals in the appropriate range? (explain if "B" or "U" is reported)	✓		✓
9.) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?	✓		✓
10.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓	✓	
11.) Is a current standard/reagent sheet attached to the workgroup?	✓	✓	
12.) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? yes Cal WG#: 487523 Digest Time In: 1044

Digest Date: 12/6/19 Digest Temp: 88°C Digest Time Out: 1244

Disposable Vessel Lot #*: —

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
DUP	out of range	RA

Comments:
raw data changed to reflect SX order actually run

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMII011.10.16.12

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487527

Date Reported:	09-Dec-19
Run ID:	R1763234
Date Analyzed:	06-Dec-19
ICAL Workgroup:	WG487523
Instrument ID:	M7600

WG487527CCV

Tag: Measured: 12/6/2019 2:58:55 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00495	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	99	1		%	++	0.0002	0.001			

WG487527CCB

Tag: Measured: 12/6/2019 2:59:51 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

WG487527PQV

Tag: Measured: 12/6/2019 3:00:47 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00106	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	106	1		%	++	0.0002	0.001			

WG487361PBS

Tag: Measured: 12/6/2019 3:01:43 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

WG487361LFB1

Tag: Measured: 12/6/2019 3:02:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00205	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	102	1		%	++	0.0002	0.001			

L56147-01

Tag: Measured: 12/6/2019 3:03:36 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6 RA	

L56147-02

Tag: Measured: 12/6/2019 3:04:32 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6 RA	

L56147-03

Tag: Measured: 12/6/2019 3:05:29 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6 RA	

L56147-04

Tag: Measured: 12/6/2019 3:06:26 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6 RA	

L56147-05

Tag: Measured: 12/6/2019 3:07:23 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT	.0002	1	B	mg/L	++	0.0002	0.001		Q6 RA	

L56147-05MS2

Tag: Measured: 12/6/2019 3:08:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00219	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	99	1		%	++	0.0002	0.001			

L56147-05MSD2

Tag: Measured: 12/6/2019 3:09:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00222	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	101	1		%	++	0.0002	0.001			
SREV	MERCURY	RPD	1	1		%	++	0.0002	0.001			

WG487527CCV1

Tag: Measured: 12/6/2019 3:10:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.0049	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	98	1		%	++	0.0002	0.001			

WG487527CCB1

Tag: Measured: 12/6/2019 3:11:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

L56147-05DUP

Tag: Measured: 12/6/2019 3:12:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00038	1	B	mg/L	++	0.0002	0.001	Diff = 0.00018 < 0.1 (QL); no qual.		
SREV	MERCURY	RPD	62	1	B	%	ALRT	0.0002	0.001		RA	

WG487527CCV2

Tag: Measured: 12/6/2019 3:13:03 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00496	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	99	1		%	++	0.0002	0.001			

WG487527CCB2

Tag: Measured: 12/6/2019 3:13:59 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

ACZ Laboratories, Inc.
Standards/Reagents Information
Mercury (waters) by CVAA
SOP#: II027.09.17.03
EPA methods: M245.1 & M7470A

Reagents	PCN	Expiration
HNO_3 (digestion)	59364	1/9/2021
$K_2S_2O_8$	59049	12/31/2020
H_2SO_4	58969	9/4/2021
$KMnO_4$	59255	9/14/2021
$SnCl_2$	60115	10/21/2024
HCl (for $SnCl_2$)	60374	5/17/2022
Hydroxylamine SO_4	58521	3/19/2024
NaCl	58452	9/30/2023

Standards	SCN	Expiration
Calibration Intermediate (1 mg/L):	HG191112-1	2/10/2020

VERIFIED BY: SLM 12/6/19

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG487527 **HG-MWMT**

Sample	Date	SCN	Hg
WG487527CCV	12/06/19 14:58	HG190911-3	X
WG487527CCB	12/06/19 14:59		X
WG487527PQV	12/06/19 15:00	HG191125-2	X
WG487361PBS	12/06/19 15:01		X
WG487361LFB1	12/06/19 15:02	HG191125-3	X
L56147-01	12/06/19 15:03		X
L56147-02	12/06/19 15:04		X
L56147-03	12/06/19 15:05		X
L56147-04	12/06/19 15:06		X
L56147-05	12/06/19 15:07		X
L56147-05MS2	12/06/19 15:08	HG191125-3	X
L56147-05MSD2	12/06/19 15:09	HG191125-3	X
WG487527CCV1	12/06/19 15:10	HG190911-3	X
WG487527CCB1	12/06/19 15:11		X
L56147-05DUP	12/06/19 15:12		X
WG487527CCB2	12/06/19 15:13		X
WG487527CCV2	12/06/19 15:13	HG190911-3	X

HG-T-200

QC List Type: QC-CV-200
QCListMatClass: LIQUID
Bench Sheet List: I-CV-T
QC Ref: MA-HG-DW
Group ID: MA-G-HG-T-200
Method Ref: M245.1 CVAA
SOP Ref: SOPII005

WG487682

ACZ Laboratories, Inc

Instrument ID: M7600
Analyst: SLM
ACZ Dept: 33
Create Date: 12/09/2019 9:59
Start Date/Time:
End Date/Time:

L56147-2001131042

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Mercury (mg/L)	Dilution	Comments
1	WG487682ICV	HG190911-3					1	
2	WG487682ICB	NONE					1	
3	WG487682PQV	HG191206-2					1	
4	WG487682LRB	NONE					1	
5	WG487682LFB	HG191206-3					1	
6	L56222-01	R-GIL-01-191203		50			1	
7	L56222-01LFM	HG191206-3					1	
8	L56222-01LFMD	HG191206-3					1	
9	L56222-02	R-BIL-01-1912103		50			1	
10	L56222-03	R-WPE-01-191203		50			1	
11	L56222-04	R-TOEDRAIN-01-191203		50			1	
12	L56222-05	R-SPIL-01-191203		50			1	
13	L56238-01	SON HI BATHROOM					1	
14	WG487682CCV1	HG190911-3					1	
15	WG487682CCB1	NONE					1	
16	**L56239-01**	FK191202411					1	
17	**L56248-02**	R2FD191204402					1	
18	**L56248-03**	R2DS191204403					1	
19	**L56249-01**	FK191204401					1	
20	**L56249-02**	FK191204402					1	
21	L56249-02LFM	HG191206-3					1	
22	L56249-02LFMD	HG191206-3					1	
23	**L56250-01**	RW191204401					1	
24	**L56252-03**	R1FD191204402					1	

Report Comments:

Internal Comments

AREV: SLM 12/9/19
Initials, Date

SREV: JEH 12/10/19
Initials, Date

12/9/2019 9:59:32 AM 121319

HG-T-200

QC List Type: QC-CV-200
QCListMatClass: LIQUID
Bench Sheet List: I-CV-T
QC Ref: MA-HG-DW
Group ID: MA-G-HG-T-200
Method Ref: M245.1 CVAA
SOP Ref: SOPII005

WG487682

ACZ Laboratories, Inc

Instrument ID: M7600
Analyst:
ACZ Dept: 33
Create Date: 12/09/2019 9:59
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Mercury (mg/L)	Dilution	Comments
25	**L56252-04**	R1DS191204402					1	
26	WG487682CCV2	HG190911-3					1	
27	WG487682CCB2	NONE					1	
28	**L56253-02**	R3FD191204402					1	
29	**L56253-03**	R3DS191204402					1	
30	L56258-01	EFFLUENT 003A (24HC)					1	
31	L56262-01	02_110119_10		40			1	
32	L56272-01	UR-006-TRASW					1	
33	L56272-02	UR-04-TRASW					1	
34	WG487682CCV3	HG190911-3					1	
35	WG487682CCB3	NONE					1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 9:59:33 AM 121319

L56147-2001131042

HG-T-200

QC List Type: QC-CV-200
QCListMatClass: LIQUID
Bench Sheet List: I-CV-T
QC Ref: MA-HG-DW
Group ID: MA-G-HG-T-200
Method Ref: M245.1 CVAA
SOP Ref: SOPII005

WG487682

ACZ Laboratories, Inc

Instrument ID: M7600
Analyst:
ACZ Dept: 33
Create Date: 12/09/2019 9:59
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56222-01	U,RPC ||
L56222-02	U,RPC ||
L56222-03	U,RPC ||
L56222-04	U,RPC,GPDPC,T || U,RPC,GPC,T ||
L56222-05	U,RPC || U,RPC ||
L56238-01	RedRad,P,U,WF,RPC,GFA,Y,VLP(3) || P,U,WF,RPC,GFA,Y,VLP(3) ||
L56239-01	P,LU,U,W,RPC,Y,VLUP(3) ||
L56248-02	P,U,W,RPC,Y ||
L56248-03	P,U,W,RPC,Y ||
L56249-01	P,U,W,RPC,Y ||
L56249-02	P,U,W,RPC,Y ||
L56250-01	P,U,W,RPC,Y ||
L56252-03	P,U,W,RPC,Y ||
L56252-04	P,U,W,RPC,Y ||
L56253-02	P,U,W,RPC,Y ||
L56253-03	P,U,W,RPC,Y ||
L56258-01	RCB,U,W,RPC,GFA,GPDPC,T ||
L56262-01	U,WF,RPC,GPC,Y ||
L56272-01	U,W,RPC,GPC,Y,BGFA,T || U,W,RPC,GPC,Y,BGFA,T ||
L56272-02	U,W,RPC,GPC,Y,BGFA,T || U,W,RPC,GPC,Y,BGFA,T ||

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 9:59:33 AM 121319

ACZ Laboratories, Inc.

HG-CVAA/SE-HY DATA REVIEW CHECKLIST

Data Reviewer: SLM
Date: 12/9/19

Approved: JEN
Date: 12/10/19

Work Group: 487682
Sample Type: HG-T-200
Analysis Date: 12/9/19
Analyst: SLM

	Yes	No	N/A
1.) Does the instrument calibration meet the specified method criteria? ($r \geq 0.995$)	✓		
2.) Was the low calibration standard dropped? If Yes, notify PM of change to PQL.		✓	
3.) Are all of the QC critera listed in LIMS within the acceptance limits?	✓		
4.) Are "H" flags for missed hold time appropriate?			✓
5.) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?			✓
6.) Are all dilution factors correctly calculated and uploaded? (Soil, Sludge, Water)			✓
7.) Is any sample prepped / analyzed on dilution appropriately "D" qualified (except o-cal)?			✓
8.) Are dilutions for o-cals in the appropriate range? (explain if "B" or "U" is reported)			✓
9.) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?			✓
10.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
11.) Is a current standard/reagent sheet attached to the workgroup?	✓		
12.) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? no Cal WG#: — Digest Time In: 1230

Digest Date: 12/9/19 Digest Temp: 88°C Digest Time Out: 1430

Disposable Vessel Lot #*: —

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMII011.10.16.12

ACZ Laboratories, Inc.

Report Generated By Teledyne Leeman QuickTrace

Analyst: ilab

Worksheet file: C:\Users\Public\Documents\Teledyne CETAC\QuickTrace\Worksheets\WG487685.wszf

Creation Date: 12/9/2019 3:36:24 PM

Comment:

Results

Sample Name	Type	Date/Time	Conc (ppb)	µAbs	%RSD	Residual	Flags	DF	% Recovery
Calibration Blank	STD	12/09/19 02:16:08 pm	0.000	10091	0.00	-4.71		1.00	N/A
Replicates 10091.3									
Standard #1 (0.5 ppb)	STD	12/09/19 02:17:05 pm	0.500	86975	0.00	12.71		1.00	N/A
Replicates 86974.8									
Standard #2 (1.0 ppb)	STD	12/09/19 02:18:03 pm	1.000	154616	0.00	-32.07		1.00	N/A
Replicates 154616.1									
Standard #3 (2.0 ppb)	STD	12/09/19 02:19:01 pm	2.000	312932	0.00	33.39		1.00	N/A
Replicates 312931.6									
Standard #4 (5.0 ppb)	STD	12/09/19 02:20:00 pm	5.000	752187	0.00	-10.43		1.00	N/A
Replicates 752187.1									
Standard #5 (10.0ppb)	STD	12/09/19 02:20:58 pm	10.000	1496846	0.00	1.11		1.00	N/A
Replicates 1496845.6									

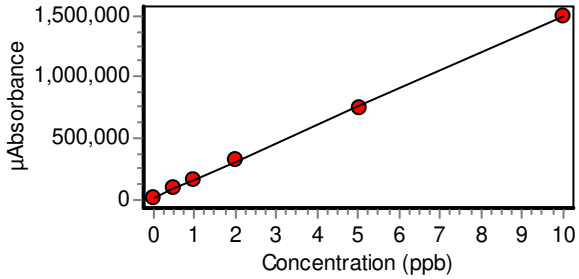
Calibration

Equation: Abs = 148588.921x + 10791.866

R2: 0.99997

SEE: 3667.6960

Flags:



CCV	CCV	12/09/19 04:16:21 pm	4.890	737856	0.00			1.00	97.86
Replicates 737856.3									
CCB	CCB	12/09/19 04:17:17 pm	-0.060	1893	0.00			1.00	N/A
Replicates 1892.9									
WG487685PQV	UNK	12/09/19 04:18:14 pm	0.890	143028	0.00			1.00	N/A
Replicates 143028.1									
WG487250PBS	UNK	12/09/19 04:19:11 pm	-0.050	3372	0.00			1.00	N/A
Replicates 3371.9									
WG487250LFB1	UNK	12/09/19 04:20:08 pm	1.880	290866	0.00			1.00	N/A
Replicates 290866.1									
L56147-06	UNK	12/09/19 04:21:05 pm	-0.057	2349	0.00			1.00	N/A
Replicates 2349.3									

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487682

Date Reported: 10-Dec-19
Run ID: R1763580
Date Analyzed: 09-Dec-19
ICAL Workgroup:
Instrument ID: M7600

WG487682ICV

Tag: Measured: 12/9/2019 3:18:22 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.005	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	100	1		%	++	0.0002	0.001			

WG487682ICB

Tag: Measured: 12/9/2019 3:19:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

WG487682PQV

Tag: Measured: 12/9/2019 3:20:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00093	1	B	mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	93	1	B	%	++	0.0002	0.001			

WG487682LRB

Tag: Measured: 12/9/2019 3:21:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

WG487682LFB

Tag: Measured: 12/9/2019 3:22:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00193	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	96	1		%	++	0.0002	0.001			

L56222-01

Tag: Measured: 12/9/2019 3:23:03 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-T-200		1	U	mg/L	++	0.0002	0.001			

L56222-01LFM

Tag: Measured: 12/9/2019 3:23:59 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00194	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	97	1		%	++	0.0002	0.001			

L56222-01LFMD

Tag: Measured: 12/9/2019 3:24:56 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00194	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	97	1		%	++	0.0002	0.001			
SREV	MERCURY	RPD	0	1		%	++	0.0002	0.001			

[redacted]

QC List Type: QC-CV-SM
QCListMatClass: SOLID
Bench Sheet List: I-CV-MWMT
QC Ref: MA-HG-D-846
Group ID: MA-G-HG-MWMT
Method Ref: M7470A
SOP Ref: SOPII005

WG487685

ACZ Laboratories, Inc

Instrument ID: M7600
Analyst: SLM
ACZ Dept: 33
Create Date: 12/09/2019 10:02
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	HGMWMT	Dilution	Comments
1	WG487685ICV	HG190911-3			1	✔	1	
2	WG487685ICB	NONE			1	✔	1	
3	WG487685PQV	HG191206-2			1	✔	1	
4	WG487250PBS	NONE			1	✔	1	
5	L56147-06	STSB29_6-15			1	✔	1	
6	L56147-06MS	HG191206-3			1	✔	1	
7	L56147-06MSD	HG191206-3			1	✔	1	
8	L56147-07	STSB29-FD_6-15			1	✔	1	
9	L56147-08	STSB30_0.5-3			1	✔	1	
10	L56147-09	STSB30_6-15			1	✔	1	
11	L56147-10	STSB31_0.5-3			1	✔	1	
12	L56147-11	STSB31_6-15			1	✔	1	
13	WG487250LFB1	HG191206-3			1	✔	1	
14	WG487685CCV	HG190911-3			1	✔	1	
15	WG487685CCB	NONE			1	✔	1	

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-06MS	ICP Spike
L56147-06MSD	ICP Spike
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250LFB1	ICP LFB

Report Comments:

Internal Comments

AREV: SLM 12/10/19
Initials, Date

SREV: UEH 12/10/19
Initials, Date

12/9/2019 10:02:37 AM 121719

L56147-2001131042

ACZ Laboratories, Inc.
HG-CVAA/SE-HY DATA REVIEW CHECKLIST

Data Reviewer: SLM
Date: 12/10/19

Work Group: 487685
Sample Type: HG-MWMT
Analysis Date: 12/9/19
Analyst: SLM

Approved: [illegible]
Date: 12/10/19

	Yes	No	N/A
1.) Does the instrument calibration meet the specified method criteria? ($r \geq 0.995$)	✓		
2.) Was the low calibration standard dropped? If Yes, notify PM of change to PQL.		✓	
3.) Are all of the QC critera listed in LIMS within the acceptance limits?	✓		
4.) Are "H" flags for missed hold time appropriate?			✓
5.) Are all samples requiring re-analysis / re-digestion at REDO / REDX status?			✓
6.) Are all dilution factors correctly calculated and uploaded? (Soil, Sludge, Water)			✓
7.) Is any sample prepped / analyzed on dilution appropriately "D" qualified (except o-cal)?			✓
8.) Are dilutions for o-cals in the appropriate range? (explain if "B" or "U" is reported)			✓
9.) Is the correct sub-sample type entered on the bench sheet (if different than SOP)?			✓
10.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
11.) Is a current standard/reagent sheet attached to the workgroup?	✓		
12.) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? yes Cal WG#: 487682 Digest Time In: 1230

Digest Date: 12/9/19 Digest Temp: 88°C Digest Time Out: 1430

Disposable Vessel Lot #*: —

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMII011.10.16.12

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487685

Date Reported:	10-Dec-19
Run ID:	R1763678
Date Analyzed:	09-Dec-19
ICAL Workgroup:	WG487682
Instrument ID:	M7600

WG487685CCV

Tag: Measured: 12/9/2019 4:16:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00489	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	98	1		%	++	0.0002	0.001			

WG487685CCB

Tag: Measured: 12/9/2019 4:17:17 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

WG487685PQV

Tag: Measured: 12/9/2019 4:18:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00089	1	B	mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	89	1	B	%	++	0.0002	0.001			

WG487250PBS

Tag: Measured: 12/9/2019 4:19:11 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

WG487250LFB1

Tag: Measured: 12/9/2019 4:20:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00188	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	94	1		%	++	0.0002	0.001			

~~L56147-06~~

Tag: Measured: 12/9/2019 4:21:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6	

L56147-06MS

Tag: Measured: 12/9/2019 4:22:02 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.0019	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	95	1		%	++	0.0002	0.001			

L56147-06MSD

Tag: Measured: 12/9/2019 4:22:59 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00187	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	93	1		%	++	0.0002	0.001			
SREV	MERCURY	RPD	2	1		%	++	0.0002	0.001			

L56147-07

Tag: Measured: 12/9/2019 4:23:56 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6	

L56147-08

Tag: Measured: 12/9/2019 4:24:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6	

L56147-09

Tag: Measured: 12/9/2019 4:25:50 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6	

L56147-10

Tag: Measured: 12/9/2019 4:26:48 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT	.0004	1	B	mg/L	++	0.0002	0.001		Q6	

WG487685CCV1

Tag: Measured: 12/9/2019 4:27:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00488	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	98	1		%	++	0.0002	0.001			

WG487685CCB1

Tag: Measured: 12/9/2019 4:28:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

L56147-11

Tag: Measured: 12/9/2019 4:29:37 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	HG-MWMT		1	U	mg/L	++	0.0002	0.001		Q6	

WG487685CCV2

Tag: Measured: 12/9/2019 4:30:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND	0.00483	1		mg/L	++	0.0002	0.001			
SREV	MERCURY	REC	97	1		%	++	0.0002	0.001			

WG487685CCB2

Tag: Measured: 12/9/2019 4:31:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	MERCURY	FOUND		1	U	mg/L	++	0.0002	0.001			

ACZ Laboratories, Inc.
Standards/Reagents Information
Mercury (waters) by CVAA
SOP#: II027.09.17.03
EPA methods: M245.1 & M7470A

Reagents	PCN	Expiration
HNO_3 (digestion)	59364	1/9/2021
$K_2S_2O_8$	59049	12/31/2020
H_2SO_4	58969	9/4/2021
$KMnO_4$	59255	9/14/2021
$SnCl_2$	60115	10/21/2024
HCl (for $SnCl_2$)	60374	5/17/2022
Hydroxylamine SO_4	58521	3/19/2024
NaCl	58452	9/30/2023

Standards	SCN	Expiration
Calibration Intermediate (1 mg/L):	HG191112-1	2/10/2020

VERIFIED BY: SLM 12/9/19

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Metals Analysis

WG487685 **HG-MWMT**

Sample	Date	SCN	Hg
WG487685CCV	12/09/19 16:16	HG190911-3	X
WG487685CCB	12/09/19 16:17		X
WG487685PQV	12/09/19 16:18	HG191206-2	X
WG487250PBS	12/09/19 16:19		X
WG487250LFB1	12/09/19 16:20	HG191206-3	X
L56147-06	12/09/19 16:21		X
L56147-06MS	12/09/19 16:22	HG191206-3	X
L56147-06MSD	12/09/19 16:22	HG191206-3	X
L56147-07	12/09/19 16:23		X
L56147-08	12/09/19 16:24		X
L56147-09	12/09/19 16:25		X
L56147-10	12/09/19 16:26		X
WG487685CCV1	12/09/19 16:27	HG190911-3	X
WG487685CCB1	12/09/19 16:28		X
L56147-11	12/09/19 16:29		X
WG487685CCV2	12/09/19 16:30	HG190911-3	X
WG487685CCB2	12/09/19 16:31		X

Cyanide WAD -Aqueous

QC List Type: QC-RFA-CN
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-CN-WAD
QC Ref: WC-INST-AQ-T
Group ID: WC-G-RFA-CN-WAD-AQ
Method Ref: SM4500 CN-I
SOP Ref: SOPWC058

WG488018

ACZ Laboratories, Inc

Instrument ID: FIA1
Analyst: MGS2
ACZ Dept: 37
Create Date: 12/12/2019 14:26
Start Date/Time: 4 4
End Date/Time: 4 4

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	CN WAD	instrument dilution factor	Cyanide (mg/L)	Dilution	Comments
1	WG488018ICV	WI191202-7			1		☑			1	
2	WG488018ICB	NONE			1		☑			1	
3	WG487952LRB	NONE			0.5		☑			0.5	
4	WG487952LFB	WI191202-4			0.5		☑			0.5	
5	L55951-04	ROUGHER TAILS SLURRY			0.5		☑			0.5	
6	L55951-04DUP	NONE			0.5		☑			0.5	
7	L56307-08	MW-6		40	0.5		☑			0.5	
8	L56307-08LFM	WI191202-4			0.5		☑			0.5	
9	L56307-09	MW-7		40	0.5		☑			0.5	
10	L56307-10	MW-8		40	0.5		☑			0.5	
11	L56353-01	AS-GWCDEC001			0.5		☑			0.5	
12	L56353-02	AS-GWCDEC002			0.5		☑			0.5	
13	WG488018CCV1	WI191202-2			1		☑			1	
14	WG488018CCB1	NONE			1		☑			1	
15	L56353-03	AS-GWCDEC003			0.5		☑			0.5	
16	L56353-04	AS-GWCDEC004			0.5		☑			0.5	
17	L56353-05	AS-GWCDEC005			0.5		☑			0.5	
18	L56353-06	AS-GWCDEC006			0.5		☑			0.5	
19	L56353-07	AS-GWCDEC007			0.5		☑			0.5	
20	L56353-07DUP	NONE			0.5		☑			0.5	
21	L56353-08	AS-GWCDEC008			0.5		☑			0.5	
22	L56353-08LFM	WI191202-4			0.5		☑			0.5	
23	L56353-09	AS-GWCDEC009			0.5		☑			0.5	

Report Comments: _____

Internal Comments _____

AREV: MGS2 12-12-19
Initials, Date

SREV: KRH 12-13-19
Initials, Date

12/12/2019 2:26:45 PM 112819

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: MSG2
Date: 12·12·19

SREV: KRH
Date: 12-13-19

Instrument ID: FIA 1

Work Group: 488018
Sample Type: CN-WAD
Analysis Date: 12·12·19
Analyst: MSG2

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
2) Is a current standard/reagent sheet attached to the workgroup?	✓		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?			✓
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	✓		
5) Are all of the QC critera listed in LIMS within specified limits?	✓		
6) If applicable, was a passing PQV indcluded in the WG?			✓
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	✓		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	✓		
9) Was sample-analysis completed within the holding time?	✓		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?			✓
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			✓
12) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? —

Calibration WG: —

Prep WG#: 487952

Disposable Vessel Lot#*: 4106310-97

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
951-04DUP	LOX MOC	RA
353-07DUP	Y	Y

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

Cyanide WAD -Aqueous

QC List Type: QC-RFA-CN
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-CN-WAD
QC Ref: WC-INST-AQ-T
Group ID: WC-G-RFA-CN-WAD-AQ
Method Ref: SM4500 CN-I
SOP Ref: SOPWC058

WG488018

ACZ Laboratories, Inc

Instrument ID: FIA1
Analyst:
ACZ Dept: 37
Create Date: 12/12/2019 14:26
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	CN WAD	instrument dilution factor	Cyanide (mg/L)	Dilution	Comments
24	L56353-10	AS-GWCDEC010	8		0.5		✔			0.5	
25	WG488018CCV2	WI191202-2			1		✔			1	
26	WG488018CCB2	NONE			1		✔			1	
27	L56353-11	AS-GWCDEC011			0.5		✔			0.5	
28	L56353-12	AS-GWCDEC012			0.5		✔			0.5	
29	L56355-01	FK191209402		30	0.5		✔			0.5	
30	L56356-01	DW191209401		30	0.5		✔	5		~~0.5~~ 2.5	O-LAC
31	L56356-02	DW191209402		30	0.5		✔	5		~~0.5~~ 2.5	Y
32	L56356-03	DW191209403		30	0.5		✔			0.5	
33	WG488018CCV3	WI191202-2			1		✔			1	
34	WG488018CCB3	NONE			1		✔			1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 2:26:47 PM 112819

Cyanide WAD -Aqueous

QC List Type: QC-RFA-CN
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-CN-WAD
QC Ref: WC-INST-AQ-T
Group ID: WC-G-RFA-CN-WAD-AQ
Method Ref: SM4500 CN-I
SOP Ref: SOPWC058

WG488018

ACZ Laboratories, Inc

Instrument ID: FIA1
Analyst:
ACZ Dept: 37
Create Date: 12/12/2019 14:26
Start Date/Time:
End Date/Time:

Sample	Login Comments
L55951-04	P,U,W,G,GPC,BK,Y || HCT Leachate
L56307-08	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56307-09	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56307-10	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56353-01	P,GPC ||
L56353-02	P,GPC ||
L56353-03	P,GPC ||
L56353-04	P,GPC ||
L56353-05	P,GPC ||
L56353-06	P,GPC ||
L56353-07	P,GPC ||
L56353-08	P,GPC ||
L56353-09	P,GPC ||
L56353-10	P,GPC ||
L56353-11	P,GPC ||
L56353-12	P,GPC || P,GPC ||
L56355-01	P ||
L56356-01	P ||
L56356-02	P ||
L56356-03	P ||

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 2:26:47 PM 112819

X-CN-WAD

WG487952

ACZ Laboratories, Inc

QC List Type: I-WCPREP-CN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-CN
QC Ref: WC PREP
Group ID: IP-G-WC-CN-WAD
Method Ref: SM4500 CN-I
SOP Ref: SOPWC072

Instrument ID: WCDIG
Analyst: mss2
ACZ Dept: 30
Create Date: 12/12/2019 10:19
Start Date/Time: 12/12/2019 10:20
End Date/Time: 12/12/2019 14:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	CNWAD	pH Screen (units)	Sulfide Screen	Chlorine Screen	Sample Volume (mL)	Final Volume (mL)	Dilution	Comments
1	WG487952LRB	NONE	p		12/12/19 10:20	☑	12	-	-	50	25	0.5	
2	WG487952LFB	WI191202-4	p		12/12/19 10:28	☑	12	-	-	50	25	0.5	
3	L55951-04	ROUGHER TAILS SLURRY	p		12/12/19 10:37	☑	13	-	-	50	25	0.5	
4	L55951-04DUP	NONE	p		12/12/19 10:46	☑	13	-	-	50	25	0.5	
5	L56307-08	MW-6	p	40	12/12/19 10:55	☑	13	-	-	50	25	0.5	
6	L56307-08LFM	WI191202-4	p		12/12/19 11:04	☑	13	-	-	50	25	0.5	
7	L56307-09	MW-7	p	40	12/12/19 11:12	☑	13	-	-	50	25	0.5	
8	L56307-10	MW-8	p	40	12/12/19 11:21	☑	13	-	-	50	25	0.5	
9	L56353-01	AS-GWCDEC001	p		12/12/19 11:30	☑	13	-	-	50	25	0.5	
10	L56353-02	AS-GWCDEC002	p		12/12/19 11:39	☑	13	-	-	50	25	0.5	
11	L56353-03	AS-GWCDEC003	p		12/12/19 11:48	☑	13	-	-	50	25	0.5	
12	L56353-04	AS-GWCDEC004	p		12/12/19 11:56	☑	13	-	-	50	25	0.5	
13	L56353-05	AS-GWCDEC005	p		12/12/19 12:05	☑	13	-	-	50	25	0.5	
14	L56353-06	AS-GWCDEC006	p		12/12/19 12:14	☑	13	-	-	50	25	0.5	
15	L56353-07	AS-GWCDEC007	p		12/12/19 12:23	☑	13	-	-	50	25	0.5	
16	L56353-07DUP	NONE	p		12/12/19 12:32	☑	13	-	-	50	25	0.5	
17	L56353-08	AS-GWCDEC008	p		12/12/19 12:40	☑	13	-	-	50	25	0.5	
18	L56353-08LFM	WI191202-4	p		12/12/19 12:49	☑	13	-	-	50	25	0.5	
19	L56353-09	AS-GWCDEC009	p		12/12/19 12:58	☑	13	-	-	50	25	0.5	
20	L56353-10	AS-GWCDEC010	p		12/12/19 13:07	☑	13	-	-	50	25	0.5	
21	L56353-11	AS-GWCDEC011	p		12/12/19 13:16	☑	13	-	-	50	25	0.5	
22	L56353-12	AS-GWCDEC012	p		12/12/19 13:24	☑	13	-	-	50	25	0.5	
23	**L56355-01**	FK191209402	p	30	12/12/19 13:33	☑	13	-	-	50	25	0.5	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 2:24:07 PM 112819

X-CN-WAD

WG487952

ACZ Laboratories, Inc

QC List Type: I-WCPREP-CN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-CN
QC Ref: WC PREP
Group ID: IP-G-WC-CN-WAD
Method Ref: SM4500 CN-I
SOP Ref: SOPWC072

Instrument ID: WCDIG
Analyst: mss2
ACZ Dept: 30
Create Date: 12/12/2019 10:19
Start Date/Time: 12/12/2019 10:20
End Date/Time: 12/12/2019 14:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	CN WAD	pH Screen (units)	Sulfide Screen	Chlorine Screen	Sample Volume (mL)	Final Volume (mL)	Dilution	Comments
24	L56356-01	DW191209401	p	30	12/12/19 13:42	☑	13	-	-	50	25	0.5	
25	L56356-02	DW191209402	p	30	12/12/19 13:51	☑	13	-	-	50	25	0.5	
26	L56356-03	DW191209403	p	30	12/12/19 14:00	☑	13	-	-	50	25	0.5	

Sample	Login Comments
L55951-04	P,U,W,G,GPC,BK,Y || HCT Leachate
L56307-08	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56307-09	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56307-10	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56353-01	P,GPC ||
L56353-02	P,GPC ||
L56353-03	P,GPC ||
L56353-04	P,GPC ||
L56353-05	P,GPC ||
L56353-06	P,GPC ||
L56353-07	P,GPC ||
L56353-08	P,GPC ||
L56353-09	P,GPC ||
L56353-10	P,GPC ||
L56353-11	P,GPC ||
L56353-12	P,GPC || P,GPC ||
L56355-01	P ||
L56356-01	P ||
L56356-02	P ||
L56356-03	P ||

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 2:24:07 PM 112819

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: LACHAT

Parameter: Cyanide Instrument

Instrument Reagents

	PCN/SCN	Prep By:	Expiration:
1) Phosphate Buffer	PCN58272	mss2	1/11/2020
2) 0.25 N NaOH	PCN58925	KRH	11/25/2020
3) Chloramine T *made daily	PCN59137	mss2	12/12/2019
4) Pyridine-Barbituric Acid Reagent *made monthly	WIR191202-1	mss2	01/02/20

CN Working Standards Prepared Fresh Daily mss2

Author: wcins

Date : 12/12/2019

Channel 1 - Set: 3 / 3

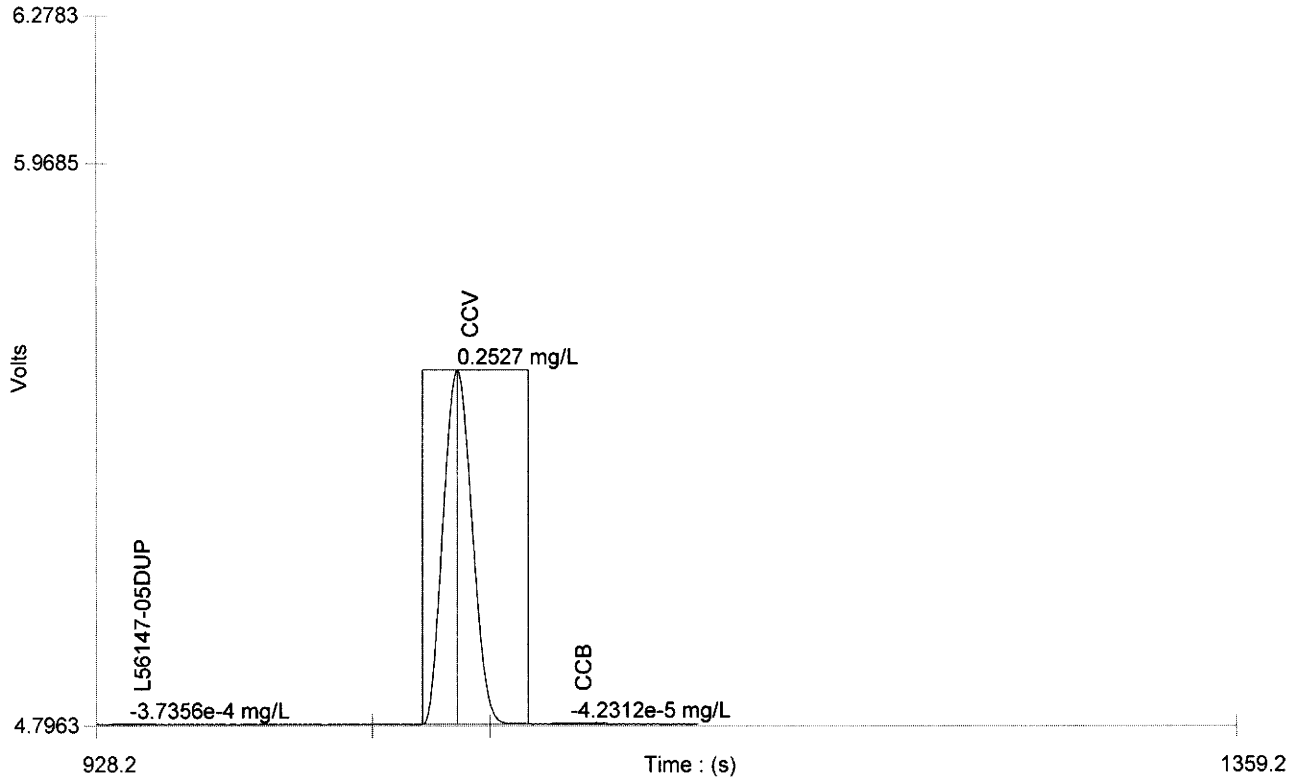
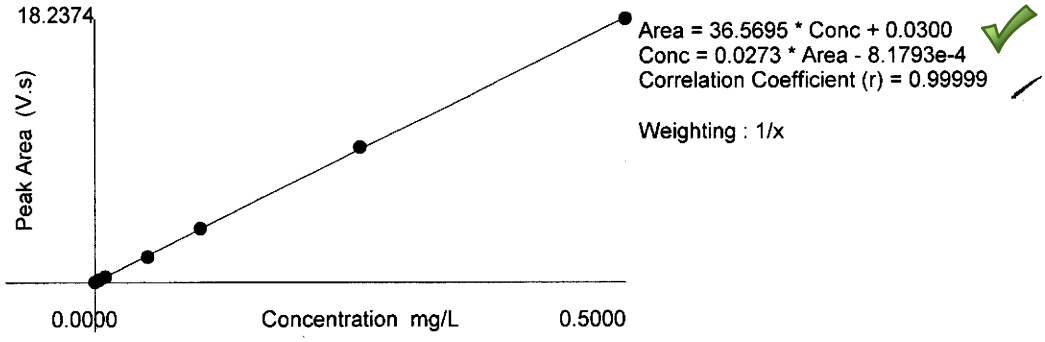


Table : 1 (CN)

	Known Conc. (mg/L)	Rep.	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc (mg/L)	Detection Date	Detection Time
1	0.5000	1	18.2374	1.4565	0.0	0.4	0.4978	12/12/2019	2:47:23 PM
2	0.2500	1	9.3224	0.7395	0.0	-1.6	0.2540	12/12/2019	2:48:15 PM
3	0.1000	1	3.7075	0.2976	0.0	-0.6	0.1005	12/12/2019	2:49:07 PM
4	0.0500	1	1.7651	0.1399	0.0	5.0	0.0474	12/12/2019	2:50:00 PM
5	0.0100	1	0.3865	0.0294	0.0	2.3	0.0097	12/12/2019	2:50:53 PM
6	0.0040	1	0.1856	0.0142	0.0	-5.3	0.0043	12/12/2019	2:51:47 PM
7	0.0000	1	0.0292	0.0019			-1.8519e-5	12/12/2019	2:52:41 PM

Figure : 1 (CN)



ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488018

Date Reported: 13-Dec-19
Run ID: R1764359
Date Analyzed: 12-Dec-19
ICAL Workgroup:
Instrument ID: FIA1

WG488018ICV

Tag: Measured: 12/12/2019 2:55:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.2979	1		mg/L	++	0.003	0.01			
SREV	CYANIDE	REC	99	1		%	++	0.003	0.01			

WG488018ICB

Tag: Measured: 12/12/2019 2:56:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.003	0.01			

WG487952LRB

Tag: Measured: 12/12/2019 2:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		0.5	U	mg/L	++	0.003	0.01			

WG487952LFB

Tag: Measured: 12/12/2019 2:57:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.201	0.5		mg/L	++	0.003	0.01			
SREV	CYANIDE	REC	101	0.5		%	++	0.003	0.01			

L55951-04

Tag: Measured: 12/12/2019 2:58:47 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-WAD	.007	0.5	B	mg/L	++	0.003	0.01		RA TA TB	

L55951-04DUP

Tag: Measured: 12/12/2019 2:59:39 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.0065	0.5	B	mg/L	++	0.003	0.01			
SREV	CYANIDE	RPD	7	0.5		%	++	0.003	0.01		RA	

L56307-08

Tag: Measured: 12/12/2019 3:00:32 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-WAD		0.5	U	mg/L	++	0.003	0.01		RA	

L56307-08LFM

Tag: Measured: 12/12/2019 3:01:25 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.1997	0.5		mg/L	++	0.003	0.01			
SREV	CYANIDE	REC	100	0.5		%	++	0.003	0.01			

L56307-09

Tag: Measured: 12/12/2019 3:02:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-WAD		0.5	U	mg/L	++	0.003	0.01		RA	

Cyanide MWMT

QC List Type: QC-RFA-CN
QCListMatClass: LIQUID
Bench Sheet List:
QC Ref: WC-RFA-T-SOL
Group ID: WC-G-RFA-CN-WAD-MWM
Method Ref: 335.4
SOP Ref: SOPWC058

WG488005

ACZ Laboratories, Inc

Instrument ID: FIA1
Analyst: MSS2
ACZ Dept: 37
Create Date: 12/12/2019 13:35
Start Date/Time: 1 Y
End Date/Time: 1 3:45p

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	CNWADMWMT	Dilution
1	WG488005ICV	WI191202-7	P		1	☑	1
2	WG488005ICB	NONE			1	☑	1
3	WG487912LRB	NONE			1	☑	1 MSS2 12.12.19
4	WG487912LFB	WI191202-4			1	☑	1
5	WG487250PBS	NONE			1	☑	1 0.5
6	L56147-06	STSB29_6-15			1	☑	1
7	L56147-07	STSB29-FD_6-15			1	☑	1
8	L56147-07LFM	WI191202-4			1	☑	1
9	L56147-08	STSB30_0.5-3			1	☑	1
10	L56147-09	STSB30_6-15			1	☑	1
11	L56147-10	STSB31_0.5-3			1	☑	1
12	L56147-11	STSB31_6-15			1	☑	1
13	WG488005CCV1	WI191202-2			1	☑	1
14	WG488005CCB1	NONE			1	☑	1
15	WG487361PBS	NONE			1	☑	1 0.9
16	L56147-01	STSB27_0.5-3			1	☑	1
17	L56147-02	STSB27_6-15			1	☑	1
18	L56147-03	STSB28_0.5-3			1	☑	1
19	L56147-04	STSB28_6-15			1	☑	1
20	L56147-05	STSB29_0.5-3			1	☑	1
21	L56147-05DUP	NONE			1	☑	1

Report Comments: ICAL WH488018

Internal Comments

AREV: MSS2 12.12.19
Initials, Date

SREV: KRH 12-13-19
Initials, Date

12/12/2019 1:36:28 PM 121719

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: MGS2
Date: 12-12-19

SREV: KKH
Date: 12-13-19

Instrument ID F141

Work Group: 488005
Sample Type: CN-WAP-MW/MT
Analysis Date: 12-12-19
Analyst: MGS2

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
2) Is a current standard/reagent sheet attached to the workgroup?	✓		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?			✓
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	✓		
5) Are all of the QC critera listed in LIMS within specified limits?	✓		
6) If applicable, was a passing PQV indcluded in the WG?			✓
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	✓		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)			✓
9) Was sample-analysis completed within the holding time?	✓		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?			✓
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			✓
12) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? yes Calibration WG: 488018

Prep WG#: 487912 Disposable Vessel Lot#*: A106310-97

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
147-050UP	CLOX MDL	RA

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

L56147-2001131042

Cyanide MWMT

QC List Type: QC-RFA-CN
QCListMatClass: LIQUID
Bench Sheet List:
QC Ref: WC-RFA-T-SOL
Group ID: WC-G-RFA-CN-WAD-MWM
Method Ref: 335.4
SOP Ref: SOPWC058

WG488005

ACZ Laboratories, Inc

Instrument ID: FIA1
Analyst:
ACZ Dept: 37
Create Date: 12/12/2019 13:35
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	CNWADMWMT	Dilution
22	WG488005CCV2	WI191202-2			1	☑	1
23	WG488005CCB2	NONE			1	☑	1

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 1:36:28 PM 121719

X-CN-WAD-MWMT

QC List Type: I-WCPREP-CN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-CN
QC Ref: WC PREP
Group ID: IP-G-WC-WAD-MWMT
Method Ref: SM4500 CN-I
SOP Ref: SOPWC072

WG487912

ACZ Laboratories, Inc

Instrument ID: WCDIG
Analyst: mss2
ACZ Dept: 30
Create Date: 12/12/2019 9:10
Start Date/Time: 12/11/2019 8:30
End Date/Time: 12/11/2019 13:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	CN WAD MWMT	pH Screen (units)	Sulfide Screen	Chlorine Screen	Sample Volume (mL)	Final Volume (mL)	Dilution	Comments
1	WG487912LRB	NONE	p		12/11/19 8:30	☑	12	-	-	50	25	1 0.5	
2	WG487912LFB	WI191202-4	p		12/11/19 8:46	☑	12	-	-	50	25	1	
3	WG487250PBS	NONE	p		12/11/19 9:03	☑	13	-	-	50	25	1	
4	L56147-06	STSB29_6-15	p		12/11/19 9:20	☑	13	-	-	50	25	1	
5	L56147-07	STSB29-FD_6-15	p		12/11/19 9:37	☑	13	-	-	50	25	1	
6	L56147-07LFM	WI191202-4	p		12/11/19 9:54	☑	13	-	-	50	25	1	
7	L56147-08	STSB30_0.5-3	p		12/11/19 10:11	☑	13	-	-	50	25	1	
8	L56147-09	STSB30_6-15	p		12/11/19 10:28	☑	13	-	-	50	25	1	
9	L56147-10	STSB31_0.5-3	p		12/11/19 10:44	☑	12	-	-	50	25	1	
10	L56147-11	STSB31_6-15	p		12/11/19 11:01	☑	13	-	-	50	25	1	
11	WG487361PBS	NONE	p		12/11/19 11:18	☑	13	-	-	50	25	1	
12	L56147-01	STSB27_0.5-3	p		12/11/19 11:35	☑	13	-	-	50	25	1	
13	L56147-02	STSB27_6-15	p		12/11/19 11:52	☑	13	-	-	50	25	1	
14	L56147-03	STSB28_0.5-3	p		12/11/19 12:09	☑	13	-	-	50	25	1	
15	L56147-04	STSB28_6-15	p		12/11/19 12:26	☑	13	-	-	50	25	1	
16	L56147-05	STSB29_0.5-3	p		12/11/19 12:43	☑	13	-	-	50	25	1	
17	L56147-05DUP	NONE	p		12/11/19 12:59	☑	13	-	-	50	25	1	

MSS2
12-12-19

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:29:54 AM 121719

X-CN-WAD-MWMT

WG487912

ACZ Laboratories, Inc

QC List Type: I-WCPREP-CN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-CN
QC Ref: WC PREP
Group ID: IP-G-WC-WAD-MWMT
Method Ref: SM4500 CN-I
SOP Ref: SOPWC072

Instrument ID: WCDIG
Analyst: mss2
ACZ Dept: 30
Create Date: 12/12/2019 9:10
Start Date/Time: 12/11/2019 8:30
End Date/Time: 12/11/2019 13:00

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:29:54 AM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488005

Date Reported: 13-Dec-19
Run ID: R1764367
Date Analyzed: 12-Dec-19
ICAL Workgroup: WG488018
Instrument ID: FIA1

WG488005CCV1

Tag: Measured: 12/12/2019 3:33:31 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.2512	1		mg/L	++	0.003	0.01			
SREV	CYANIDE	REC	100	1		%	++	0.003	0.01			

WG488005CCB1

Tag: Measured: 12/12/2019 3:34:25 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.003	0.01			

WG487912LRB

Tag: Measured: 12/12/2019 3:35:19 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		0.5	U	mg/L	++	0.003	0.01			

WG487912LFB

Tag: Measured: 12/12/2019 3:36:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.2007	0.5		mg/L	++	0.003	0.01			
SREV	CYANIDE	REC	100	0.5		%	++	0.003	0.01			

WG487250PBS

Tag: Measured: 12/12/2019 3:37:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		0.5	U	mg/L	++	0.003	0.01			

L56147-06

Tag: Measured: 12/12/2019 3:37:58 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	.D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-07

Tag: Measured: 12/12/2019 3:38:51 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	.D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-07LFM

Tag: Measured: 12/12/2019 3:39:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.1933	0.5		mg/L	++	0.003	0.01			
SREV	CYANIDE	REC	97	0.5		%	++	0.003	0.01			

L56147-08

Tag: Measured: 12/12/2019 3:40:36 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	.D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-09

Tag: Measured: 12/12/2019 3:41:29 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	,D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-10

Tag: Measured: 12/12/2019 3:42:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	,D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-11

Tag: Measured: 12/12/2019 3:43:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	,D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

WG488005CCV2

Tag: Measured: 12/12/2019 3:44:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.2528 ✓	1		mg/L	++	0.003	0.01			
SREV	CYANIDE	REC	101	1		%	++	0.003	0.01			

WG488005CCB2

Tag: Measured: 12/12/2019 3:44:59 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U ✓	mg/L	++	0.003	0.01			

WG487361PBS

Tag: Measured: 12/12/2019 3:45:51 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		0.5	U	mg/L	++	0.003	0.01			

L56147-01

Tag: Measured: 12/12/2019 3:46:43 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	,D-MWMT		0.5	U ✓	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-02

Tag: Measured: 12/12/2019 3:47:35 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	,D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-03

Tag: Measured: 12/12/2019 3:48:27 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	,D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-04

Tag: Measured: 12/12/2019 3:49:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	,D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-05

Tag: Measured: 12/12/2019 3:50:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	,D-MWMT		0.5	U	mg/L	++	0.003	0.01		Q6 RA TB	

L56147-05DUP

Tag:

Measured: 12/12/2019 3:51:06 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		0.5	U	mg/L	++	0.003	0.01			
SREV	CYANIDE	RPD	0	0.5		%	++	0.003	0.01		RA	

WG488005CCV3

Tag:

Measured: 12/12/2019 3:53:34 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	0.2527	1		mg/L	++	0.003	0.01			
SREV	CYANIDE	REC	101	1		%	++	0.003	0.01			

WG488005CCB3

Tag:

Measured: 12/12/2019 3:54:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.003	0.01			

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG488005 **Cyanide MWMT**

Sample	Date	SCN	CYANIDE
WG488005CCV1	12/12/19 15:33	WI191202-2	X
WG488005CCB1	12/12/19 15:34		X
WG487912LRB	12/12/19 15:35		X
WG487912LFB	12/12/19 15:36	WI191202-4	X
WG487250PBS	12/12/19 15:37		X
L56147-06	12/12/19 15:37		X
L56147-07	12/12/19 15:38		X
L56147-07LFM	12/12/19 15:39	WI191202-4	X
L56147-08	12/12/19 15:40		X
L56147-09	12/12/19 15:41		X
L56147-10	12/12/19 15:42		X
L56147-11	12/12/19 15:43		X
WG488005CCB2	12/12/19 15:44		X
WG488005CCV2	12/12/19 15:44	WI191202-2	X
WG487361PBS	12/12/19 15:45		X
L56147-01	12/12/19 15:46		X
L56147-02	12/12/19 15:47		X
L56147-03	12/12/19 15:48		X
L56147-04	12/12/19 15:49		X
L56147-05	12/12/19 15:50		X
L56147-05DUP	12/12/19 15:51		X
WG488005CCV3	12/12/19 15:53	WI191202-2	X
WG488005CCB3	12/12/19 15:54		X

L56147-2001131042

X-CN-WAD-MWMT

QC List Type: I-WCPREP-CN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-CN
QC Ref: WC PREP
Group ID: IP-G-WC-WAD-MWMT
Method Ref: SM4500 CN-I
SOP Ref: SOPWC072

WG487912

ACZ Laboratories, Inc

Instrument ID: WCDIG
Analyst: mss2
ACZ Dept: 30
Create Date: 12/12/2019 9:10
Start Date/Time: 12/11/2019 8:30
End Date/Time: 12/11/2019 13:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	CN WAD MWMT	pH Screen (units)	Sulfide Screen	Chlorine Screen	Sample Volume (mL)	Final Volume (mL)	Dilution	Comments
1	WG487912LRB	NONE	p		12/11/19 8:30	☑	12	-	-	50	25	1	
2	WG487912LFB	WI191202-4	p		12/11/19 8:46	☑	12	-	-	50	25	1	
3	WG487250PBS	NONE	p		12/11/19 9:03	☑	13	-	-	50	25	1	
4	L56147-06	STSB29_6-15	p		12/11/19 9:20	☑	13	-	-	50	25	1	
5	L56147-07	STSB29-FD_6-15	p		12/11/19 9:37	☑	13	-	-	50	25	1	
6	L56147-07LFM	WI191202-4	p		12/11/19 9:54	☑	13	-	-	50	25	1	
7	L56147-08	STSB30_0.5-3	p		12/11/19 10:11	☑	13	-	-	50	25	1	
8	L56147-09	STSB30_6-15	p		12/11/19 10:28	☑	13	-	-	50	25	1	
9	L56147-10	STSB31_0.5-3	p		12/11/19 10:44	☑	12	-	-	50	25	1	
10	L56147-11	STSB31_6-15	p		12/11/19 11:01	☑	13	-	-	50	25	1	
11	WG487361PBS	NONE	p		12/11/19 11:18	☑	13	-	-	50	25	1	
12	L56147-01	STSB27_0.5-3	p		12/11/19 11:35	☑	13	-	-	50	25	1	
13	L56147-02	STSB27_6-15	p		12/11/19 11:52	☑	13	-	-	50	25	1	
14	L56147-03	STSB28_0.5-3	p		12/11/19 12:09	☑	13	-	-	50	25	1	
15	L56147-04	STSB28_6-15	p		12/11/19 12:26	☑	13	-	-	50	25	1	
16	L56147-05	STSB29_0.5-3	p		12/11/19 12:43	☑	13	-	-	50	25	1	
17	L56147-05DUP	NONE	p		12/11/19 12:59	☑	13	-	-	50	25	1	

Report Comments: _____

Internal Comments _____

AREV: MSS2 12-12-19
Initials, Date

SREV: KRH 12-12-19.
Initials, Date

12/12/2019 9:30:02 AM 121719

ACZ Laboratories, Inc.

WC INST PREP REVIEW CHECKLIST

AREV:	MGS2
Date:	12-12-19

Work Group:	487912
Sample Type:	X-CN-W40-MWMT
Prep Date:	12-11-19
Analyst:	MGS2

SREV:	KRH
Date:	12-12-19

	YES	NO	N / A
1.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
2.) Are all samples received in the appropriate sample container? *	✓		
3.) **For CN-T:** Is a PQV included if DW samples are present in the WG?			✓
4.) **For CN:** Is the correct sample pH documented on the bench sheet and entered in LIMS?	✓		
5.) **For CN:** Is any sample with pH < 12 appropriately "Q" qualified?			✓
6.) **For CN:** Was any sample that tested (+) for sulfide prepped within 24 hours from collection? *			✓
7.) Are the correct dilution factors documented on the bench sheet and entered in LIMS?	✓		
8.) Is any sample prepared on dilution appropriately "D" qualified?			✓
9.) Is a current standard/reagent form included with the workgroup?	✓		
10.) **For Solids:** Are all quarantined samples entered into the 'Quaranteen Spreadsheet' and disposed of properly?			✓
11.) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Disposable Vessel Lot#**: E7-9-9331-NN Soils Department Prep Workgroup: 487256 | 487361

For any item listed above that is checked "No" state the corrective action/explanation in the sections below.

QC/Sample ID	Problem	Corrective Action

Comments:

* If "No" then data must be appropriately qualifed.

** Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

X-CN-WAD-MWMT

WG487912

ACZ Laboratories, Inc

QC List Type: I-WCPREP-CN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-CN
QC Ref: WC PREP
Group ID: IP-G-WC-WAD-MWMT
Method Ref: SM4500 CN-I
SOP Ref: SOPWC072

Instrument ID: WCDIG
Analyst: mss2
ACZ Dept: 30
Create Date: 12/12/2019 9:10
Start Date/Time: 12/11/2019 8:30
End Date/Time: 12/11/2019 13:00

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:30:02 AM 121719

X-CN-WAD-MWMT

QC List Type: I-WCPREP-CN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-CN
QC Ref: WC PREP
Group ID: IP-G-WC-WAD-MWMT
Method Ref: SM4500 CN-I
SOP Ref: SOPWC072

WG487912

ACZ Laboratories, Inc

Instrument ID: WCDIG
Analyst: MGG
ACZ Dept: 30
Create Date: 12/12/2019 9:10
Start Date/Time: 12/11/19 8:30a
End Date/Time: Y 1pm

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	CNWADMWMT	pH Screen (units)	Sulfide Screen	Chlorine Screen	Sample Volume (mL)	Final Volume (mL)	Dilution	Comments
1	WG487912LRB	NONE	P			☑	12	–	–	50	25	1	
2	WG487912LFB	WI191202-4				☑	12					1	
3	WG487250PBS	NONE				☑	13					1	
4	L56147-06	STSB29_6-15				☑						1	
5	L56147-07	STSB29-FD_6-15				☑						1	
6	L56147-07LFM	WI191202-4				☑						1	
7	L56147-08	STSB30_0.5-3				☑						1	
8	L56147-09	STSB30_6-15				☑						1	
9	L56147-10	STSB31_0.5-3				☑	12					1	
10	L56147-11	STSB31_6-15				☑	13					1	
11	WG487361PBS	NONE				☑						1	
12	L56147-01	STSB27_0.5-3				☑						1	
13	L56147-02	STSB27_6-15				☑						1	
14	L56147-03	STSB28_0.5-3				☑						1	
15	L56147-04	STSB28_6-15				☑						1	
16	L56147-05	STSB29_0.5-3				☑						1	
17	L56147-05DUP	NONE				☑						1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:11:04 AM 121719

X-CN-WAD-MWMT

QC List Type: I-WCPREP-CN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-CN
QC Ref: WC PREP
Group ID: IP-G-WC-WAD-MWMT
Method Ref: SM4500 CN-I
SOP Ref: SOPWC072

WG487912

ACZ Laboratories, Inc

Instrument ID: WCDIG
Analyst:
ACZ Dept: 30
Create Date: 12/12/2019 9:10
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:11:04 AM 121719

L56147-2001131042

Meteoric Water Mobility

WG487250

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 16:20
End Date/Time: 12/06/2019 10:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487250CSTD1	NONE															
2	WG487250CSTD2	NONE															
3	WG487250CSTD3	NONE															
4	WG487250ICV	PCN58503	As Rec		12/04/19 16:20		4.04		4.04	4.04							21.5
5	WG487250PBS	NONE	As Rec		12/04/19 19:06		5.95	23	6.39	6.40	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
6	L56147-06	STSB29_6-15	As Rec		12/04/19 21:53	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
7	L56147-06MS	Multiple	As Rec		12/05/19 0:40	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
8	L56147-06MSD	Multiple	As Rec		12/05/19 3:26	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
9	L56147-07	STSB29-FD_6-15	As Rec		12/05/19 6:13	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
10	L56147-07MS	MS190905-3	As Rec		12/05/19 9:00	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
11	L56147-07MSD	MS190905-3	As Rec		12/05/19 11:46	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
12	L56147-08	STSB30_0.5-3	As Rec		12/05/19 14:33	0	5.95	23	4.09	4.35	5000	5014.1	8.24	12/04/19 10:45	12/05/19 14:25	27.6666666667443	20.8
13	L56147-09	STSB30_6-15	As Rec		12/05/19 17:20	0	5.95	23	5.85	5.87	5000	5006.3	21.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.6
14	L56147-10	STSB31_0.5-3	As Rec		12/05/19 20:06	0	5.95	23	4.1	4.04	5000	5004.3	11.31	12/04/19 10:45	12/05/19 14:20	27.5833333333139	20.5
15	L56147-11	STSB31_6-15	As Rec		12/05/19 22:53	0	5.95	23	5.66	5.71	5000	5000.7	28.21	12/04/19 10:45	12/05/19 16:05	29.3333333334303	20.6
16	WG487250CCV1	PCN58503	As Rec		12/06/19 1:40		4.05		4.05	4.05							21.5
17	WG487250LFB1	Multiple	As Rec		12/06/19 4:26	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
18	WG487250LFB2	MS190905-3	As Rec		12/06/19 7:13	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
19	WG487250CCV2	PCN58503	As Rec		12/06/19 10:00		4.05		4.04	4.04							21.4

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:32:14 AM 121719

L56147-2001131042

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487361

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/03/2019 1:50
End Date/Time: 12/05/2019 13:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487361CSTD1	NONE															
2	WG487361CSTD2	NONE															
3	WG487361CSTD3	NONE															
4	WG487361ICV	PCN58503	As Rec		12/03/19 1:50		4.01		4.01	4.01							20.7
5	WG487361PBS	NONE	As Rec		12/03/19 5:46	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
6	L56147-01	STSB27_0.5-3	As Rec		12/03/19 9:43	0	5.19	23	7.70	7.78	5000	5005.7	13.12	12/03/19 9:45	12/04/19 14:15	28.5	20.8
7	L56147-02	STSB27_6-15	As Rec		12/03/19 13:40	0	5.19	23	7.59	7.66	5000	5001.4	20.4	12/03/19 9:45	12/04/19 14:20	28.5833333332557	20.7
8	L56147-03	STSB28_0.5-3	As Rec		12/03/19 17:36	0	5.19	23	4.63	4.58	5000	5002.4	8.77	12/03/19 9:45	12/04/19 12:40	26.9166666667443	20.9
9	L56147-04	STSB28_6-15	As Rec		12/03/19 21:33	0	5.19	23	6.91	6.93	5000	5005.8	26.92	12/03/19 9:45	12/04/19 14:35	28.8333333333721	20.8
10	L56147-05	STSB29_0.5-3	As Rec		12/04/19 1:30	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
11	L56147-05MS1	Multiple	As Rec		12/04/19 5:26	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
12	L56147-05MSD1	Multiple	As Rec		12/04/19 9:23	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
13	L56147-05MS2	Multiple	As Rec		12/04/19 13:20	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
14	L56147-05MSD2	Multiple	As Rec		12/04/19 17:16	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
15	WG487361CCV1	PCN58503	As Rec		12/04/19 21:13		4.04		4.03	4.03							20.5
16	L56147-05DUP	NONE	As Rec		12/05/19 1:10	0	5.19	23	4.32	4.31	5000	5001.6	12.17	12/03/19 9:45	12/04/19 13:45	27.9999999999416	20.8
17	WG487361LFB1	Multiple	As Rec		12/05/19 5:06	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
18	WG487361LFB2	Multiple	As Rec		12/05/19 9:03	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
19	WG487361CCV2	PCN58503	As Rec		12/05/19 13:00		4.02		4.01	4.01							20.5

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:32:46 AM 121719

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: LACHAT

Parameter: CYANIDE **WAD** AQ / LOW LEVEL /SOILS / MWMT / 1312 / NV

Prep Reagents

	PCN	Prep Analyst	Expiration
1) 0.25N NaOH	PCN58925	KRH	11/25/2020
2) Sodium Acetate Buffer	WIR191106-3	ttg	11/6/2020
3) Zinc Acetate Solution	PCN57610	mss2	11/12/2020
4) Methyl Red Indicator Solution	PCN57292	ttg	8/21/2020
5) Purple Sample Matrix	PCN57958	wtc	9/26/2020
6) 10 % Acetic Acid Solution	PCN58941	ttg	9/6/2020
5) Bismuth Nitrate for Sulfide Treatment			
6) Ascorbic Acid for Chlorine Treatment	PCN55138		4/30/2020

See SOP for standard and reagent prep

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487912

Date Reported: 12-Dec-19
Run ID: R1764062
Date Analyzed: 11-Dec-19
ICAL Workgroup:
Instrument ID: WCDIG

WG487912LRB

Tag: Measured: 12/11/2019 8:30:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	TEXT		1			++			-		
SREV	FINAL VOLUME	PREP	25	1		mL	++					
SREV	PH SCREEN	PREP	12	1		units	++					
SREV	SULFIDE SCREEN	TEXT		1			++			-		
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

WG487912LFB

Tag: Measured: 12/11/2019 8:46:52 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	TEXT		1			++			-		
SREV	FINAL VOLUME	PREP	25	1		mL	++					
SREV	PH SCREEN	PREP	12	1		units	++					
SREV	SULFIDE SCREEN	TEXT		1			++			-		
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

WG487250PBS

Tag: Measured: 12/11/2019 9:03:44 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	TEXT		1			++			-		
SREV	FINAL VOLUME	PREP	25	1		mL	++					
SREV	PH SCREEN	PREP	13	1		units	++					
SREV	SULFIDE SCREEN	TEXT		1			++			-		
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-06

Tag: Measured: 12/11/2019 9:20:36 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-07

Tag: Measured: 12/11/2019 9:37:28 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-07LFM

Tag: Measured: 12/11/2019 9:54:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	TEXT		1			++			-		
SREV	FINAL VOLUME	PREP	25	1		mL	++					
SREV	PH SCREEN	PREP	13	1		units	++					
SREV	SULFIDE SCREEN	TEXT		1			++			-		
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-08

Tag: Measured: 12/11/2019 10:11:12 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-09

Tag: Measured: 12/11/2019 10:28:04 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-10

Tag: Measured: 12/11/2019 10:44:56 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	12	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-11

Tag: Measured: 12/11/2019 11:01:48 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

WG487361PBS

Tag: Measured: 12/11/2019 11:18:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	TEXT		1			++			-		
SREV	FINAL VOLUME	PREP	25	1		mL	++					
SREV	PH SCREEN	PREP	13	1		units	++					
SREV	SULFIDE SCREEN	TEXT		1			++			-		
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

L56147-01

Tag: Measured: 12/11/2019 11:35:32 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-02

Tag: Measured: 12/11/2019 11:52:24 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-03

Tag: Measured: 12/11/2019 12:09:16 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-04

Tag: Measured: 12/11/2019 12:26:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-05

Tag: Measured: 12/11/2019 12:43:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	,D-MWMT		1			++			-		
SREV	FINAL VOLUME	,D-MWMT	25	1		mL	++					
SREV	PH SCREEN	,D-MWMT	13	1		units	++					
SREV	SULFIDE SCREEN	,D-MWMT		1			++			-		
SREV	VOLUME, SAMPLE	,D-MWMT	50	1		mL	++					

L56147-05DUP

Tag: Measured: 12/11/2019 12:59:52 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORINE SCREEN	TEXT		1			++			-		
SREV	FINAL VOLUME	PREP	25	1		mL	++					
SREV	PH SCREEN	PREP	13	1		units	++					
SREV	SULFIDE SCREEN	TEXT		1			++			-		
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Inorganic Prep

WG487912 **X-CN-WAD-MWMT**

Sample	Date	SCN	CHLORINE SCREEN	SULFIDE SCREEN
WG487912LRB	12/11/19 08:30		X	X
WG487912LFB	12/11/19 08:46		X	X
WG487250PBS	12/11/19 09:03		X	X
L56147-06	12/11/19 09:20		X	X
L56147-07	12/11/19 09:37		X	X
L56147-07LFM	12/11/19 09:54		X	X
L56147-08	12/11/19 10:11		X	X
L56147-09	12/11/19 10:28		X	X
L56147-10	12/11/19 10:44		X	X
L56147-11	12/11/19 11:01		X	X
WG487361PBS	12/11/19 11:18		X	X
L56147-01	12/11/19 11:35		X	X
L56147-02	12/11/19 11:52		X	X
L56147-03	12/11/19 12:09		X	X
L56147-04	12/11/19 12:26		X	X
L56147-05	12/11/19 12:43		X	X
L56147-05DUP	12/11/19 12:59		X	X

CHLORIDE-SOLIDS

QC List Type: QC-RFA-CL
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-CL-MWMT
QC Ref: WC-RFA-D-SOL
Group ID: WC-G-RFA-CL-MWMT
Method Ref: SM4500Cl-E
SOP Ref: SOPWC066

WG488095

ACZ Laboratories, Inc

Instrument ID: KONELAB
Analyst: WTC
ACZ Dept: 37
Create Date: 12/13/2019 12:08
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	Analysis Date	CLMWMT	Chloride (mg/L)	Dilution	Comments
1	WG488095ICV	WI190501-1	MWMT		1				☑		1	
2	WG488095ICB	NONE			1				☑		1	
3	WG488095LFB	WI190812-3			1				☑		1	
4	WG487250PBS	NONE			1				☑		1	
5	L56147-06	STSB29_6-15			1		2440		☑		~~2~~ 1	
6	L56147-06AS	WI190812-3			1				☑		~~2~~	
7	L56147-07	STSB29-FD_6-15			1		2430		☑		~~2~~	
8	L56147-07DUP	NONE			1				☑		~~2~~	
9	L56147-08	STSB30_0.5-3			1		2730		☑		~~2~~	
10	L56147-09	STSB30_6-15			1		3670		☑	WTC 12/13/19	~~2~~	
11	L56147-10	STSB31_0.5-3			1		5130		☑		~~8~~	
12	L56147-11	STSB31_6-15			1		3740		☑		~~2~~	
13	WG488095CCV1	WI190111-5			1				☑		1	
14	WG488095CCB1	NONE			1				☑		1	
15	L56147-01	STSB27_0.5-3			1		2940		☑		~~2~~ 1	
15	WG487361PBS	NONE			1				☑		1	
16	L56147-02	STSB27_6-15			1		2760		☑		~~2~~ 1	
17	L56147-03	STSB28_0.5-3			1		2750		☑		~~2~~	
18	L56147-04	STSB28_6-15			1		3040		☑		~~2~~	
19	L56147-05	STSB29_0.5-3			1		3540		☑		~~2~~	
20	L56019-04	SLOPE-01			1	9.9			☑		1	
20	L56019-06	SLOPE-02			1	12.9			☑		1	

Report Comments:

Internal Comments

AREV: WTC 12/13/19
Initials, Date

SREV: KRH 12-13-19
Initials, Date

12/13/2019 12:08:44 PM 112519

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: WTC
Date: 12/13/19

Instrument ID Konelab

SREV: KRH
Date: 12-13-19

Work Group: 488095
Sample Type: CL - MWMT
Analysis Date: 12/13/19
Analyst: WTC

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
2) Is a current standard/reagent sheet attached to the workgroup?	✓		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?			✓
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	✓		
5) Are all of the QC critera listed in LIMS within specified limits?	✓		
6) If applicable, was a passing PQV indcluded in the WG?			✓
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	✓		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)			✓
9) Was sample analysis completed within the holding time?	✓		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?			✓
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			✓
12) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? — Calibration WG: —

Prep WG#: 487250, 487361, 487687 Disposable Vessel Lot#*: A106310-97

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

CHLORIDE-SOLIDS

QC List Type: QC-RFA-CL
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-CL-MWMT
QC Ref: WC-RFA-D-SOL
Group ID: WC-G-RFA-CL-MWMT
Method Ref: SM4500Cl-E
SOP Ref: SOPWC066

WG488095

ACZ Laboratories, Inc

Instrument ID: KONELAB
Analyst:
ACZ Dept: 37
Create Date: 12/13/2019 12:08
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	Analysis Date	CLMWMT	Chloride (mg/L)	Dilution	Comments
20	L56019-08	SLOPE-03	MWMT		1	21.4			☑		1	
21	L56019-10	SLOPE-SE	↓		1	14.7			☑		1	
22	WG488095CCV2	WI190111-5			1				☑		1	
23	WG488095CCB2	NONE			1				☑		1	

Sample	Login Comments
L56019-04	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-06	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-08	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-10	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/13/2019 12:08:44 PM 112519

Meteoric Water Mobility

WG487250

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 16:20
End Date/Time: 12/06/2019 10:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487250CSTD1	NONE															
2	WG487250CSTD2	NONE															
3	WG487250CSTD3	NONE															
4	WG487250ICV	PCN58503	As Rec		12/04/19 16:20		4.04		4.04	4.04							21.5
5	WG487250PBS	NONE	As Rec		12/04/19 19:06		5.95	23	6.39	6.40	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
6	L56147-06	STSB29_6-15	As Rec		12/04/19 21:53	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
7	L56147-06MS	WI191023-2	As Rec		12/05/19 0:40	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
8	L56147-06MSD	II191127-2	As Rec		12/05/19 3:26	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
9	L56147-07	STSB29-FD_6-15	As Rec		12/05/19 6:13	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
10	L56147-07MS	MS190905-3	As Rec		12/05/19 9:00	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
11	L56147-07MSD	MS190905-3	As Rec		12/05/19 11:46	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
12	L56147-08	STSB30_0.5-3	As Rec		12/05/19 14:33	0	5.95	23	4.09	4.35	5000	5014.1	8.24	12/04/19 10:45	12/05/19 14:25	27.6666666667443	20.8
13	L56147-09	STSB30_6-15	As Rec		12/05/19 17:20	0	5.95	23	5.85	5.87	5000	5006.3	21.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.6
14	L56147-10	STSB31_0.5-3	As Rec		12/05/19 20:06	0	5.95	23	4.1	4.04	5000	5004.3	11.31	12/04/19 10:45	12/05/19 14:20	27.5833333333139	20.5
15	L56147-11	STSB31_6-15	As Rec		12/05/19 22:53	0	5.95	23	5.66	5.71	5000	5000.7	28.21	12/04/19 10:45	12/05/19 16:05	29.3333333334303	20.6
16	WG487250CCV1	PCN58503	As Rec		12/06/19 1:40		4.05		4.05	4.05							21.5
17	WG487250LFB1	II191127-2	As Rec		12/06/19 4:26	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
18	WG487250LFB2	MS190905-3	As Rec		12/06/19 7:13	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
19	WG487250CCV2	PCN58503	As Rec		12/06/19 10:00		4.05		4.04	4.04							21.4

Report Comments:

Internal Comments

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/13/2019 1:46:17 PM 121719

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487361

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/03/2019 1:50
End Date/Time: 12/05/2019 13:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487361CSTD1	NONE															
2	WG487361CSTD2	NONE															
3	WG487361CSTD3	NONE															
4	WG487361ICV	PCN58503	As Rec		12/03/19 1:50		4.01		4.01	4.01							20.7
5	WG487361PBS	NONE	As Rec		12/03/19 5:46	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
6	L56147-01	STSB27_0.5-3	As Rec		12/03/19 9:43	0	5.19	23	7.70	7.78	5000	5005.7	13.12	12/03/19 9:45	12/04/19 14:15	28.5	20.8
7	L56147-02	STSB27_6-15	As Rec		12/03/19 13:40	0	5.19	23	7.59	7.66	5000	5001.4	20.4	12/03/19 9:45	12/04/19 14:20	28.5833333332557	20.7
8	L56147-03	STSB28_0.5-3	As Rec		12/03/19 17:36	0	5.19	23	4.63	4.58	5000	5002.4	8.77	12/03/19 9:45	12/04/19 12:40	26.9166666667443	20.9
9	L56147-04	STSB28_6-15	As Rec		12/03/19 21:33	0	5.19	23	6.91	6.93	5000	5005.8	26.92	12/03/19 9:45	12/04/19 14:35	28.8333333333721	20.8
10	L56147-05	STSB29_0.5-3	As Rec		12/04/19 1:30	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
11	L56147-05MS1	MS191119-5	As Rec		12/04/19 5:26	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
12	L56147-05MSD1	MS191119-5	As Rec		12/04/19 9:23	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
13	L56147-05MS2	II191127-2	As Rec		12/04/19 13:20	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
14	L56147-05MSD2	II191127-2	As Rec		12/04/19 17:16	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
15	WG487361CCV1	PCN58503	As Rec		12/04/19 21:13		4.04		4.03	4.03							20.5
16	L56147-05DUP	NONE	As Rec		12/05/19 1:10	0	5.19	23	4.32	4.31	5000	5001.6	12.17	12/03/19 9:45	12/04/19 13:45	27.9999999999418	20.8
17	WG487361LFB1	II191127-2	As Rec		12/05/19 5:06	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
18	WG487361LFB2	MS191119-5	As Rec		12/05/19 9:03	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
19	WG487361CCV2	PCN58503	As Rec		12/05/19 13:00		4.02		4.01	4.01							20.5

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/13/2019 1:46:37 PM 121719

Meteoric Water Mobility

WG487687

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/09/2019 10:05
Start Date/Time: 12/09/2019 17:28
End Date/Time: 12/11/2019 9:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487687CSTD1	NONE															
2	WG487687CSTD2	NONE															
3	WG487687CSTD3	NONE															
4	WG487687ICV	PCN58503	As Rec		12/09/19 17:28		4.01		4.05	4.05							20.9
5	WG487687PBS	NONE	As Rec		12/09/19 20:17	0	4.73	23	6.17	6.32	0	5004	0	12/09/19 10:00	12/10/19 11:35	25.5833333334303	20.7
6	L56019-02	TOP01	As Rec		12/09/19 23:07	0	4.73	23	6.67	6.73	5000	5015.3	.83	12/09/19 10:00	12/10/19 14:55	28.9166666668025	20.6
7	L56019-02MS1	MS191119-5	As Rec		12/10/19 1:56	0	4.73	23	6.67	6.73	5000	5015.3	.83	12/09/19 10:00	12/10/19 14:55	28.9166666668025	20.6
8	L56019-02MSD1	MS191119-5	As Rec		12/10/19 4:45	0	4.73	23	6.67	6.73	5000	5015.3	.83	12/09/19 10:00	12/10/19 14:55	28.9166666668025	20.6
9	L56019-02MS2	Multiple	As Rec		12/10/19 7:35	0	4.73	23	6.67	6.73	5000	5015.3	.83	12/09/19 10:00	12/10/19 14:55	28.9166666668025	20.6
10	L56019-02MSD2	Multiple	As Rec		12/10/19 10:24	0	4.73	23	6.67	6.73	5000	5015.3	.83	12/09/19 10:00	12/10/19 14:55	28.9166666668025	20.6
11	L56019-04	SLOPE-01	As Rec		12/10/19 13:14	0	4.73	23	6.86	6.85	5000	5000.8	.47	12/09/19 10:00	12/10/19 12:50	26.8333333333139	20.4
12	L56019-06	SLOPE-02	As Rec		12/10/19 16:03	0	4.73	23	6.75	6.79	5000	5009	.59	12/09/19 10:00	12/10/19 14:00	28.0000000001164	20
13	L56019-08	SLOPE-03	As Rec		12/10/19 18:53	0	4.73	23	6.81	6.87	5000	5001.9	.7	12/09/19 10:00	12/10/19 13:40	27.6666666667443	19.8
14	L56019-10	SLOPE-SE	As Rec		12/10/19 21:42	0	4.73	23	6.88	6.9	5000	5013.3	.49	12/09/19 10:00	12/10/19 13:50	27.8333333334303	19.7
15	WG487687CCV1	PCN58503	As Rec		12/11/19 0:31		4.06		4.05	4.05							20.5
16	WG487687LFB1	Multiple	As Rec		12/11/19 3:21	0	4.73	23	6.17	6.32	0	5004	0	12/09/19 10:00	12/09/19 11:35	1.58333333343035	20.7
17	WG487687LFB2	MS191119-5	As Rec		12/11/19 6:10	0	4.73	23	6.17	6.32	0	5004	0	12/09/19 10:00	12/09/19 11:35	1.58333333343035	20.7
18	WG487687CCV2	PCN58503	As Rec		12/11/19 9:00		4.05		4.05	4.05							20.7

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/13/2019 1:47:47 PM 112519

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: Konelab

Parameter: Chloride

Working Standards Preparation: See SOP

Instrument Reagents	SCN	**Prep By:**	**Expiration Date:**
1) Combined Color Reagent	WIR191025-4	rbt	12/25/2019

*All Standards and Reagents prepared according to SOP.

Calibration results AquaKem 6.5 Page: 1

ACZ Laboratory
Konelab User

13.12.2019 15:08

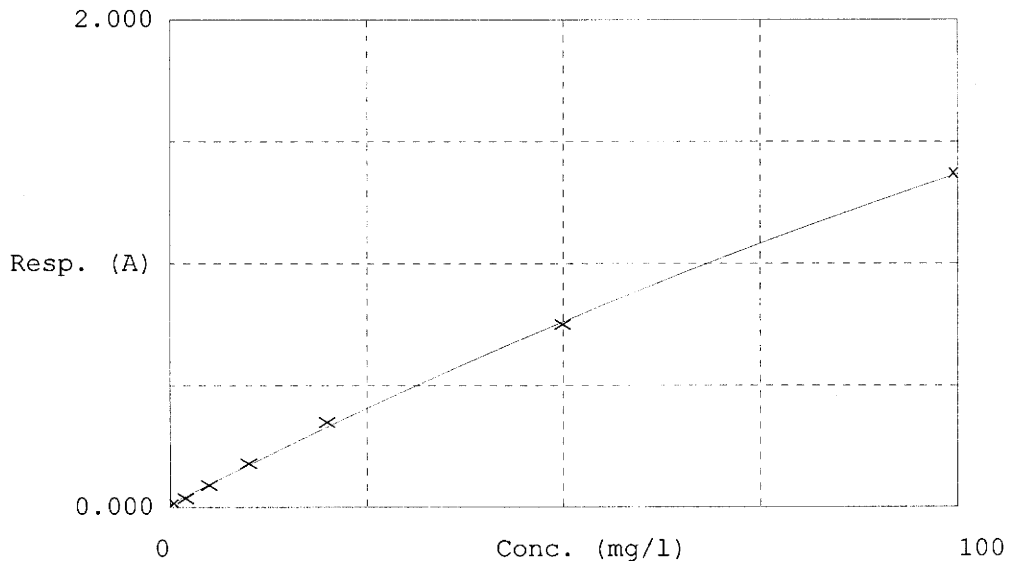
Test Chloride

Accepted 13.12.2019 11:30

Resp. = A * Conc. ^ 2 + B * Conc. + C
A = 0
B = 0.016
C = 0.012

Coeff. of det. 0.999615

Errors



	Calibrator	Response	Calc. con.	Conc.	Errors
1	Cl-0	0.011	-0.026645	0.000000	
2	CL-100	0.036	1.447845	2.000000	
3	CL-100	0.090	4.766045	5.000000	
4	CL-100	0.179	10.329221	10.000000	
5	CL-100	0.347	21.149303	20.000000	
6	CL-100	0.751	49.138161	50.000000	
7	CL-100	1.368	100.206017	100.000000	
8	CL-ICB(control)	0.009	-0.146468	0.000000	
9	CL-ICV(control)	0.832	55.189999	55.000000	

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488095

Date Reported: 13-Dec-19
Run ID: R1764521
Date Analyzed: 13-Dec-19
ICAL Workgroup:
Instrument ID: KONELAB

WG488095ICB

Tag: Measured: 12/13/2019 11:30:31 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND		1	U	mg/L	++	0.5	2			

WG488095ICV

Tag: Measured: 12/13/2019 11:30:32 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND	55.19	1		mg/L	++	0.5	2			
SREV	CHLORIDE	REC	101	1		%	++	0.5	2			

WG488095CCV1

Tag: Measured: 12/13/2019 12:53:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND	49.27	1		mg/L	++	0.5	2			
SREV	CHLORIDE	REC	98	1		%	++	0.5	2			

WG488095CCB1

Tag: Measured: 12/13/2019 12:53:11 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND		1	U	mg/L	++	0.5	2			

WG488095LFB

Tag: Measured: 12/13/2019 12:53:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND	31.86	1		mg/L	++	0.5	2			
SREV	CHLORIDE	REC	106	1		%	++	0.5	2			

WG487250PBS

Tag: Measured: 12/13/2019 12:53:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND		1	U	mg/L	++	0.5	2			

L56147-06

Tag: Measured: 12/13/2019 12:53:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	10.2	1		mg/L	++	0.5	2		HD TB	

L56147-06AS

Tag: Measured: 12/13/2019 12:53:15 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND	41.16	1		mg/L	++	0.5	2			
SREV	CHLORIDE	REC	103	1		%	++	0.5	2			

L56147-07

Tag: Measured: 12/13/2019 12:53:16 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	8.9	1		mg/L	++	0.5	2		HD TB	

L56147-07DUP Tag: Measured: 12/13/2019 12:53:17 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND	9.02	1		mg/L	++	0.5	2			
SREV	CHLORIDE	RPD	1	1		%	++	0.5	2			

L56147-08 Tag: Measured: 12/13/2019 12:53:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	1.9	1	B	mg/L	++	0.5	2		HD TB	

L56147-09 Tag: Measured: 12/13/2019 12:53:19 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	17.2	1		mg/L	++	0.5	2		HD TB	

L56147-10 Tag: Measured: 12/13/2019 12:53:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	12.6	1		mg/L	++	0.5	2		HD TB	

L56147-11 Tag: Measured: 12/13/2019 12:53:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	7.6	1		mg/L	++	0.5	2		HD TB	

WG488095CCV2 Tag: Measured: 12/13/2019 12:55:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND	51.41	1		mg/L	++	0.5	2			
SREV	CHLORIDE	REC	103	1		%	++	0.5	2			

WG488095CCB2 Tag: Measured: 12/13/2019 12:55:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND		1	U	mg/L	++	0.5	2			

WG487361PBS Tag: Measured: 12/13/2019 12:55:09 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND		1	U	mg/L	++	0.5	2			

L56147-01 Tag: Measured: 12/13/2019 12:55:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	3.6	1		mg/L	++	0.5	2		HD TB	

L56147-02 Tag: Measured: 12/13/2019 12:55:11 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	5.1	1		mg/L	++	0.5	2		HD TB	

L56147-03 Tag: Measured: 12/13/2019 12:55:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	2.2	1		mg/L	++	0.5	2		HD TB	

L56147-04

Tag: Measured: 12/13/2019 12:55:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	20.9	1		mg/L	++	0.5	2		HD TB	

L56147-05

Tag: Measured: 12/13/2019 12:55:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT	3.3	1		mg/L	++	0.5	2		HD TB	

L56019-08

Tag: Measured: 12/13/2019 12:55:15 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT		1	U	mg/L	++	0.5	2		HD TA TB	

L56019-04

Tag: Measured: 12/13/2019 12:55:16 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT		1	U	mg/L	++	0.5	2		HD TA TB	

L56019-06

Tag: Measured: 12/13/2019 12:55:17 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT		1	U	mg/L	++	0.5	2		HD TA TB	

L56019-10

Tag: Measured: 12/13/2019 12:55:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	CL-MWMT		1	U	mg/L	++	0.5	2		HD TA TB	

WG488095CCV3

Tag: Measured: 12/13/2019 12:55:34 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND	51.54	1		mg/L	++	0.5	2			
SREV	CHLORIDE	REC	103	1		%	++	0.5	2			

WG488095CCB3

Tag: Measured: 12/13/2019 12:55:35 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CHLORIDE	FOUND		1	U	mg/L	++	0.5	2			

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG488095 **CHLORIDE-SOLIDS**

Sample	Date	SCN	CHLORIDE
WG488095ICB	12/13/19 11:30		X
WG488095ICV	12/13/19 11:30	WI190501-1	X
WG487250PBS	12/13/19 12:53		X
WG488095CCB1	12/13/19 12:53		X
L56147-07DUP	12/13/19 12:53		X
L56147-11	12/13/19 12:53		X
L56147-07	12/13/19 12:53		X
WG488095CCV1	12/13/19 12:53	WI190111-5	X
L56147-10	12/13/19 12:53		X
WG488095LFB	12/13/19 12:53	WI190812-3	X
L56147-09	12/13/19 12:53		X
L56147-08	12/13/19 12:53		X
L56147-06	12/13/19 12:53		X
L56147-06AS	12/13/19 12:53	WI190812-3	X
L56147-03	12/13/19 12:55		X
L56019-10	12/13/19 12:55		X
L56147-05	12/13/19 12:55		X
L56019-04	12/13/19 12:55		X
WG487361PBS	12/13/19 12:55		X
L56147-02	12/13/19 12:55		X
WG488095CCB3	12/13/19 12:55		X
L56019-08	12/13/19 12:55		X
WG488095CCB2	12/13/19 12:55		X
WG488095CCV3	12/13/19 12:55	WI190111-5	X
L56147-01	12/13/19 12:55		X
WG488095CCV2	12/13/19 12:55	WI190111-5	X

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG488095 **CHLORIDE-SOLIDS**

Sample	Date	SCN	CHLORIDE
L56147-04	12/13/19 12:55		X
L56019-06	12/13/19 12:55		X

N-NO3NO2-DISSOLVED

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-NO3NO2
QC Ref: WC-INST-AQ-PQV
Group ID: WC-G-RFA-NO3NO2-D
Method Ref: M353.2
SOP Ref: SOPWC016

WG487529

ACZ Laboratories, Inc

Instrument ID: FIA2
Analyst: PJD
ACZ Dept: 37
Create Date: 12/05/2019 20:43
Start Date/Time: 12/5/19
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	NNO2	NNO3NO2	pH Screen (units)	Chlorine Screen	Nitrite (mg/L)	Nitrate/Nitrite (mg/L)	Dilution	Comments
1	WG487529ICV	WI191112-1			✓	✓					1	
2	WG487529ICB	NONE			✓	✓					1	
3	WG487529LFB	WI191004-3			✓	✓					1	
4	L56245-02	GUNN-WWTP EFF	W		✓	✓	7	–			1	f. lt.
5	L56245-02AS	WI191004-3			✓	✓		–			1	
6	L56246-01	REG 85			✓	✓	7	–			1	
7	L56246-01DUP	NONE			✓	✓		–			1	
8	L56248-02	R2FD191204402			✓	✓	7	–			~~1~~ 10	o-cal
9	L56248-03	R2DS191204403			✓	✓	7	–			~~1~~ 4	
10	L56249-01	FK191204401			✓	✓	7	–			~~1~~ 3	
11	L56249-02	FK191204402			✓	✓	7	–			1	
12	L56250-01	RW191204401			✓	✓	7	–			1	
13	L56252-03	R1FD191204402			✓	✓	7	–			~~1~~ 20	o-cal
14	WG487529CCV1	WI191203-3			✓	✓					1	
15	WG487529CCB1	NONE			✓	✓				PJD 12/5/19	1	
16	L56252-04	R1FD191204402	W		✓	✓	7	–			1	
17	L56253-02	R3FD191204402			✓	✓	7	–			~~1~~ 15	o-cal
18	L56253-03	R3DS191204402			✓	✓	7	–			~~1~~ 5	
19	L56253-03AS	WI191004-3			✓	✓		–			~~1~~ 5	
20	L56254-01	GROUNDWATER			✓	✓	7	–			1	f. lt
21	L56254-01DUP	NONE			✓	✓		–			1	
22	L56257-01	EFFLUENT 003A (24HC)			✓	✓	7	–			~~1~~ 3	o-cal

Report Comments:

Internal Comments

AREV: PJD 12/~~5~~6/19
Initials, Date PJD 12/6/19

SREV: KRH 12-6-19
Initials, Date

12/5/2019 8:44:26 PM 121319

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: PJS
Date: 12/6/19

SREV: XRH
Date: 12-6-19

Instrument ID: FIA2

Work Group: 487529
Sample Type: NO3NO2-D
Analysis Date: 12/5/19
Analyst: PJS

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	X		
2) Is a current standard/reagent sheet attached to the workgroup?	X		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?	X		
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	X		
5) Are all of the QC critera listed in LIMS within specified limits?		X	
6) If applicable, was a passing PQV indcluded in the WG?			X
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	X		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	X		
9) Was sample-analysis completed within the holding time?	X		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?	X		
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			X
12) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		X

KRH 12-6-19

Continuing Calibration? no Calibration WG: —

Prep WG#: N/A Disposable Vessel Lot#*: A106310-97

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
245-02	small amount filtered	2U
246-01		
254-01		
257-01 → 03		
265-01		
280-01		
246-01	OVR <10X MDL	RA
254-01	OVR	
254-01	OVR carry over	repeat w end
272-01		
252-01		
253-03	MS low recovery 89%	M2

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

N-NO3NO2-DISSOLVED

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-NO3NO2
QC Ref: WC-INST-AQ-PQV
Group ID: WC-G-RFA-NO3NO2-D
Method Ref: M353.2
SOP Ref: SOPWC016

WG487529

ACZ Laboratories, Inc

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/05/2019 20:43
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	NNO2	NNO3NO2	pH Screen (units)	Chlorine Screen	Nitrite (mg/L)	Nitrate/Nitrite (mg/L)	Dilution	Comments
23	L56257-02	RIVER UPSTREAM (GR)	W		☑	☑	7	-			1	filt.
24	L56257-03	RIVER DOWNSTREAM (GR			☑	☑	7	-			1	
25	L56265-01	PLANT EFFLUENT			☑	☑	7	-			1	10
26	WG487529CCV2	WI191203-3			☑	☑					1	
27	WG487529CCB2	NONE			☑	☑					1	
28	L56272-01	UR-006-TRASW	W		☑	☑	7	-			1	
29	L56272-02	UR-04-TRASW			☑	☑	7	-			1	
30	L56280-01	MW-5			☑	☑	7	-			1	filt.
31	WG487529CCV3	WI191203-3			☑	☑					1	
32	WG487529CCB3	NONE			☑	☑					1	

PJB 12/5/19

Report Comments:

Internal Comments

AREV: Initials, Date

SREV: Initials, Date

12/5/2019 8:44:28 PM 121319

L56147-2001131042

N-NO3NO2-DISSOLVED

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-NO3NO2
QC Ref: WC-INST-AQ-PQV
Group ID: WC-G-RFA-NO3NO2-D
Method Ref: M353.2
SOP Ref: SOPWC016

WG487529

ACZ Laboratories, Inc

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/05/2019 20:43
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56245-02	WF,Y ||
L56246-01	WF,Y ||
L56248-02	P,U,W,RPC,Y ||
L56248-03	P,U,W,RPC,Y ||
L56249-01	P,U,W,RPC,Y ||
L56249-02	P,U,W,RPC,Y ||
L56250-01	P,U,W,RPC,Y ||
L56252-03	P,U,W,RPC,Y ||
L56252-04	P,U,W,RPC,Y ||
L56253-02	P,U,W,RPC,Y ||
L56253-03	P,U,W,RPC,Y ||
L56254-01	P,U,WF,RPC,GPCFA,GPDPC,Y ||
L56257-01	WF,Y ||
L56257-02	WF,Y ||
L56257-03	WF,Y ||
L56265-01	WF,Y ||
L56272-01	U,W,RPC,GPC,Y,BGFA,T || U,W,RPC,GPC,Y,BGFA,T ||
L56272-02	U,W,RPC,GPC,Y,BGFA,T || U,W,RPC,GPC,Y,BGFA,T ||
L56280-01	U,WF,RPC,GFA,Y,VLUP(3) ||

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/5/2019 8:44:28 PM 121319

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: Lachat

Parameter: NO_3NO_2 / Dissolved / Yellow / Sludge / KCL / MWMT / WE / 1312

Standard Preparation & Documentation

Instrument Reagents	SCN/PCN	Prepped by:	Expiration Date:
1) Stock Ammonium Chloride EDTA Buffer	WIR191116-1	pjb	11/16/2020
2) NO3NO2 and NO2 Color Reagent	WIR191120-4	pjb	2/20/2020
3) NH4OH (yellows and KCls only)	PCN52830		12/31/2019
4) HCl (yellows only)	PCN52674		10/31/2021

***Refer to SOP for standard and reagent prep.**

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: Lachat

Parameter: NO_3NO_2 Dissolved / Yellow / Sludge / KCL / MWMT / WE / 1312

Standard Preparation & Documentation

Instrument Reagents	SCN/PCN	Prepped by:	Expiration Date:
1) Stock Ammonium Chloride EDTA Buffer	WIR191116-1	pjb	11/16/2020
2) NO3NO2 and NO2 Color Reagent	WIR191120-4	pjb	2/20/2020
3) NH4OH (yellows and KCls only)	PCN52830		12/31/2019
4) HCl (yellows only)	PCN52674		10/31/2021

***Refer to SOP for standard and reagent prep.**

Author: wcins

Date : 12/5/2019

Channel 2 (NO2) - Set: 4 / 4

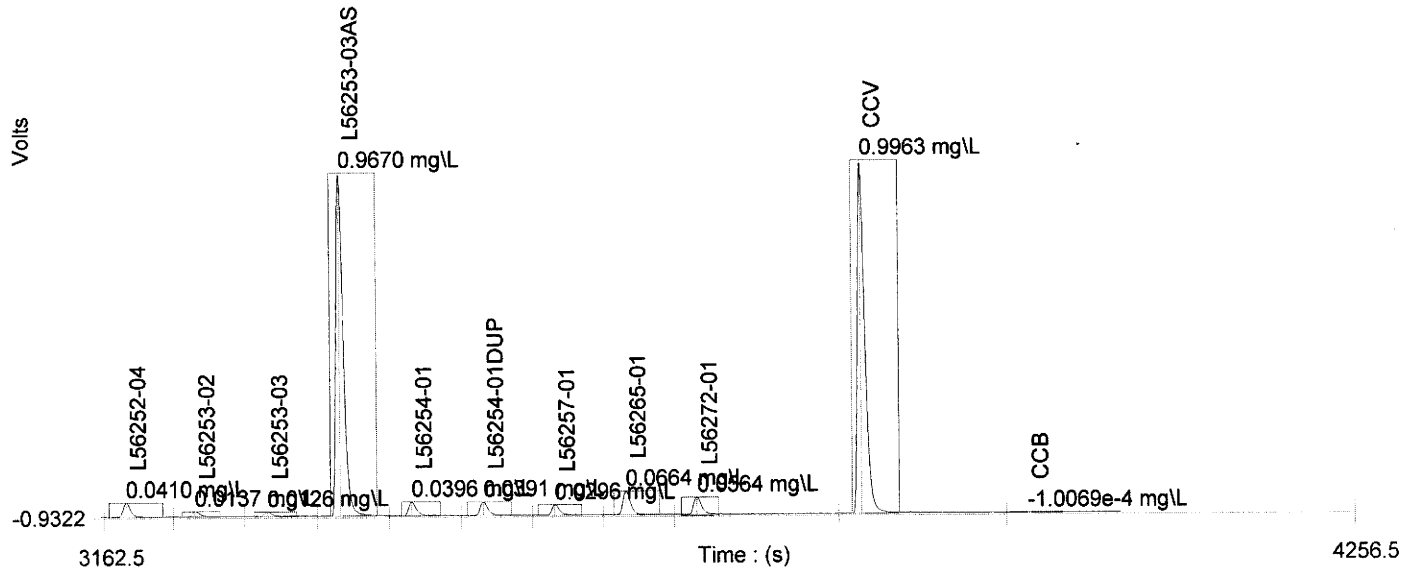


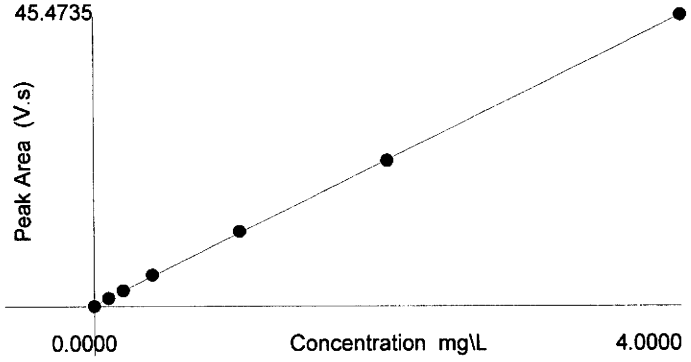
Table : 1 (NO3NO2)

	Known Conc. (mg\L)	Rep.	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc (mg\L)	Detection Date	Detection Time
1	4.0000	1	45.4735	3.6385	0.0	0.0	3.9991	12/5/2019	9:06:57 PM
2	2.0000	1	22.7271	1.8823	0.0	0.4	1.9912	12/5/2019	9:08:12 PM
3	1.0000	1	11.6683	0.9786	0.0	-1.5	1.0150	12/5/2019	9:09:27 PM
4	0.4000	1	4.8757	0.4104	0.0	-3.7	0.4154	12/5/2019	9:10:42 PM
5	0.2000	1	2.4293	0.2033	0.0	0.3	0.1995	12/5/2019	9:11:58 PM
6	0.1000	1	1.2499	0.1020	0.0	4.1	0.0954	12/5/2019	9:13:14 PM
7	0.0000	1	-0.0062	-0.0017			-0.0155	12/5/2019	9:14:31 PM

Author: wcins

Date : 12/5/2019

Figure : 1 (NO3NO2)



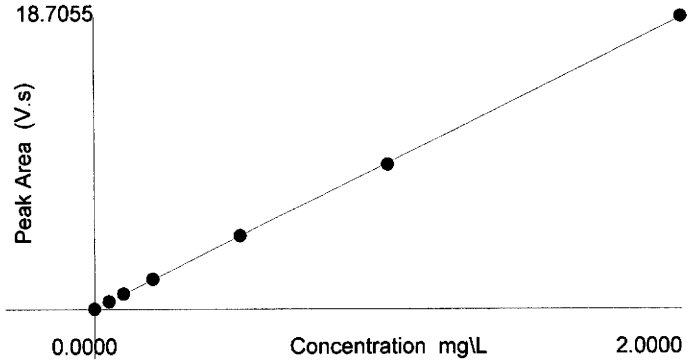
Area = 11.3280 * Conc + 0.1703
Conc = 0.0883 * Area - 0.0150
Correlation Coefficient (r) = 0.99997

Weighting : None

Table : 2 (NO2)

	Known Conc. (mg\L)	Rep.	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc (mg\L)	Detection Date	Detection Time
1	2.0000	1	18.7055	2.5036	0.0	-0.3	2.0055	12/5/2019	9:06:59 PM
2	1.0000	1	9.2256	1.2228	0.0	1.2	0.9880	12/5/2019	9:08:14 PM
3	0.5000	1	4.6771	0.6262	0.0	0.0	0.4998	12/5/2019	9:09:29 PM
4	0.2000	1	1.9157	0.2558	0.0	-1.7	0.2034	12/5/2019	9:10:44 PM
5	0.1000	1	0.9787	0.1303	0.0	-2.7	0.1028	12/5/2019	9:12:00 PM
6	0.0500	1	0.4957	0.0653	0.0	-1.8	0.0510	12/5/2019	9:13:16 PM
7	0.0000	1	0.0171	0.0012			-3.9255e-4	12/5/2019	9:14:33 PM

Figure : 2 (NO2)



Area = 9.3163 * Conc + 0.0211
Conc = 0.1073 * Area - 0.0022
Correlation Coefficient (r) = 0.99997

Weighting : None

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487529

Date Reported: 06-Dec-19
Run ID: R1763098
Date Analyzed: 05-Dec-19
ICAL Workgroup:
Instrument ID: FIA2

WG487529ICV

Tag: Measured: 12/5/2019 9:17:29 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.378 ✓	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	98	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.591	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	97 ✓	1		%	++	0.01	0.05			

WG487529ICB

Tag: Measured: 12/5/2019 9:18:46 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	NITRITE	FOUND		1	U ✓	mg/L	++	0.01	0.05			

WG487529LFB

Tag: Measured: 12/5/2019 9:22:34 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	1.919	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	96	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.951	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	95	1		%	++	0.01	0.05			

L56245-02

Tag: Measured: 12/5/2019 9:23:50 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	N-NO3NO2	1.67	1		mg/L	++	0.02	0.1		RA ZU	
SREV	NITRITE	N-NO2	.08	1		mg/L	++	0.01	0.05		RA ZU	

L56245-02AS

Tag: Measured: 12/5/2019 9:25:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	3.495	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	91	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	1.052	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	97	1		%	++	0.01	0.05			

L56246-01

Tag: Measured: 12/5/2019 9:26:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	N-NO3NO2	.14	1		mg/L	++	0.02	0.1		Q6 RA ZU	
SREV	NITRITE	N-NO2		1	U	mg/L	++	0.01	0.05		Q6 RA ZU	

L56246-01DUP

Tag: Measured: 12/5/2019 9:27:36 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	0.156	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	RPD	11	1		%	++	0.02	0.1		RA	
SREV	NITRITE	FOUND		1	U	mg/L	++	0.01	0.05			
SREV	NITRITE	RPD	0	1		%	++	0.01	0.05		RA	

N-NO3NO2-MWMT

WG487531

ACZ Laboratories, Inc

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-ACFA-NO3NO2-MWMT
QC Ref: WC-RFA-D-SOL
Group ID: WC-G-RFA-NO3NO2-MWM
Method Ref: M353.2
SOP Ref: SOPWC016

Instrument ID: FIA2
Analyst: PJJ
ACZ Dept: 37
Create Date: 12/05/2019 22:36
Start Date/Time: 12/5/19
End Date/Time:

L56147-2001131042

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	N NO2 MWMT	N NO3NO2 MWMT	Nitrate/Nitrite (mg/L)	Nitrite (mg/L)	ph screen (units)	Chlorine Screen	Dilution	Comments
1	WG487531ICV	WI191112-1			1	☑	☑					1	
2	WG487531ICB	NONE			1	☑	☑					1	
3	WG487531LFB	WI191004-3			1	☑	☑					1	
4	WG487361PBS	NONE	W		1	☑	☑			7	-	1	
5	L56147-01	STSB27_0.5-3			1	☑	☑			7	-	1	
6	L56147-01AS	WI191004-3			1	☑	☑			7	-	1	
7	L56147-02	STSB27_6-15			1	☑	☑			7	-	1	
8	L56147-03	STSB28_0.5-3			1	☑	☑			8-adjusted	-	1	centrifuged
9	L56147-04	STSB28_6-15			1	☑	☑			7	-	1	
10	L56147-05	STSB29_0.5-3			1	☑	☑			8-adjusted	-	1	centrifuged
11	~~L56147-05MS1~~	~~MS190905-3~~			1	☑	☑					1	
12	~~L56147-05MSD1~~	~~MS190905-3~~	PJJ 12/5/19		1	☑	☑					1	
13	WG487531CCV1	WI191203-3			1	☑	☑					1	
14	WG487531CCB1	NONE			1	☑	☑					1	
15	~~L56147-05MS2~~	~~II191127-2~~			1	☑	☑					1	
16	~~L56147-05MSD2~~	~~II191127-2~~			1	☑	☑					1	
17	L56147-05DUP	NONE	W		1	☑	☑			8-adjusted	-	1	centrifuged
18	WG487531CCV2	WI191203-3			1	☑	☑					1	
19	WG487531CCB2	NONE			1	☑	☑					1	

Report Comments:

Internal Comments

AREV: PJJ 12/6/19
Initials, Date

SREV: KRH 12-6-19
Initials, Date

12/5/2019 10:36:31 PM 121719

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: PJG
Date: 12/6/19

SREV: KRH
Date: 12-6-19

Instrument ID: FIA2

Work Group: 487531
Sample Type: NO3NO2-NWM
Analysis Date: 12/5/19
Analyst: PJG

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	X		
2) Is a current standard/reagent sheet attached to the workgroup?	X		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?	X		
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	X		
5) Are all of the QC critera listed in LIMS within specified limits?	X		
6) If applicable, was a passing PQV indcluded in the WG?			X
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	X		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	X	KRH 12-6-19	OK @ SREV ✓
9) Was sample-analysis completed within the holding time?	X		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?	X		
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			X
12) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		X KRH 12-6-19

Continuing Calibration? yes Calibration WG: 487529

Prep WG#: 487361 Disposable Vessel Lot#*: A106310-97

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
147-03 DUP	<10 x MDL	RA

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

N-NO3NO2-MWMT

WG487531

ACZ Laboratories, Inc

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-ACFA-NO3NO2-MWMT
QC Ref: WC-RFA-D-SOL
Group ID: WC-G-RFA-NO3NO2-MWM
Method Ref: M353.2
SOP Ref: SOPWC016

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/05/2019 22:36
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MS2	ICP Spike
L56147-05MSD1	ICPMS Spike
L56147-05MSD2	ICP Spike

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/5/2019 10:36:31 PM 121719

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487361

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/03/2019 1:50
End Date/Time: 12/05/2019 13:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487361CSTD1	NONE															
2	WG487361CSTD2	NONE															
3	WG487361CSTD3	NONE															
4	WG487361ICV	PCN58503	As Rec		12/03/19 1:50		4.01		4.01	4.01							20.7
5	WG487361PBS	NONE	As Rec		12/03/19 5:46	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
6	L56147-01	STSB27_0.5-3	As Rec		12/03/19 9:43	0	5.19	23	7.70	7.78	5000	5005.7	13.12	12/03/19 9:45	12/04/19 14:15	28.5	20.8
7	L56147-02	STSB27_6-15	As Rec		12/03/19 13:40	0	5.19	23	7.59	7.66	5000	5001.4	20.4	12/03/19 9:45	12/04/19 14:20	28.5833333332557	20.7
8	L56147-03	STSB28_0.5-3	As Rec		12/03/19 17:36	0	5.19	23	4.63	4.58	5000	5002.4	8.77	12/03/19 9:45	12/04/19 12:40	26.9166666667443	20.9
9	L56147-04	STSB28_6-15	As Rec		12/03/19 21:33	0	5.19	23	6.91	6.93	5000	5005.8	26.92	12/03/19 9:45	12/04/19 14:35	28.8333333333721	20.8
10	L56147-05	STSB29_0.5-3	As Rec		12/04/19 1:30	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
11	L56147-05MS1	MS190905-3	As Rec		12/04/19 5:26	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
12	L56147-05MSD1	MS190905-3	As Rec		12/04/19 9:23	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
13	L56147-05MS2	Multiple	As Rec		12/04/19 13:20	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
14	L56147-05MSD2	Multiple	As Rec		12/04/19 17:16	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
15	WG487361CCV1	PCN58503	As Rec		12/04/19 21:13		4.04		4.03	4.03							20.5
16	L56147-05DUP	NONE	As Rec		12/05/19 1:10	0	5.19	23	4.32	4.31	5000	5001.6	12.17	12/03/19 9:45	12/04/19 13:45	27.9999999999418	20.8
17	WG487361LFB1	Multiple	As Rec		12/05/19 5:06	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
18	WG487361LFB2	MS190905-3	As Rec		12/05/19 9:03	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
19	WG487361CCV2	PCN58503	As Rec		12/05/19 13:00		4.02		4.01	4.01							20.5

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 1:02:00 AM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487531

Date Reported:	06-Dec-19
Run ID:	R1763099
Date Analyzed:	05-Dec-19
ICAL Workgroup:	WG487529
Instrument ID:	FIA2

WG487531CCV1

Tag: Measured: 12/5/2019 10:44:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.06	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	103	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.998 ✓	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	100	1		%	++	0.01	0.05			

WG487531CCB1

Tag: Measured: 12/5/2019 10:47:03 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U ✓	mg/L	++	0.02	0.1			
SREV	NITRITE	FOUND		1	U	mg/L	++	0.01	0.05			

WG487531LFB

Tag: Measured: 12/5/2019 10:48:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	1.95 ✓	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	98	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.942	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	94	1		%	++	0.01	0.05			

WG487361PBS

Tag: Measured: 12/5/2019 10:49:37 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	NITRITE	FOUND		1	U ✓	mg/L	++	0.01	0.05			

~~L56147-01~~

Tag: Measured: 12/5/2019 10:50:54 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT		1	U	mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-01AS

Tag: Measured: 12/5/2019 10:52:11 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.044	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	102	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.993 ✓	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	99	1		%	++	0.01	0.05			

~~L56147-02~~

Tag: Measured: 12/5/2019 10:53:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.14	1		mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-03

Tag: Measured: 12/5/2019 10:54:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.29	1		mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-04

Tag: Measured: 12/5/2019 10:56:01 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.13	1		mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-05

Tag: Measured: 12/5/2019 10:57:17 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.16	1		mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-05DUP

Tag: Measured: 12/5/2019 10:58:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	0.159 ✓	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	RPD	1	1		%	++	0.02	0.1		RA	
SREV	NITRITE	FOUND		1	U	mg/L	++	0.01	0.05			
SREV	NITRITE	RPD	0	1		%	++	0.01	0.05		RA	

WG487531CCV2

Tag: Measured: 12/5/2019 11:01:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.059 ✓	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	103	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	1.003	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	100	1		%	++	0.01	0.05			

WG487531CCB2

Tag: Measured: 12/5/2019 11:04:24 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	NITRITE	FOUND		1	U ✓	mg/L	++	0.01	0.05			

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487531 **N-NO3NO2-MWMT**

Sample	Date	SCN	NITRATE/NITRITE	NITRITE
WG487531CCV1	12/05/19 22:44	WI191203-3	X	X
WG487531CCB1	12/05/19 22:47		X	X
WG487531LFB	12/05/19 22:48	WI191004-3	X	X
WG487361PBS	12/05/19 22:49		X	X
L56147-01	12/05/19 22:50		X	X
L56147-01AS	12/05/19 22:52	WI191004-3	X	X
L56147-02	12/05/19 22:53		X	X
L56147-03	12/05/19 22:54		X	X
L56147-04	12/05/19 22:56		X	X
L56147-05	12/05/19 22:57		X	X
L56147-05DUP	12/05/19 22:58		X	X
WG487531CCV2	12/05/19 23:01	WI191203-3	X	X
WG487531CCB2	12/05/19 23:04		X	X

L56147-2001131042

N-NO3NO2-DISSOLVED

WG487641

ACZ Laboratories, Inc

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-NO3NO2
QC Ref: WC-INST-AQ-PQV
Group ID: WC-G-RFA-NO3NO2-D
Method Ref: M353.2
SOP Ref: SOPWC016

Instrument ID: FIA2
Analyst: PJB
ACZ Dept: 37
Create Date: 12/06/2019 19:34
Start Date/Time: 12/6/19
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	NO2	NO3NO2	pH Screen (units)	Chlorine Screen	Nitrite (mg/L)	Nitrate/Nitrite (mg/L)	Dilution	Comments
1	WG487641ICV	WI191112-1			☑	☑					1	
2	WG487641ICB	NONE			☑	☑					1	
3	WG487641LFB1	WI191004-3			☑	☑					1	
4	L56294-01	UPSTREAM	W		☑	☑	7	–			~~15~~ –	filt. o-cal
5	L56294-01AS	WI191004-3			☑	☑	7	–			~~15~~ –	
6	L56294-02	DOWNSTREAM			☑	☑	7	–			~~13~~ –	
7	L56294-02DUP	NONE			☑	☑	7	–			~~13~~ –	
8	L56295-01	EFFLUENT			☑	☑	7	–		PJB 12/6/19	~~15~~ –	
9	L56296-01	INFLUENT			☑	☑	7	–			1	
10	L56297-01	IPW-20			☑	☑	7	–			1	
11	L56297-02	IPW-40			☑	☑	7	–			1	
12	L56298-01	FRE			☑	☑	7	–			1	
13	L56298-02	FRE-DUP			☑	☑	7	–			1	filt.
14	WG487641CCV1	WI191203-3			☑	☑					1	
15	WG487641CCB1	NONE			☑	☑					1	
16	L56298-03	TMS	W		☑	☑	7	–			1	filt.
17	L56298-04	BR1			☑	☑	7	–			1	
18	L56298-05	BR6			☑	☑	7	–			1	
19	L56298-05AS	WI191004-3			☑	☑	7	–			1	
20	L56298-06	STL			☑	☑	7	–			1	
21	L56298-06DUP	NONE			☑	☑	7	–			1	
22	L56298-07	SDE			☑	☑	7	–			~~15~~	o-cal

Report Comments:

Internal Comments

AREV: PJB 12/7/19
Initials, Date

SREV: KRH ~~10~~ 12 10-10-19 KRH 12-10-19
Initials, Date

12/6/2019 7:35:01 PM 121719

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: PJB
Date: 12/7/19

SREV: KRH
Date: 12-10-19

Instrument ID FIA2

Work Group: 487641
Sample Type: N03N02-D
Analysis Date: 12/6/19
Analyst: PJB

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	X		
2) Is a current standard/reagent sheet attached to the workgroup?	X		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?	X		
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	X		
5) Are all of the QC critera listed in LIMS within specified limits?	X		
6) If applicable, was a passing PQV indcluded in the WG?			X
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	X		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	X		
9) Was sample analysis completed within the holding time?	X		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?	X		
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			X
12) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? No

Calibration WG: —

Prep WG#: N/A

Disposable Vessel Lot#*: A106310-97

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
294-01,02	small amount filtered	2V
295-01		
296-01		
298-01 → 16		
295-01	S5295-01 not S8295-01 (used raw - filtered - because no white)	repeat in R group
294-02 / DUP	<10x MDL	RA
298-06 / DUP		
-16 / DUP		

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

N-NO3NO2-DISSOLVED

WG487641

ACZ Laboratories, Inc

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-NO3NO2
QC Ref: WC-INST-AQ-PQV
Group ID: WC-G-RFA-NO3NO2-D
Method Ref: M353.2
SOP Ref: SOPWC016

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/06/2019 19:34
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	NO2	NO3NO2	pH Screen (units)	Chlorine Screen	Nitrite (mg/L)	Nitrate/Nitrite (mg/L)	Dilution	Comments
23	L56298-08	BRE	w		☑	☑	7				1	f./t
24	L56298-09	BRL	↓		☑	☑	7				1	↓
25	L56298-10	BR5			☑	☑	7				1	
26	WG487641CCV2	WI191203-3			☑	☑					1	
27	WG487641CCB2	NONE			☑	☑					1	
28	L56298-11	TMU	w		☑	☑	7				1	f./t
29	L56298-12	ABV CME	↓		☑	☑	7				1	↓
30	L56298-13	CME			☑	☑	7				1	
31	L56298-14	SOD			☑	☑	7				1	
32	WG487641LFB2	WI191004-3			☑	☑					1	
33	L56298-15	SRE	w		☑	☑	7				1	f./t.
34	L56298-15AS	WI191004-3	↓		☑	☑	7				1	↓
35	L56298-16	SRL			☑	☑	7				1	
36	L56298-16DUP	NONE			☑	☑	7				1	
37	WG487641CCV3	WI191203-3			☑	☑					1	
38	WG487641CCB3	NONE			☑	☑					1	

Report Comments:

Internal Comments

AREV: _____ Initials, Date

SREV: _____ Initials, Date

12/6/2019 7:35:03 PM 121719

N-NO3NO2-DISSOLVED

WG487641

ACZ Laboratories, Inc

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-NO3NO2
QC Ref: WC-INST-AQ-PQV
Group ID: WC-G-RFA-NO3NO2-D
Method Ref: M353.2
SOP Ref: SOPWC016

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/06/2019 19:34
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56294-01	WF,Y ||
L56294-02	WF,Y ||
L56295-01	U,WF,RPC,GPCFA,GPDPC,Y ||
L56296-01	U,WF,RPC,GPCFA,GPDPC,Y ||
L56297-01	P,W ||
L56297-02	P,W ||
L56298-01	WF,Y ||
L56298-02	WF,Y ||
L56298-03	WF,Y ||
L56298-04	WF,Y ||
L56298-05	WF,Y ||
L56298-06	WF,Y ||
L56298-07	WF,Y ||
L56298-08	WF,Y ||
L56298-09	WF,Y ||
L56298-10	WF,Y ||
L56298-11	WF,Y ||
L56298-12	WF,Y ||
L56298-13	WF,Y ||
L56298-14	WF,Y ||
L56298-15	WF,Y ||
L56298-16	WF,Y ||

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 7:35:03 PM 121719

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: Lachat

Parameter: NO_3NO_2 Dissolved / Yellow / Sludge / KCL / MWMT / WE / 1312

Standard Preparation & Documentation

Instrument Reagents	SCN/PCN	Prepped by:	Expiration Date:
1) Stock Ammonium Chloride EDTA Buffer	WIR191116-1	pjb	11/16/2020
2) NO3NO2 and NO2 Color Reagent	WIR191120-4	pjb	2/20/2020
3) NH4OH (yellows and KCls only)	PCN52830		12/31/2019
4) HCl (yellows only)	PCN52674		10/31/2021

***Refer to SOP for standard and reagent prep.**

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: Lachat

Parameter: NO_3NO_2 Dissolved / Yellow / Sludge / KCL / MWMT / WE / 1312

Standard Preparation & Documentation

Instrument Reagents	SCN/PCN	Prepped by:	Expiration Date:
1) Stock Ammonium Chloride EDTA Buffer	WIR191116-1	pjb	11/16/2020
2) NO3NO2 and NO2 Color Reagent	WIR191120-4	pjb	2/20/2020
3) NH4OH (yellows and KCls only)	PCN52830		12/31/2019
4) HCl (yellows only)	PCN52674		10/31/2021

***Refer to SOP for standard and reagent prep.**

Author: wcins

Date : 12/6/2019

Channel 2 (NO2) - Set: 4 / 4

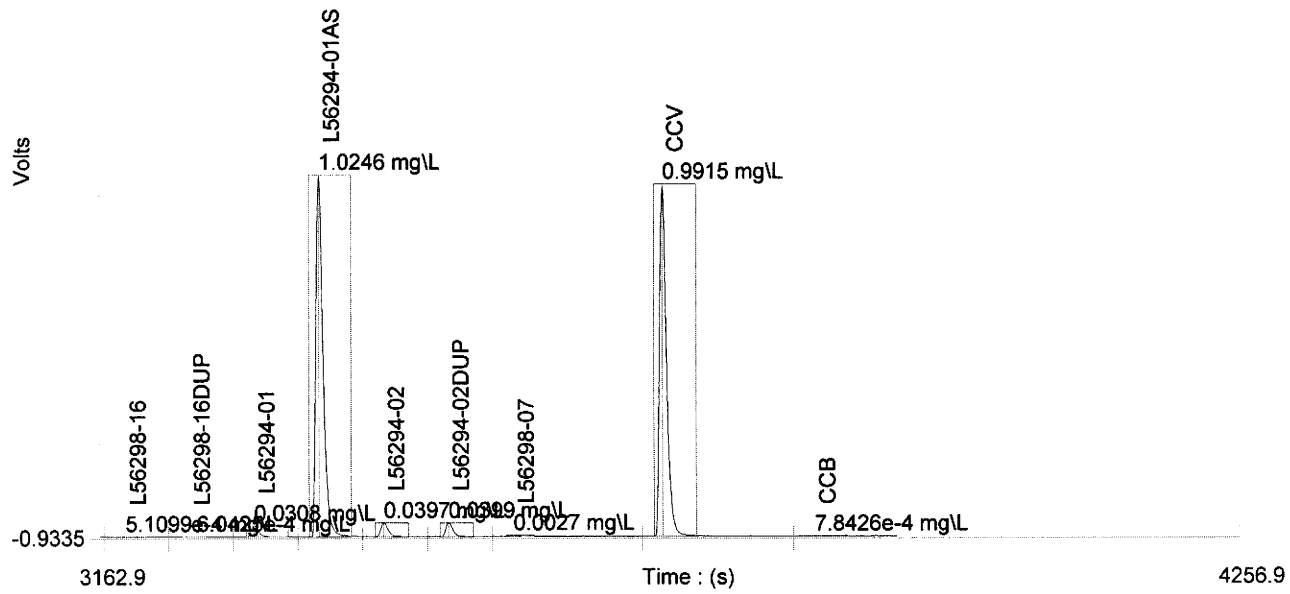
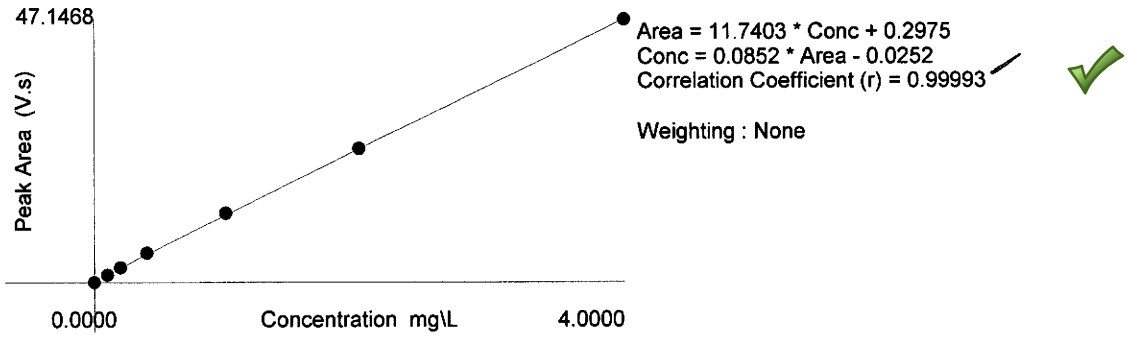


Table : 1 (NO3NO2)

	Known Conc. (mg\L)	Rep.	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc (mg\L)	Detection Date	Detection Time
1	4.0000	1	47.1468	3.8576	0.0	0.2	3.9900	12/6/2019	8:29:19 PM
2	2.0000	1	23.8206	2.0102	0.0	-0.2	2.0035	12/6/2019	8:30:34 PM
3	1.0000	1	12.3216	1.0607	0.0	-2.4	1.0242	12/6/2019	8:31:49 PM
4	0.4000	1	5.2388	0.4547	0.0	-4.9	0.4210	12/6/2019	8:33:04 PM
5	0.2000	1	2.6254	0.2294	0.0	0.8	0.1984	12/6/2019	8:34:20 PM
6	0.1000	1	1.3281	0.1142	0.0	9.7	0.0879	12/6/2019	8:35:36 PM
7	0.0000	1	0.0020	8.2553e-4			-0.0250	12/6/2019	8:36:53 PM

Figure : 1 (NO3NO2)



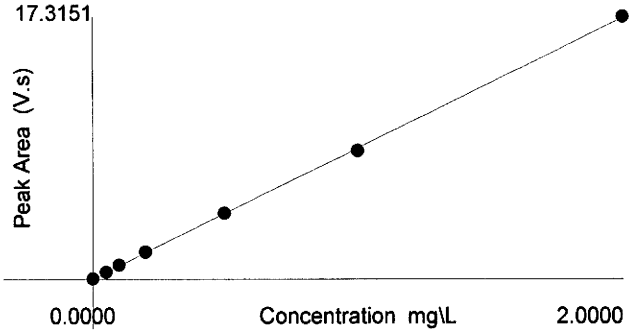
Author: wcins

Date : 12/6/2019

Table : 2 (NO2)

	Known Conc. (mg\L)	Rep.	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc (mg\L)	Detection Date	Detection Time
1	2.0000	1	17.3151	2.2343	0.0	-0.4	2.0082	12/6/2019	8:29:21 PM
2	1.0000	1	8.4712	1.0824	0.0	1.8	0.9817	12/6/2019	8:30:35 PM
3	0.5000	1	4.3275	0.5608	0.0	-0.1	0.5007	12/6/2019	8:31:51 PM
4	0.2000	1	1.7630	0.2288	0.0	-1.5	0.2031	12/6/2019	8:33:06 PM
5	0.1000	1	0.9137	0.1181	0.0	-4.4	0.1045	12/6/2019	8:34:22 PM
6	0.0500	1	0.4589	0.0589	0.0	-3.1	0.0517	12/6/2019	8:35:38 PM
7	0.0000	1	0.0148	6.8956e-4			1.5372e-4	12/6/2019	8:36:55 PM

Figure : 2 (NO2)



Area = 8.6144 * Conc + 0.0141
Conc = 0.1161 * Area - 0.0016
Correlation Coefficient (r) = 0.99993

Weighting : None

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487641

Date Reported: 10-Dec-19
Run ID: R1763291
Date Analyzed: 06-Dec-19
ICAL Workgroup:
Instrument ID: FIA2

WG487641ICV

Tag: Measured: 12/6/2019 8:39:51 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.405 ✓	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	100	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.592	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	97	1		%	++	0.01	0.05			

WG487641ICB

Tag: Measured: 12/6/2019 8:41:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	NITRITE	FOUND		1	U ✓	mg/L	++	0.01	0.05			

WG487641LFB1

Tag: Measured: 12/6/2019 8:44:56 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	1.911	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	96	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.948	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	95	1		%	++	0.01	0.05			

L56294-01

Tag: Measured: 12/6/2019 8:46:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	NITRATE/NITRITE	N-NO3NO2	4.30	1	O	mg/L	OCAL	0.02	0.1			
SREV	NITRITE	N-NO2	.10	1		mg/L	++	0.01	0.05		RA ZU	

L56294-01AS

Tag: Measured: 12/6/2019 8:47:27 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	NITRATE/NITRITE	FOUND	5.697	1		mg/L	++	0.02	0.1			
FAIL	NITRATE/NITRITE	REC	70	1		%	ALRT	0.02	0.1			
SREV	NITRITE	FOUND	1.073	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	97	1		%	++	0.01	0.05			

L56294-02

Tag: Measured: 12/6/2019 8:48:43 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	NITRATE/NITRITE	N-NO3NO2	4.43	1	O	mg/L	OCAL	0.02	0.1			
SREV	NITRITE	N-NO2	.11	1		mg/L	++	0.01	0.05		RA ZU	

L56294-02DUP

Tag: Measured: 12/6/2019 8:49:58 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	NITRATE/NITRITE	FOUND	4.432	1		mg/L	++	0.02	0.1			
FAIL	NITRATE/NITRITE	RPD	0	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.111	1		mg/L	++	0.01	0.05			
SREV	NITRITE	RPD	1	1		%	++	0.01	0.05			

L56147-2001131042

N-NO3NO2-MWMT

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-ACFA-NO3NO2-MWMT
QC Ref: WC-RFA-D-SOL
Group ID: WC-G-RFA-NO3NO2-MWM
Method Ref: M353.2
SOP Ref: SOPWC016

WG487643

ACZ Laboratories, Inc

Instrument ID: FIA2
Analyst: PJB
ACZ Dept: 37
Create Date: 12/06/2019 21:50
Start Date/Time: 12/6/19
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	NO2MWMT	NO3NO2MWMT	Nitrate/Nitrite (mg/L)	Nitrite (mg/L)	ph screen (units)	Chlorine Screen	Dilution	Comments
1	WG487643ICV	WI191112-1			1	☑	☑					1	
2	WG487643ICB	NONE			1	☑	☑					1	
3	WG487643LFB	WI191004-3			1	☑	☑					1	
4	WG487250PBS	NONE	W		1	☑	☑			7	–	1	
5	L56147-06	STSB29_6-15			1	☑	☑			7	–	1	
6	L56147-06AS	WI191004-3			1	☑	☑					1	
7	~~L56147-06MS~~	~~II191127-2~~	PJB 12/6/19		1	☑	☑					1	
8	~~L56147-06MSD~~	~~II191127-2~~			1	☑	☑					1	
9	L56147-07	STSB29-FD_6-15			1	☑	☑			7	–	1	
10	~~L56147-07MS~~	~~MS190905-3~~			1	☑	☑					1	
11	~~L56147-07MSD~~	~~MS190905-3~~			1	☑	☑					1	
12	L56147-08	STSB30_0.5-3			1	☑	☑			8-adjusted	–	1	centrifuged
13	WG487643CCV1	WI191203-3			1	☑	☑					1	
14	WG487643CCB1	NONE			1	☑	☑					1	
15	L56147-09	STSB30_6-15	W		1	☑	☑			8-adjusted	–	1	centrifuged
16	L56147-10	STSB31_0.5-3			1	☑	☑			7-adjusted	–	1	
17	L56147-11	STSB31_6-15			1	☑	☑			8-adjusted	–	1	
18	WG487643CCV2	WI191203-3			1	☑	☑					1	
19	WG487643CCB2	NONE			1	☑	☑					1	

Report Comments:

Internal Comments

AREV: PJB 12/7/19
Initials, Date

SREV: KRH 12-10-19
Initials, Date

12/6/2019 9:50:55 PM 121719

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: PJB
Date: 12/7/19

SREV: KRH
Date: 12-10-19

Instrument ID FIA2

Work Group: 487643
Sample Type: NO3NO2-MWM
Analysis Date: 12/6/19
Analyst: PJB

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	X		
2) Is a current standard/reagent sheet attached to the workgroup?	X		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?	X		
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	X		
5) Are all of the QC critera listed in LIMS within specified limits?	X		
6) If applicable, was a passing PQV indcluded in the WG?			X
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	X		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	X		
9) Was sample-analysis completed within the holding time?	X		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?	X		
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			X
12) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? Yes Calibration WG: 487641

Prep WG#: 487250 Disposable Vessel Lot#*: A106310-971

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
147-07/DUP	<10X MDL	RA

Comments: DUP made @ inst.

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

N-NO3NO2-MWMT

QC List Type: QC-RFA-NO3NO2
QCListMatClass: LIQUID
Bench Sheet List: I-ACFA-NO3NO2-MWMT
QC Ref: WC-RFA-D-SOL
Group ID: WC-G-RFA-NO3NO2-MWM
Method Ref: M353.2
SOP Ref: SOPWC016

WG487643

ACZ Laboratories, Inc

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/06/2019 21:50
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-06MS	ICP Spike
L56147-06MSD	ICP Spike
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 9:50:55 PM 121719

L56147-2001131042

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487250

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 16:20
End Date/Time: 12/06/2019 10:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487250CSTD1	NONE															
2	WG487250CSTD2	NONE															
3	WG487250CSTD3	NONE															
4	WG487250ICV	PCN58503	As Rec		12/04/19 16:20		4.04		4.04	4.04							21.5
5	WG487250PBS	NONE	As Rec		12/04/19 19:06		5.95	23	6.39	6.40	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
6	L56147-06	STSB29_6-15	As Rec		12/04/19 21:53	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
7	L56147-06MS	II191127-2	As Rec		12/05/19 0:40	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
8	L56147-06MSD	II191127-2	As Rec		12/05/19 3:26	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
9	L56147-07	STSB29-FD_6-15	As Rec		12/05/19 6:13	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
10	L56147-07MS	MS190905-3	As Rec		12/05/19 9:00	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
11	L56147-07MSD	MS190905-3	As Rec		12/05/19 11:46	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
12	L56147-08	STSB30_0.5-3	As Rec		12/05/19 14:33	0	5.95	23	4.09	4.35	5000	5014.1	8.24	12/04/19 10:45	12/05/19 14:25	27.6666666667443	20.8
13	L56147-09	STSB30_6-15	As Rec		12/05/19 17:20	0	5.95	23	5.85	5.87	5000	5006.3	21.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.6
14	L56147-10	STSB31_0.5-3	As Rec		12/05/19 20:06	0	5.95	23	4.1	4.04	5000	5004.3	11.31	12/04/19 10:45	12/05/19 14:20	27.5833333333139	20.5
15	L56147-11	STSB31_6-15	As Rec		12/05/19 22:53	0	5.95	23	5.66	5.71	5000	5000.7	28.21	12/04/19 10:45	12/05/19 16:05	29.3333333334303	20.6
16	WG487250CCV1	PCN58503	As Rec		12/06/19 1:40		4.05		4.05	4.05							21.5
17	WG487250LFB1	II191127-2	As Rec		12/06/19 4:26	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
18	WG487250LFB2	MS190905-3	As Rec		12/06/19 7:13	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
19	WG487250CCV2	PCN58503	As Rec		12/06/19 10:00		4.05		4.04	4.04							21.4

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/7/2019 9:15:18 PM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487643

Date Reported: 10-Dec-19
Run ID: R1763289
Date Analyzed: 06-Dec-19
ICAL Workgroup: WG487641
Instrument ID: FIA2

WG487643CCV1

Tag:

Measured: 12/6/2019 9:52:57 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.012	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	101	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.992 ✓	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	99	1		%	++	0.01	0.05			

WG487643CCB1

Tag:

Measured: 12/6/2019 9:55:55 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U ✓	mg/L	++	0.02	0.1			
SREV	NITRITE	FOUND		1	U	mg/L	++	0.01	0.05			

WG487643LFB

Tag:

Measured: 12/6/2019 9:57:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.029 ✓	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	101	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	1.007	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	101	1		%	++	0.01	0.05			

WG487250PBS

Tag:

Measured: 12/6/2019 9:58:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U ✓	mg/L	++	0.02	0.1			
SREV	NITRITE	FOUND		1	U	mg/L	++	0.01	0.05			

L56147-06

Tag:

Measured: 12/6/2019 9:59:47 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.03	1	B	mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-06AS

Tag:

Measured: 12/6/2019 10:01:03 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.088	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	103	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	1.01 ✓	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	101	1		%	++	0.01	0.05			

L56147-07

Tag:

Measured: 12/6/2019 10:02:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT		1	U	mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-07DUP

Tag: Measured: 12/6/2019 10:03:37 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	RPD	0	1		%	++	0.02	0.1		RA	
SREV	NITRITE	FOUND		1	U	mg/L	++	0.01	0.05			
SREV	NITRITE	RPD	0	1		%	++	0.01	0.05		RA	

L56147-08

Tag: Measured: 12/6/2019 10:04:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.19	1		mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-09

Tag: Measured: 12/6/2019 10:06:09 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.05	1	B	mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-10

Tag: Measured: 12/6/2019 10:07:26 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.76	1		mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

L56147-11

Tag: Measured: 12/6/2019 10:08:41 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	)2-MWMT	.06	1	B	mg/L	++	0.02	0.1		HD Q6 RA TB	
SREV	NITRITE	)2-MWMT		1	U	mg/L	++	0.01	0.05		HD Q6 RA TB	

WG487643CCV2

Tag: Measured: 12/6/2019 10:11:36 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND	2.021	1		mg/L	++	0.02	0.1			
SREV	NITRATE/NITRITE	REC	101	1		%	++	0.02	0.1			
SREV	NITRITE	FOUND	0.995	1		mg/L	++	0.01	0.05			
SREV	NITRITE	REC	100	1		%	++	0.01	0.05			

WG487643CCB2

Tag: Measured: 12/6/2019 10:14:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITRATE/NITRITE	FOUND		1	U	mg/L	++	0.02	0.1			
SREV	NITRITE	FOUND		1	U	mg/L	++	0.01	0.05			

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487643 **N-NO3NO2-MWMT**

Sample	Date	SCN	NITRATE/NITRITE	NITRITE
WG487643CCV1	12/06/19 21:52	WI191203-3	X	X
WG487643CCB1	12/06/19 21:55		X	X
WG487643LFB	12/06/19 21:57	WI191004-3	X	X
WG487250PBS	12/06/19 21:58		X	X
L56147-06	12/06/19 21:59		X	X
L56147-06AS	12/06/19 22:01	WI191004-3	X	X
L56147-07	12/06/19 22:02		X	X
L56147-07DUP	12/06/19 22:03		X	X
L56147-08	12/06/19 22:04		X	X
L56147-09	12/06/19 22:06		X	X
L56147-10	12/06/19 22:07		X	X
L56147-11	12/06/19 22:08		X	X
WG487643CCV2	12/06/19 22:11	WI191203-3	X	X
WG487643CCB2	12/06/19 22:14		X	X

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487514

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: NMC
ACZ Dept: 37
Create Date: 12/05/2019 16:25
Start Date/Time: 12/05/2019 16:25
End Date/Time: 12/05/2019 16:45

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487514PBW	NONE	soilprep			12/05/19 16:25	69.5256	50	69.5261	69.5261	0.0005	.00000	Pass	10.0000	#122
2	WG487514LCSW	PCN59816	soilprep			12/05/19 16:27	58.0151	50	58.0647	58.0646	0.0495	.00010	Pass	990.0000	
3	WG487361PBS	NONE	soilprep			12/05/19 16:30	58.9319	50	58.9323	58.9321	0.0002	.00020	Pass	4.0000	
4	L56147-01	STSB27_0.5-3	soilprep			12/05/19 16:32	59.0631	50	59.2104	59.21	0.1469	.00040	Pass	2938.0000	
5	L56147-02	STSB27_6-15	soilprep			12/05/19 16:35	58.6122	50	58.7508	58.7504	0.1382	.00040	Pass	2764.0000	
6	L56147-03	STSB28_0.5-3	soilprep			12/05/19 16:37	69.146	50	69.2839	69.2835	0.1375	.00040	Pass	2750.0001	
7	L56147-04	STSB28_6-15	soilprep			12/05/19 16:40	69.2548	50	69.4065	69.4068	0.1520	.00030	Pass	3039.9999	
8	L56147-05	STSB29_0.5-3	soilprep			12/05/19 16:42	67.5216	50	67.6988	67.6985	0.1769	.00030	Pass	3538.0000	
9	L56147-05DUP	NONE	soilprep			12/05/19 16:45	69.1537	50	69.3359	69.3359	0.1822	.00000	Pass	3644.0000	

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: Cep 12/10/19
Initials, Date

SREV: ENB 12/10/19
Initials, Date

12/10/2019 8:50:12 AM 121719

ACZ Laboratories, Inc.

WET CHEMISTRY SOLIDS DATA REVIEW CHECKLIST

AREV: Eep
Date: 12/10/19

Work Group: 487514
Sample Type: TDS-MWMT
Analysis Date: 12/5/19
Analyst: NMC

SREV: ENB
Date: 12/10/19

	Yes	No	N/A
1.) Are all weights properly entered?	✓		
2.) Are all sample volumes properly entered?	✓		
3.) Do all samples pass the constant weight check? If No, update status to REDO.	✓		
4.) Do all samples have < **0.20** g of residue? If no, redo sample(s) using less volume.	✓		
5.) Is any sample analyzed using less volume appropriately "D" qualified (except > **0.20** g)?			✓
6.) Is any sample with a Z3 auto qualifier run at 1x? If no, redo sample(s) on a lower dilution.			✓
7.) Are all of the QC critera listed in LIMS within specified limits?	✓		
8.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
9.) Are all analyses within method holding time? Flag data if "No."	✓		
10.) Are drying oven temperatures and times recorded on the WG Benchsheets?	✓		
11.) **For WG's containing DW sample(s)**: PQV included with WG?			✓
12.) **For TSS only:** Is PBW volume ≥ largest volume of client sample?			✓
13.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

For any item listed above that is checked "No" state the corrective action/explanation in the sections below.

QC/Sample ID	Analytical Problem	Corrective action

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMWC012.02.16.16

L56147-2001131042

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487514

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: NMC
ACZ Dept: 37
Create Date: 12/05/2019 16:25
Start Date/Time: 12/05/2019 16:25
End Date/Time: 12/05/2019 16:45

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487514PBW	NONE	soilprep			12/05/19 16:25	69.5256	50	69.5261	69.5261	0.0005	.00000	Pass	10.0000	#122
2	WG487514LCSW	PCN59816	soilprep			12/05/19 16:27	58.0151	50	58.0647	58.0646	0.0495	.00010	Pass	990.0000	
3	WG487361PBS	NONE	soilprep			12/05/19 16:30	58.9319	50	58.9323	58.9321	0.0002	.00020	Pass	4.0000	
4	L56147-01	STSB27_0.5-3	soilprep			12/05/19 16:32	59.0631	50	59.2104	59.21	0.1469	.00040	Pass	2938.0000	
5	L56147-02	STSB27_6-15	soilprep			12/05/19 16:35	58.6122	50	58.7508	58.7504	0.1382	.00040	Pass	2764.0000	
6	L56147-03	STSB28_0.5-3	soilprep			12/05/19 16:37	69.146	50	69.2839	69.2835	0.1375	.00040	Pass	2750.0001	
7	L56147-04	STSB28_6-15	soilprep			12/05/19 16:40	69.2548	50	69.4073	69.4065	0.1517	.00080	Dry More	3034.0001	
8	L56147-05	STSB29_0.5-3	soilprep			12/05/19 16:42	67.5216	50	67.6988	67.6985	0.1769	.00030	Pass	3538.0000	
9	L56147-05DUP	NONE	soilprep			12/05/19 16:45	69.1537	50	69.3359	69.3359	0.1822	.00000	Pass	3644.0000	

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.

Report Comments: In 179°C @ 15:59 12/9/19
out 180°C @ 17:46 12/9/19

Internal Comments

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 3:58:04 PM 121719

L56147-2001131042

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487514

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: NMC
ACZ Dept: 37
Create Date: 12/05/2019 16:25
Start Date/Time: 12/05/2019 16:25
End Date/Time: 12/05/2019 16:45

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487514PBW	NONE	soilprep			12/05/19 16:25	69.5256	50	69.5261	69.5261	0.0005	.00000	Pass	10.0000	#122
2	WG487514LCSW	PCN59816	soilprep			12/05/19 16:27	58.0151	50	58.0647	58.0646	0.0495	.00010	Pass	990.0000	
3	WG487361PBS	NONE	soilprep			12/05/19 16:30	58.9319	50	58.9323	58.9321	0.0002	.00020	Pass	4.0000	
4	L56147-01	STSB27_0.5-3	soilprep			12/05/19 16:32	59.0631	50	59.2104	59.21	0.1469	.00040	Pass	2938.0000	
5	L56147-02	STSB27_6-15	soilprep			12/05/19 16:35	58.6122	50	58.7508	58.7504	0.1382	.00040	Pass	2764.0000	
6	L56147-03	STSB28_0.5-3	soilprep			12/05/19 16:37	69.146	50	69.2839	69.2835	0.1375	.00040	Pass	2750.0001	
7	L56147-04	STSB28_6-15	soilprep			12/05/19 16:40	69.2548	50	69.408	69.4073	0.1525	.00070	Dry More	3050.0001	
8	L56147-05	STSB29_0.5-3	soilprep			12/05/19 16:42	67.5216	50	67.6988	67.6985	0.1769	.00030	Pass	3538.0000	
9	L56147-05DUP	NONE	soilprep			12/05/19 16:45	69.1537	50	69.3359	69.3359	0.1822	.00000	Pass	3644.0000	

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.

EMK 12/9/19

Report Comments: in ~~170~~ 180°C @ ~~10:17~~ 11:30 12/9/19
out ⊥ 12:39 ⊥

Internal Comments

AREV: Initials, Date

SREV: Initials, Date

12/9/2019 9:57:29 AM 121719

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487514

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: NMC
ACZ Dept: 37
Create Date: 12/05/2019 16:25
Start Date/Time: 12/05/2019 16:25
End Date/Time: 12/05/2019 16:45

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487514PBW	NONE	soilprep			12/05/19 16:25	69.5256	50	69.5261				Dry More	10.0000	#122
2	WG487514LCSW	PCN59816	soilprep			12/05/19 16:27	58.0151	50	58.0647				Dry More	992.0000	
3	WG487361PBS	NONE	soilprep			12/05/19 16:30	58.9319	50	58.9323				Dry More	8.0000	
4	L56147-01	STSB27_0.5-3	soilprep			12/05/19 16:32	59.0631	50	59.2104				Dry More	2946.0001	
5	L56147-02	STSB27_6-15	soilprep			12/05/19 16:35	58.6122	50	58.7508				Dry More	2772.0001	
6	L56147-03	STSB28_0.5-3	soilprep			12/05/19 16:37	69.146	50	69.2839				Dry More	2757.9999	
7	L56147-04	STSB28_6-15	soilprep			12/05/19 16:40	69.2548	50	69.408				Dry More	3064.0000	
8	L56147-05	STSB29_0.5-3	soilprep			12/05/19 16:42	67.5216	50	67.6988				Dry More	3544.0001	
9	L56147-05DUP	NONE	soilprep			12/05/19 16:45	69.1537	50	69.3359				Dry More	3644.0000	

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.

Report Comments: in 180°C 10:21 12/7/19
out 1 @ 13:38 1

Internal Comments

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/7/2019 10:21:38 AM 121719

L56147-2001131042

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487514

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: NMC
ACZ Dept: 37
Create Date: 12/05/2019 16:25
Start Date/Time: 12/05/2019 16:25
End Date/Time: 12/05/2019 16:45

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487514PBW	NONE	soilprep			12/05/19 16:25	69.5256	50					Dry More		#122
2	WG487514LCSW	PCN59816	soilprep			12/05/19 16:27	58.0151	50					Dry More		
3	WG487361PBS	NONE	soilprep			12/05/19 16:30	58.9319	50					Dry More		
4	L56147-01	STSB27_0.5-3	soilprep			12/05/19 16:32	59.0631	50					Dry More		
5	L56147-02	STSB27_6-15	soilprep			12/05/19 16:35	58.6122	50					Dry More		
6	L56147-03	STSB28_0.5-3	soilprep			12/05/19 16:37	69.146	50					Dry More		
7	L56147-04	STSB28_6-15	soilprep			12/05/19 16:40	69.2548	50					Dry More		
8	L56147-05	STSB29_0.5-3	soilprep			12/05/19 16:42	67.5216	50					Dry More		
9	L56147-05DUP	NONE	soilprep			12/05/19 16:45	69.1537	50					Dry More		

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.

Report Comments: IN 90.2°C @ 16:56 12/5/19
out 90° in 180° @ 16:27 12/6/19

Internal Comments out 180°C @ 17:36 12/6/19
WG487361
DUP L56147-05

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/5/2019 4:33:18 PM 121719

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487618

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: eep
ACZ Dept: 37
Create Date: 12/06/2019 13:52
Start Date/Time: 12/06/2019 14:10
End Date/Time: 12/06/2019 14:29

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487618PBW	NONE	u			12/06/19 14:10	67.3309	50	67.331	67.3308	-0.0001	.00020	Pass	-2.0000	72
2	WG487618LCSW	PCN59816	u			12/06/19 14:12	68.122	50	68.1699	68.1696	0.0476	.00030	Pass	952.0000	
3	WG487250PBS	NONE	u			12/06/19 14:14	69.8335	50	69.8341	69.8338	0.0003	.00030	Pass	6.0000	
4	L56147-06	STSB29_6-15	u			12/06/19 14:16	68.5228	50	68.6446	68.6447	0.1219	.00010	Pass	2438.0000	
5	L56147-07	STSB29-FD_6-15	u			12/06/19 14:18	61.9163	50	62.0375	62.0376	0.1213	.00010	Pass	2425.9999	
6	L56147-08	STSB30_0.5-3	u			12/06/19 14:21	61.5363	50	61.6726	61.6727	0.1364	.00010	Pass	2728.0000	
7	L56147-09	STSB30_6-15	u			12/06/19 14:23	68.147	50	68.3303	68.3303	0.1833	.00000	Pass	3666.0001	
8	L56147-10	STSB31_0.5-3	u			12/06/19 14:25	59.793	25	59.9214	59.9213	0.1283	.00010	Pass	5131.9999	
9	L56147-11	STSB31_6-15	u			12/06/19 14:27	56.08	50	56.2672	56.2669	0.1869	.00030	Pass	3738.0001	
10	L56147-11DUP	NONE	u			12/06/19 14:29	70.5055	50	70.6917	70.6915	0.1860	.00020	Pass	3720.0001	

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: eep 12/10/19
Initials, Date

SREV: ENB 12/10/19
Initials, Date

12/10/2019 8:48:27 AM 121719

ACZ Laboratories, Inc.

WET CHEMISTRY SOLIDS DATA REVIEW CHECKLIST

AREV: eep
Date: 12/10/19

SREV: ENB
Date: 12/10/19

Work Group: 487618
Sample Type: TDS-MWMT
Analysis Date: 12/6/19
Analyst: eep

	Yes	No	N/A
1.) Are all weights properly entered?	✓		
2.) Are all sample volumes properly entered?	✓		
3.) Do all samples pass the constant weight check? If No, update status to REDO.	✓		
4.) Do all samples have < **0.20** g of residue? If no, redo sample(s) using less volume.	✓		
5.) Is any sample analyzed using less volume appropriately "D" qualified (except > **0.20** g)?			✓
6.) Is any sample with a Z3 auto qualifier run at 1x? If no, redo sample(s) on a lower dilution.			✓
7.) Are all of the QC critera listed in LIMS within specified limits?	✓		
8.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
9.) Are all analyses within method holding time? Flag data if "No."	✓		
10.) Are drying oven temperatures and times recorded on the WG Benchsheets?	✓		
11.) **For WG's containing DW sample(s)**: PQV included with WG?			✓
12.) **For TSS only:** Is PBW volume ≥ largest volume of client sample?			✓
13.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

For any item listed above that is checked "No" state the corrective action/explanation in the sections below.

QC/Sample ID	Analytical Problem	Corrective action

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMWC012.02.16.16

L56147-2001131042

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487618

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: eep
ACZ Dept: 37
Create Date: 12/06/2019 13:52
Start Date/Time: 12/06/2019 14:10
End Date/Time: 12/06/2019 14:29

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487618PBW	NONE	u			12/06/19 14:10	67.3309	50	67.331	67.3308	-0.0001	.00020	Pass	-2.0000	72
2	WG487618LCSW	PCN59816	u			12/06/19 14:12	68.122	50	68.1699	68.1696	0.0476	.00030	Pass	952.0000	
3	WG487250PBS	NONE	u			12/06/19 14:14	69.8335	50	69.8341	69.8338	0.0003	.00030	Pass	6.0000	
4	L56147-06	STSB29_6-15	u			12/06/19 14:16	68.5228	50	68.6452	68.6446	0.1218	.00060	Dry More	2436.0000	
5	L56147-07	STSB29-FD_6-15	u			12/06/19 14:18	61.9163	50	62.0384	62.0375	0.1212	.00090	Dry More	2424.0001	
6	L56147-08	STSB30_0.5-3	u			12/06/19 14:21	61.5363	50	61.6734	61.6726	0.1363	.00080	Dry More	2726.0000	
7	L56147-09	STSB30_6-15	u			12/06/19 14:23	68.147	50	68.3314	68.3303	0.1833	.00110	Dry More	3666.0001	
8	L56147-10	STSB31_0.5-3	u			12/06/19 14:25	59.793	25	59.9222	59.9214	0.1284	.00080	Dry More	5135.9999	
9	L56147-11	STSB31_6-15	u			12/06/19 14:27	56.08	50	56.2681	56.2672	0.1872	.00090	Dry More	3743.9999	
10	L56147-11DUP	NONE	u			12/06/19 14:29	70.5055	50	70.693	70.6917	0.1862	.00130	Dry More	3723.9999	

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: In 179°C @ 16:04 12/9/19
out 180°C @ 17:46 12/9/19

Internal Comments

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 4:03:35 PM 121719

L56147-2001131042

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487618

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: eep
ACZ Dept: 37
Create Date: 12/06/2019 13:52
Start Date/Time: 12/06/2019 14:10
End Date/Time: 12/06/2019 14:29

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487618PBW	NONE	u			12/06/19 14:10	67.3309	50	67.331				Dry More	2.0000	72
2	WG487618LCSW	PCN59816	u			12/06/19 14:12	68.122	50	68.1699				Dry More	958.0000	
3	WG487250PBS	NONE	u			12/06/19 14:14	69.8335	50	69.8341				Dry More	12.0000	
4	L56147-06	STSB29_6-15	u			12/06/19 14:16	68.5228	50	68.6452				Dry More	2448.0000	
5	L56147-07	STSB29-FD_6-15	u			12/06/19 14:18	61.9163	50	62.0384				Dry More	2442.0001	
6	L56147-08	STSB30_0.5-3	u			12/06/19 14:21	61.5363	50	61.6734				Dry More	2741.9999	
7	L56147-09	STSB30_6-15	u			12/06/19 14:23	68.147	50	68.3314				Dry More	3688.0001	
8	L56147-10	STSB31_0.5-3	u			12/06/19 14:25	59.793	25	59.9222				Dry More	5167.9999	
9	L56147-11	STSB31_6-15	u			12/06/19 14:27	56.08	50	56.2681				Dry More	3761.9999	
10	L56147-11DUP	NONE	u			12/06/19 14:29	70.5055	50	70.693				Dry More	3750.0000	

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

EMK 12/9/19

Report Comments: in ~~176°C~~ 180°C @ ~~10:17~~ ~~12~~ 11:30 12/9/19
out 1 12:39 1

Internal Comments

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 9:51:00 AM 121719

L56147-2001131042

Total Dissolved Solids - MWMT

QC List Type: QC-TDS
QCListMatClass: LIQUID
Bench Sheet List: I-TDS
QC Ref: PBW-DUP-LCSW
Group ID: WC-G-MAN-TDS-MWMT
Method Ref: SM2540 C
SOP Ref: SOPWC024

WG487618

ACZ Laboratories, Inc

Instrument ID: WC-MANUAL
Analyst: eep
ACZ Dept: 37
Create Date: 12/06/2019 13:52
Start Date/Time: 12/06/2019 14:10
End Date/Time: 12/06/2019 14:30

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	Analysis Date	Initial Weight (g)	Sample Volume (mL)	Final Weight 1 (g)	Final Weight (g)	Amount of Residue (g)	Weight Difference (g)	Weight Check	Total Dissolved Solids (mg/L)	Comments
1	WG487618PBW	NONE	u			12/06/19 14:10	67.3309	50					Dry More		72
2	WG487618LCSW	PCN59816	u			12/06/19 14:12	68.122	50					Dry More		
3	WG487250PBS	NONE	u			12/06/19 14:14	69.8335	50					Dry More		no fit
4	L56147-06	STSB29_6-15	u			12/06/19 14:16	68.5228	50					Dry More		
5	L56147-07	STSB29-FD_6-15	u			12/06/19 14:18	61.9163	50					Dry More		
6	L56147-08	STSB30_0.5-3	u			12/06/19 14:21	61.5363	50					Dry More		
7	L56147-09	STSB30_6-15	u			12/06/19 14:23	68.147	50					Dry More		
8	L56147-10	STSB31_0.5-3	u			12/06/19 14:25	59.793	~~50~~ 25 eep 12/6/19					Dry More		Sx Blue/foam
9	L56147-11	STSB31_6-15	u			12/06/19 14:27	56.08	50					Dry More		
10	L56147-11DUP	NONE	u			12/06/19 14:29	70.5055	50					Dry More		no soil Dup

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: in 90.8°C @ 14:27 12/06/19
out 90.4°C in 180°C 12/7/19 13:23 NMC 12/7/19
Internal Comments out 180°C @ 13:38 12/7/19

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 2:12:12 PM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487514

Date Reported: 10-Dec-19
Run ID: R1763059
Date Analyzed: 05-Dec-19
ICAL Workgroup:
Instrument ID: WC-MANUAL

WG487514PBW

Tag:

Measured: 12/5/2019 4:25:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	TOTAL DISSOLVED SOLIDS	FOUND	✓	1	U	mg/L	++	20	40			
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					
SREV	WEIGHT CHECK	TEXT		1			++			Pass		
SREV	WEIGHT DIFFERENCE	PREP	0	1		g	++					
SREV	WEIGHT, FINAL	PREP	69.5261	1		g	++					
SREV	WEIGHT, FINAL1	PREP	69.5261	1		g	++					
SREV	WEIGHT, INITIAL	PREP	69.5256	1		g	++					

WG487514LCSW

Tag:

Measured: 12/5/2019 4:27:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	TOTAL DISSOLVED SOLIDS	FOUND	990	1		mg/L	++	20	40			
SREV	TOTAL DISSOLVED SOLIDS	REC	99 ✓	1		%	++	20	40			
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					
SREV	WEIGHT CHECK	TEXT		1			++			Pass		
SREV	WEIGHT DIFFERENCE	PREP	0.0001	1		g	++					
SREV	WEIGHT, FINAL	PREP	58.0646	1		g	++					
SREV	WEIGHT, FINAL1	PREP	58.0647	1		g	++					
SREV	WEIGHT, INITIAL	PREP	58.0151	1		g	++					

WG487361PBS

Tag:

Measured: 12/5/2019 4:30:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	TOTAL DISSOLVED SOLIDS	FOUND		1	U	mg/L	++	20	40			
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					
SREV	WEIGHT CHECK	TEXT		1			++			Pass ✓		
SREV	WEIGHT DIFFERENCE	PREP	0.0002	1		g	++					
SREV	WEIGHT, FINAL	PREP	58.9321	1		g	++					
SREV	WEIGHT, FINAL1	PREP	58.9323	1		g	++					
SREV	WEIGHT, INITIAL	PREP	58.9319	1		g	++					

L56147-01

Tag:

Measured: 12/5/2019 4:32:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1469	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	2940	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0004	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	59.21	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	59.2104	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	59.0631	1		g	++				TB	

L56147-02

Tag: Measured: 12/5/2019 4:35:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1382	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	2760	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0004	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	58.7504	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	58.7508	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	58.6122	1		g	++				TB	

L56147-03

Tag: Measured: 12/5/2019 4:37:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1375	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	2750	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0004	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	69.2835	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	69.2839	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	69.146	1		g	++				TB	

L56147-04

Tag: Measured: 12/5/2019 4:40:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.152	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	3040	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0003	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	69.4068	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	69.4065	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	69.2548	1		g	++				TB	

L56147-05

Tag: Measured: 12/5/2019 4:42:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1769	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	3540	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0003	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	67.6985	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	67.6988	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	67.5216	1		g	++				TB	

L56147-05DUP

Tag:

Measured: 12/5/2019 4:45:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	TOTAL DISSOLVED SOLIDS	FOUND	3640	1		mg/L	++	20	40			
SREV	TOTAL DISSOLVED SOLIDS	RPD	3	1		%	++	20	40			
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					
SREV	WEIGHT CHECK	TEXT		1			++			Pass		
SREV	WEIGHT DIFFERENCE	PREP	0	1		g	++					
SREV	WEIGHT, FINAL	PREP	69.3359	1		g	++					
SREV	WEIGHT, FINAL1	PREP	69.3359	1		g	++					
SREV	WEIGHT, INITIAL	PREP	69.1537	1		g	++					

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487514 **Total Dissolved Solids - MWMT**

Sample	Date	SCN	AL DISSOLVED SO	WEIGHT CHECK
WG487514PBW	12/05/19 16:25		X	X
WG487514LCSW	12/05/19 16:27	PCN59816	X	X
WG487361PBS	12/05/19 16:30		X	X
L56147-01	12/05/19 16:32		X	
L56147-02	12/05/19 16:35		X	
L56147-03	12/05/19 16:37		X	
L56147-04	12/05/19 16:40		X	
L56147-05	12/05/19 16:42		X	
L56147-05DUP	12/05/19 16:45		X	X

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487618

Date Reported: 10-Dec-19
Run ID: R1763223
Date Analyzed: 06-Dec-19
ICAL Workgroup:
Instrument ID: WC-MANUAL

WG487618PBW

Tag: **Measured:** 12/6/2019 2:10:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	TOTAL DISSOLVED SOLIDS	FOUND		1	U	mg/L	++	20	40			
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					
SREV	WEIGHT CHECK	TEXT		1			++			Pass		
SREV	WEIGHT DIFFERENCE	PREP	0.0002	1		g	++					
SREV	WEIGHT, FINAL	PREP	67.3308	1		g	++					
SREV	WEIGHT, FINAL1	PREP	67.331	1		g	++					
SREV	WEIGHT, INITIAL	PREP	67.3309	1		g	++					

WG487618LCSW

Tag: **Measured:** 12/6/2019 2:12:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	TOTAL DISSOLVED SOLIDS	FOUND	952	1		mg/L	++	20	40			
SREV	TOTAL DISSOLVED SOLIDS	REC	95	1		%	++	20	40			
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					
SREV	WEIGHT CHECK	TEXT		1			++			Pass		
SREV	WEIGHT DIFFERENCE	PREP	0.0003	1		g	++					
SREV	WEIGHT, FINAL	PREP	68.1696	1		g	++					
SREV	WEIGHT, FINAL1	PREP	68.1699	1		g	++					
SREV	WEIGHT, INITIAL	PREP	68.122	1		g	++					

WG487250PBS

Tag: **Measured:** 12/6/2019 2:14:26 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	TOTAL DISSOLVED SOLIDS	FOUND		1	U	mg/L	++	20	40			
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					
SREV	WEIGHT CHECK	TEXT		1			++			Pass		
SREV	WEIGHT DIFFERENCE	PREP	0.0003	1		g	++					
SREV	WEIGHT, FINAL	PREP	69.8338	1		g	++					
SREV	WEIGHT, FINAL1	PREP	69.8341	1		g	++					
SREV	WEIGHT, INITIAL	PREP	69.8335	1		g	++					

L56147-06

Tag: **Measured:** 12/6/2019 2:16:39 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1219	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	2440	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0001	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	68.6447	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	68.6446	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	68.5228	1		g	++				TB	

L56147-07

Tag: Measured: 12/6/2019 2:18:52 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1213	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	2430	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0001	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	62.0376	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	62.0375	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	61.9163	1		g	++				TB	

L56147-08

Tag: Measured: 12/6/2019 2:21:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1364	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	2730	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0001	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	61.6727	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	61.6726	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	61.5363	1		g	++				TB	

L56147-09

Tag: Measured: 12/6/2019 2:23:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1833	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	3670	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	68.3303	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	68.3303	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	68.147	1		g	++				TB	

L56147-10

Tag: Measured: 12/6/2019 2:25:31 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1283	2		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	5130	2		mg/L	++	40	80		TB	
NEED	VOLUME, SAMPLE	PREP	25	2		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0001	2		g	++				TB	
NEED	WEIGHT, FINAL	PREP	59.9213	2		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	59.9214	2		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	59.793	2		g	++				TB	

L56147-11

Tag:

Measured: 12/6/2019 2:27:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
NEED	AMOUNT OF RESIDUE	PREP	0.1869	1		g	++				TB	
SREV	TOTAL DISSOLVED SOLIDS	S-MWMT	3740	1		mg/L	++	20	40		TB	
NEED	VOLUME, SAMPLE	PREP	50	1		mL	++				TB	
NEED	WEIGHT CHECK	TEXT		1			+			Pass	TB	
NEED	WEIGHT DIFFERENCE	PREP	0.0003	1		g	++				TB	
NEED	WEIGHT, FINAL	PREP	56.2669	1		g	++				TB	
NEED	WEIGHT, FINAL1	PREP	56.2672	1		g	++				TB	
NEED	WEIGHT, INITIAL	PREP	56.08	1		g	++				TB	

L56147-11DUP

Tag:

Measured: 12/6/2019 2:29:57 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	TOTAL DISSOLVED SOLIDS	FOUND	3720 ✓	1		mg/L	++	20	40			
SREV	TOTAL DISSOLVED SOLIDS	RPD	1	1		%	++	20	40			
SREV	VOLUME, SAMPLE	PREP	50	1		mL	++					
SREV	WEIGHT CHECK	TEXT		1			++			Pass		
SREV	WEIGHT DIFFERENCE	PREP	0.0002	1		g	++					
SREV	WEIGHT, FINAL	PREP	70.6915	1		g	++					
SREV	WEIGHT, FINAL1	PREP	70.6917	1		g	++					
SREV	WEIGHT, INITIAL	PREP	70.5055	1		g	++					

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487618 **Total Dissolved Solids - MWMT**

Sample	Date	SCN	AL DISSOLVED SO	WEIGHT CHECK
WG487618PBW	12/06/19 14:10		X	X
WG487618LCSW	12/06/19 14:12	PCN59816	X	X
WG487250PBS	12/06/19 14:14		X	X
L56147-06	12/06/19 14:16		X	
L56147-07	12/06/19 14:18		X	
L56147-08	12/06/19 14:21		X	
L56147-09	12/06/19 14:23		X	
L56147-10	12/06/19 14:25		X	
L56147-11	12/06/19 14:27		X	
L56147-11DUP	12/06/19 14:29		X	X

FLUORIDE

QC List Type: QC-F
QCListMatClass: LIQUID
Bench Sheet List: I-F
QC Ref: WC-F-SOIL
Group ID: WC-G-MNP-APCF-1312DI
Method Ref: SM4500-F C
SOP Ref: SOPWC060

WG487959

ACZ Laboratories, Inc

Instrument ID: MANIP1
Analyst: ENB
ACZ Dept: 37
Create Date: 12/12/2019 10:59
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	AL	FE	F 13 12 DI	Comments
1	WG487959ICV	WC191204-2						✓	
2	WG487959ICB	NONE						✓	
3	WG487959PQV	WC191202-7						✓	
4	WG487959LFB	WC191014-1						✓	
5	WG487884PBS	NONE						✓	
6	L56019-01	TOP01						✓	
7	L56019-01DUP	NONE						✓	
8	L56019-03	SLOPE-01						✓	
9	L56019-03AS	WC191014-1						✓	
10	L56019-05	SLOPE-02						✓	
11	L56019-07	SLOPE-03						✓	
12	L56019-09	SLOPE-SE						✓	
13	WG487959CCV	WC191204-2						✓	
14	WG487959CCB	NONE						✓	

Sample	Login Comments
L56019-01	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-03	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-05	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-07	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-09	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway

Report Comments:

Internal Comments

AREV: ENB 12/13/19
Initials, Date

SREV: EMK 12/13/19
Initials, Date

12/12/2019 10:59:48 AM 112519

ACZ Laboratories, Inc.

AUTO TITRATOR DATA REVIEW CHECKLIST

AREV: ENB
Date: 12/13/19

SREV: EMK
Date: 12/13/19

Work Group: 487959
Sample Type: F-131201
Analysis Date: 12/12/19
Analyst: ENB

Instrument ID: manipl

	Yes	No	N/A
1.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓✓		
2.) Are all of the QC critera listed in LIMS within specified acceptance limits?	✓✓		
3.) **pH ONLY:** Is the difference between the 2 replicates of each sample < 0.1 ?			✓✓
4.) If new acid was prepared, was it standardized? (Attach standardization report.)			✓✓
5.) **Alk, EC, pH:** All analyses performed on an unaltered sample (not centrifuged, diluted, etc.) *			✓✓
6.) **Fluoride:** Is any sample analyzed on dilution appropriately "D" qualified (except o-cal)?			✓✓
7.) **Fluoride only**: Were all sx's checked with TISAB?	✓✓		
8.) Were all samples run within hold time (other than pH)? Flag if "No."	✓✓		
9.) Is a current standard/reagent sheet attached to the workgroup?	✓✓		
10.) **EC ONLY**:Is the meter calibration reading within acceptable limits (1271.7-1554.3)?			✓✓
11.) **For WG's containing DW samples**: PQV included for F-, Alk, & EC as applicable?	✓✓		
12.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? —— Calibration WG: 487959

Slope (Fluoride only) -58.903 Normality H2SO4 for ALK: ——

Disposable Vessel Lot**: 1966257

For any item listed above that is checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action

Comments:

* If no, qualify data with ZW. Altering the sample is a modification to the method.

** Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMWC014.10.13.16

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487959

Date Reported: 13-Dec-19
Run ID: R1764182
Date Analyzed: 12-Dec-19
ICAL Workgroup:
Instrument ID: MANIP1

WG487959ICV

Tag: Measured: 12/12/2019 11:25:56 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	1.94 ✔	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	97	1		%	++	0.1	0.4			

WG487959ICB

Tag: Measured: 12/12/2019 11:33:48 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U ✔	mg/L	++	0.1	0.4			

WG487959PQV

Tag: Measured: 12/12/2019 11:38:43 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	0.34	1	B	mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	97	1	B	%	++	0.1	0.4			

WG487959LFB

Tag: Measured: 12/12/2019 11:43:07 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	4.77	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	95	1		%	++	0.1	0.4			

WG487884PBS

Tag: Measured: 12/12/2019 11:49:23 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U	mg/L	++	0.1	0.4			

L56019-01

Tag: Measured: 12/12/2019 11:54:19 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-1312-DI		1	U	mg/L	++	0.1	0.4		RA TB	

L56019-01DUP

Tag: Measured: 12/12/2019 12:02:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U	mg/L	++	0.1	0.4			
SREV	FLUORIDE	RPD	0	1		%	++	0.1	0.4		RA	

L56019-03

Tag: Measured: 12/12/2019 12:10:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-1312-DI		1	U	mg/L	++	0.1	0.4		RA TB	

L56019-03AS

Tag: Measured: 12/12/2019 12:15:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	4.64	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	93	1		%	++	0.1	0.4			

ACZ Labs

Report Date: 12/12/2019

Report Time: 12:46 PM

Run Number	Order Number
17279	20191212-4

SampleID	RunDate	RunTime	cond (uS)	pH	ph2	palk-ppm	talk-ppm	bcarb-ppm	carb-ppm	hydr-ppm	F-ppm	F (mV)	F Dilution	Alk Sample Vol (mL)	Temp	mL H2S04 (8.3 pH)	mL H2S04 (4.5 pH)	mL H2S04 (4.2 pH)
WG487959ICV	12/12/2019	11:25 AM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	1.936	130.00	1.00	.00	21.70	-1.000	-1.000	-1.000
WG487959ICB	12/12/2019	11:33 AM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.020	247.07	1.00	.00	21.09	-1.000	-1.000	-1.000
WG487959PQV	12/12/2019	11:38 AM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.335	174.80	1.00	.00	20.69	-1.000	-1.000	-1.000
WG487959LFB	12/12/2019	11:43 AM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	4.770	106.56	1.00	.00	20.70	-1.000	-1.000	-1.000
WG487884PBS	12/12/2019	11:49 AM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.035	232.54	1.00	.00	20.83	-1.000	-1.000	-1.000
L56019-01	12/12/2019	11:54 AM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.060	218.75	1.00	.00	21.08	-1.000	-1.000	-1.000
L56019-01DUP	12/12/2019	12:02 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.059	218.99	1.00	.00	21.25	-1.000	-1.000	-1.000
L56019-03	12/12/2019	12:10 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.027	238.89	1.00	.00	21.11	-1.000	-1.000	-1.000
L56019-03AS	12/12/2019	12:15 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	4.637	107.17	1.00	.00	21.21	-1.000	-1.000	-1.000
L56019-05	12/12/2019	12:20 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.075	213.01	1.00	.00	21.37	-1.000	-1.000	-1.000
L56019-07	12/12/2019	12:25 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.060	218.38	1.00	.00	21.37	-1.000	-1.000	-1.000
L56019-09	12/12/2019	12:30 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.063	217.40	1.00	.00	21.24	-1.000	-1.000	-1.000
WG487959CCV	12/12/2019	12:34 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	1.900	130.49	1.00	.00	21.24	-1.000	-1.000	-1.000
WG487959CCB	12/12/2019	12:42 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.021	245.60	1.00	.00	21.35	-1.000	-1.000	-1.000

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Parameter: Fluoride Instr: ISE

	REAGENT	PCN/SCN	EXPIRATION DATE
Reagents:	TISAB	PCN59889	7/31/2021

PC-TitratION PLUS

Calibration Report

Calibration Record # 3571

Calibration Settings

Calibration ID	FLUORIDE	Date	12/12/2019
Channel	2	Time	11:10 AM
Probe Type	ISE	Temperature	-999.00 K -1272.15 C
Probe ID	F ELECTRODE	Analysis Type	Multi Line Fit

Operator

Calibration Results

Standard	Replicate	Set	Reading	Equation	Correlation
1	1	.25	182.25		
2	1	1.00	146.97	y = -58.599 x + 146.970	1.00
3	1	5.00	105.34	y = -59.559 x + 146.970	1.00
4	1	10.00	87.76	y = -58.399 x + 146.159	1.00
5	1	20.00	69.94	y = -59.197 x + 146.957	1.00
6	1	50.00	46.50	y = -58.903 x + 146.575	1.00

Copyright Hinterland Software Ltd.

FLUORIDE

QC List Type: QC-F
QCListMatClass: LIQUID
Bench Sheet List: I-F-MWMT
QC Ref: WC-F-SOIL
Group ID: WC-G-MNP-APCF-MWMT
Method Ref: SM4500-F C
SOP Ref: SOPWC060

WG487964

ACZ Laboratories, Inc

Instrument ID: MANIP1
Analyst: ENB
ACZ Dept: 37
Create Date: 12/12/2019 11:28
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	AL	FE	FMWMT	Comments
1	WG487964ICV	~~WC191204-2~~						✓	WC191212-1
2	WG487964ICB	NONE						✓	
3	WG487964PQV	WC191202-7						✓	
4	WG487964LFB	WC191014-1						✓	250 PBS
5	WG487250PBS	NONE						✓	
6	L56147-06	STSB29_6-15						✓	
7	L56147-06AS	WC191014-1						✓	
8	L56147-06ASD	WC191014-1						✓	
9	L56147-07	STSB29-FD_6-15						✓	
10	L56147-08	STSB30_0.5-3				10.3	0.74*	✓	100x Ad w/ TISAB (run w/ rinses)
11	L56147-09	STSB30_6-15				8.1		✓	
12	L56147-10	STSB31_0.5-3				40	1.8*	✓	500x (100x ~~1~~ 5x)
13	L56147-11	STSB31_6-15				6.8		✓	100x
14	WG487361PBS	NONE						✓	
15	L56147-01	STSB27_0.5-3						✓	
16	L56147-02	STSB27_6-15						✓	
17	L56147-03	STSB28_0.5-3				6.6		✓	100x Ad w/ TISAB (& rinses)
18	L56147-04	STSB28_6-15						✓	
19	WG487964CCV1	~~WC191204-2~~						✓	WC191212-1
20	WG487964CCB1	NONE						✓	
21	L56147-05	STSB29_0.5-3				14.3	0.27*	✓	Ad w TISAB (& rinses) 200x (100x ~~1~~ 2x)
22	L56147-05DUP	NONE				14.99*	0.142*	✓	

ENB 12/12/19

ENB 12/12/19

All Sx w/ rinses

Report Comments: 25 rinses added
Cal WG487959

Internal Comments Cal attached

AREV: ENB 12/13/19
Initials, Date

SREV: EMK 12/13/19
Initials, Date

12/12/2019 11:28:39 AM 112519

FLUORIDE

QC List Type: QC-F
QCListMatClass: LIQUID
Bench Sheet List: I-F-MWMT
QC Ref: WC-F-SOIL
Group ID: WC-G-MNP-APCF-MWMT
Method Ref: SM4500-F C
SOP Ref: SOPWC060

WG487964

ACZ Laboratories, Inc

Instrument ID: MANIP1
Analyst:
ACZ Dept: 37
Create Date: 12/12/2019 11:28
Start Date/Time:
End Date/Time:

SE Q	ACZ ID	Client ID	SubSX	Pri	Prep Dil	AL	FE	F M W MT	Comments
23	WG487687PBS	NONE						☑	
24	L56019-02	TOP01						☑	
25	L56019-02AS	WC191014-1						☑	
26	L56019-02ASD	WC191014-1						☑	
27	L56019-04	SLOPE-01						☑	
28	L56019-06	SLOPE-02						☑	
29	L56019-08	SLOPE-03						☑	
30	L56019-10	SLOPE-SE	ENB					☑	
31	WG487964CCV2	~~WG191204-2~~	12/12/19					☑	WC191212-1
32	WG487964CCB2	NONE						☑	

All SX w/ RISES

Report Comments:

Internal Comments

AREV:
Initials, Date

SREV:
Initials, Date

12/12/2019 11:28:40 AM 112519

FLUORIDE

QC List Type: QC-F
QCListMatClass: LIQUID
Bench Sheet List: I-F-MWMT
QC Ref: WC-F-SOIL
Group ID: WC-G-MNP-APCF-MWMT
Method Ref: SM4500-F C
SOP Ref: SOPWC060

WG487964

ACZ Laboratories, Inc

Instrument ID: MANIP1
Analyst:
ACZ Dept: 37
Create Date: 12/12/2019 11:28
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56019-02	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-04	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-06	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-08	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-10	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 11:28:40 AM 112519

ACZ Laboratories, Inc.

AUTO TITRATOR DATA REVIEW CHECKLIST

AREV: ENB
Date: 12/13/19

SREV: EMIC
Date: 12/13/19

Work Group: 487964
Sample Type: F-MWMT
Analysis Date: 12/12/19
Analyst: ENB

Instrument ID: manip1

	Yes	No	N/A
1.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓✓		
2.) Are all of the QC critera listed in LIMS within specified acceptance limits?		✓✓	
3.) **pH ONLY:** Is the difference between the 2 replicates of each sample < 0.1 ?			✓✓
4.) If new acid was prepared, was it standardized? (Attach standardization report.)			✓✓
5.) **Alk, EC, pH:** All analyses performed on an unaltered sample (not centrifuged, diluted, etc.) *			✓✓
6.) **Fluoride:** Is any sample analyzed on dilution appropriately "D" qualified (except o-cal)?	✓✓		
7.) **Fluoride only**: Were all sx's checked with TISAB?	✓✓		
8.) Were all samples run within hold time (other than pH)? Flag if "No."	✓✓		
9.) Is a current standard/reagent sheet attached to the workgroup?	✓✓		
10.) **EC ONLY**:Is the meter calibration reading within acceptable limits (1271.7-1554.3)?			✓✓
11.) **For WG's containing DW samples**: PQV included for F-, Alk, & EC as applicable?	✓✓		
12.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? YES

Calibration WG: 487959 ✓

Slope (Fluoride only) -58.903

Normality H2SO4 for ALK: ——

Disposable Vessel Lot**: 1906257

For any item listed above that is checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
147-06 AS/D	Rec ↓	M2
147-03,08-11,05	Over Diluted	D1

Comments:

* If no, qualify data with ZW. Altering the sample is a modification to the method.

** Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMWC014.10.13.16

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487964

Date Reported: 13-Dec-19
Run ID: R1764464
Date Analyzed: 12-Dec-19
ICAL Workgroup: WG487959
Instrument ID: MANIP1

WG487964ICV

Tag: | Measured: 12/12/2019 4:40:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	1.9	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	95	1		%	++	0.1	0.4			

WG487964ICB

Tag: | Measured: 12/12/2019 4:47:59 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U	mg/L	++	0.1	0.4			

WG487964PQV

Tag: | Measured: 12/12/2019 4:55:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	0.32	1	B	mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	91	1	B	%	++	0.1	0.4			

WG487964LFB

Tag: | Measured: 12/12/2019 5:02:25 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	4.55	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	91	1		%	++	0.1	0.4			

WG487250PBS

Tag: | Measured: 12/12/2019 5:12:22 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U	mg/L	++	0.1	0.4			

L56147-06

Tag: | Measured: 12/12/2019 5:26:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT	5.1	1		mg/L	++	0.1	0.4		M2 RA TB	

L56147-06AS

Tag: 75-125 | Measured: 12/12/2019 5:41:55 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	9.58	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	89	1		%	ALRT	0.1	0.4		M2	

L56147-06ASD

Tag: 75-125 | Measured: 12/12/2019 5:54:39 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	9.58	1		mg/L	++	0.1	0			
SREV	FLUORIDE	REC	89	1		%	ALRT	0.1	0		M2	
SREV	FLUORIDE	RPD	0	1		%	++	0.1	0			

L56147-07 Tag: Measured: 12/12/2019 6:04:04 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT	6.4	1		mg/L	++	0.1	0.4		M2 RA TB	

L56147-08 Tag: Measured: 12/12/2019 6:14:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		100	U	mg/L	++	10	40		D1 M2 RA TB	

L56147-09 Tag: Measured: 12/12/2019 6:26:43 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT	20	100	B	mg/L	++	10	40		D1 M2 RA TB	

L56147-10 Tag: Measured: 12/12/2019 6:40:02 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		500	U	mg/L	++	60	200		D1 M2 RA TB	

L56147-11 Tag: Measured: 12/12/2019 6:53:56 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		100	U	mg/L	++	10	40		D1 M2 RA TB	

WG487361PBS Tag: Measured: 12/12/2019 7:05:34 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U ✓	mg/L	++	0.1	0.4			

L56147-01 Tag: Measured: 12/12/2019 7:21:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT	1.5	1		mg/L	++	0.1	0.4		M2 RA TB	

L56147-02 Tag: Measured: 12/12/2019 7:30:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT	4.7	1		mg/L	++	0.1	0.4		M2 RA TB	

L56147-03 Tag: Measured: 12/12/2019 7:42:39 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		100	U	mg/L	++	10	40		D1 M2 RA TB	

L56147-04 Tag: Measured: 12/12/2019 7:51:37 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT	3.6	1		mg/L	++	0.1	0.4		M2 RA TB	

WG487964CCV1 Tag: Measured: 12/12/2019 8:05:42 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	1.92 ✓	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	96	1		%	++	0.1	0.4			

WG487964CCB1 Tag: Measured: 12/12/2019 8:11:55 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U	mg/L	++	0.1	0.4			

L56147-05 Tag: Measured: 12/12/2019 8:17:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		200	U	mg/L	++	20	70		D1 RA TB	

L56147-05DUP Tag: Measured: 12/12/2019 8:31:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		200	U	mg/L	++	20	70			
SREV	FLUORIDE	RPD	0	200		%	++	20	70		RA	

WG487687PBS Tag: Measured: 12/12/2019 8:44:21 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U	mg/L	++	0.1	0.4			

not project samples

L56019-02 Tag: Measured: 12/12/2019 8:56:56 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		1	U	mg/L	++	0.1	0.4		RA TA TB	

L56019-02AS Tag: Measured: 12/12/2019 9:12:43 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	4.64	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	93	1		%	++	0.1	0.4			

L56019-02ASD Tag: Measured: 12/12/2019 9:23:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	4.59	1		mg/L	++	0.1	0			
SREV	FLUORIDE	REC	92	1		%	++	0.1	0			
SREV	FLUORIDE	RPD	1	1		%	++	0.1	0			

L56019-04 Tag: Measured: 12/12/2019 9:33:26 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		1	U	mg/L	++	0.1	0.4		RA TA TB	

L56019-06 Tag: Measured: 12/12/2019 9:45:50 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		1	U	mg/L	++	0.1	0.4		RA TA TB	

L56019-08 Tag: Measured: 12/12/2019 9:58:34 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT	.1	1	B	mg/L	++	0.1	0.4		RA TA TB	

L56019-10 Tag: Measured: 12/12/2019 10:14:22 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	F-MWMT		1	U	mg/L	++	0.1	0.4		RA TA TB	

WG487964CCV2

Tag:

Measured: 12/12/2019 10:27:35 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND	1.89	1		mg/L	++	0.1	0.4			
SREV	FLUORIDE	REC	94	1		%	++	0.1	0.4			

WG487964CCB2

Tag:

Measured: 12/12/2019 10:34:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	FLUORIDE	FOUND		1	U	mg/L	++	0.1	0.4			

ACZ Labs

Report Date: 12/13/2019

Report Time: 9:13 AM

Run Number	Order Number
17284	20191212-9

SampleID	RunDate	RunTime	cond (uS)	pH	ph2	palk-ppm	talk-ppm	bcarb-ppm	carb-ppm	hydr-ppm	F-ppm	F (mV)	F Dilution	Alk Sample Vol (mL)	Temp	mL H2S04 (8.3 pH)	mL H2S04 (4.5 pH)	mL H2S04 (4.2 pH)
WG487964ICV	12/12/2019	4:40 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	1.900	130.37	1.00	.00	21.19	-1.000	-1.000	-1.000
WG487964ICB	12/12/2019	4:47 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.036	231.81	1.00	.00	21.11	-1.000	-1.000	-1.000
WG487964PQV	12/12/2019	4:55 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.316	176.26	1.00	.00	21.92	-1.000	-1.000	-1.000
WG487964LFB	12/12/2019	5:02 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	4.550	107.78	1.00	.00	21.35	-1.000	-1.000	-1.000
rinse-1	12/12/2019	5:07 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.062	217.77	1.00	.00	20.91	-1.000	-1.000	-1.000
WG487250PBS	12/12/2019	5:12 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.038	230.46	1.00	.00	20.83	-1.000	-1.000	-1.000
rinse-2	12/12/2019	5:18 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.015	253.78	1.00	.00	21.61	-1.000	-1.000	-1.000
L56147-06	12/12/2019	5:26 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	5.146	104.61	1.00	.00	21.93	-1.000	-1.000	-1.000
rinse-3	12/12/2019	5:34 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.281	179.32	1.00	.00	21.86	-1.000	-1.000	-1.000
L56147-06AS	12/12/2019	5:41 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	9.576	88.86	1.00	.00	21.92	-1.000	-1.000	-1.000
rinse-4	12/12/2019	5:46 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.424	168.82	1.00	.00	22.14	-1.000	-1.000	-1.000
L56147-06ASD	12/12/2019	5:54 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	9.576	88.86	1.00	.00	21.99	-1.000	-1.000	-1.000
rinse-5	12/12/2019	5:58 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.430	168.45	1.00	.00	21.19	-1.000	-1.000	-1.000
L56147-07	12/12/2019	6:04 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	6.390	98.99	1.00	.00	21.51	-1.000	-1.000	-1.000
rinse-6	12/12/2019	6:09 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.316	176.26	1.00	.00	22.35	-1.000	-1.000	-1.000
L56147-08	12/12/2019	6:14 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	9.580	206.66	100.00	.00	22.11	-1.000	-1.000	-1.000
rinse-7	12/12/2019	6:22 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.042	227.53	1.00	.00	21.41	-1.000	-1.000	-1.000
L56147-09	12/12/2019	6:26 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	16.316	193.11	100.00	.00	21.01	-1.000	-1.000	-1.000
rinse-8	12/12/2019	6:33 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.027	239.01	1.00	.00	21.24	-1.000	-1.000	-1.000
L56147-10	12/12/2019	6:40 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	20.596	228.27	500.00	.00	21.38	-1.000	-1.000	-1.000
rinse-9	12/12/2019	6:46 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.015	254.39	1.00	.00	21.76	-1.000	-1.000	-1.000
L56147-11	12/12/2019	6:53 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	10.800	203.61	100.00	.00	21.89	-1.000	-1.000	-1.000
rinse-10	12/12/2019	6:59 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.016	251.83	1.00	.00	21.31	-1.000	-1.000	-1.000
WG487361PBS	12/12/2019	7:05 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.030	235.96	1.00	.00	21.15	-1.000	-1.000	-1.000

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Report Date: 12/13/2019

Report Time: 9:13 AM

Run Number	Order Number
17284	20191212-9

SampleID	RunDate	RunTime	cond (uS)	pH	ph2	palk-ppm	talk-ppm	bcarb-ppm	carb-ppm	hydr-ppm	F-ppm	F (mV)	F Dilution	Alk Sample Vol (mL)	Temp	mL H2S04 (8.3 pH)	mL H2S04 (4.5 pH)	mL H2S04 (4.2 pH)
rinse-11	12/12/2019	7:13 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.009	267.45	1.00	.00	21.77	-1.000	-1.000	-1.000
L56147-01	12/12/2019	7:21 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	1.522	135.98	1.00	.00	22.26	-1.000	-1.000	-1.000
rinse-12	12/12/2019	7:26 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.099	205.93	1.00	.00	21.37	-1.000	-1.000	-1.000
L56147-02	12/12/2019	7:30 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	4.658	107.17	1.00	.00	21.22	-1.000	-1.000	-1.000
rinse-13	12/12/2019	7:34 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.212	186.40	1.00	.00	21.56	-1.000	-1.000	-1.000
L56147-03	12/12/2019	7:42 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	5.816	219.48	100.00	.00	21.82	-1.000	-1.000	-1.000
rinse-14	12/12/2019	7:48 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.025	240.96	1.00	.00	21.93	-1.000	-1.000	-1.000
L56147-04	12/12/2019	7:51 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	3.559	114.13	1.00	.00	21.35	-1.000	-1.000	-1.000
rinse-15	12/12/2019	7:57 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.156	194.33	1.00	.00	21.56	-1.000	-1.000	-1.000
WG487964CCV1	12/12/2019	8:05 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	1.918	130.00	1.00	.00	21.77	-1.000	-1.000	-1.000
WG487964CCB1	12/12/2019	8:11 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.033	233.64	1.00	.00	21.98	-1.000	-1.000	-1.000
L56147-05	12/12/2019	8:17 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	6.206	235.35	200.00	.00	21.89	-1.000	-1.000	-1.000
rinse-16	12/12/2019	8:25 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.012	259.15	1.00	.00	22.00	-1.000	-1.000	-1.000
L56147-05DUP	12/12/2019	8:31 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	5.049	240.60	200.00	.00	21.74	-1.000	-1.000	-1.000
rinse-17	12/12/2019	8:39 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.008	268.79	1.00	.00	21.77	-1.000	-1.000	-1.000
WG487687PBS	12/12/2019	8:44 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.048	223.99	1.00	.00	21.50	-1.000	-1.000	-1.000
rinse-18	12/12/2019	8:52 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.007	271.72	1.00	.00	21.67	-1.000	-1.000	-1.000
L56019-02	12/12/2019	8:56 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.097	206.29	1.00	.00	21.67	-1.000	-1.000	-1.000
rinse-19	12/12/2019	9:04 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.008	269.65	1.00	.00	21.61	-1.000	-1.000	-1.000
L56019-02AS	12/12/2019	9:12 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	4.637	107.29	1.00	.00	21.61	-1.000	-1.000	-1.000
rinse-20	12/12/2019	9:17 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.062	217.77	1.00	.00	21.44	-1.000	-1.000	-1.000
L56019-02ASD	12/12/2019	9:23 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	4.592	107.54	1.00	.00	21.51	-1.000	-1.000	-1.000
rinse-21	12/12/2019	9:28 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.066	216.18	1.00	.00	21.38	-1.000	-1.000	-1.000
L56019-04	12/12/2019	9:33 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.096	206.54	1.00	.00	21.40	-1.000	-1.000	-1.000
rinse-22	12/12/2019	9:41 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.015	254.02	1.00	.00	21.51	-1.000	-1.000	-1.000
L56019-06	12/12/2019	9:45 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.090	208.12	1.00	.00	21.28	-1.000	-1.000	-1.000
rinse-23	12/12/2019	9:53 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.010	263.91	1.00	.00	21.45	-1.000	-1.000	-1.000

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Report Date: 12/13/2019

Report Time: 9:13 AM

Run Number	Order Number
17284	20191212-9

SampleID	RunDate	RunTime	cond (uS)	pH	ph2	palk-ppm	talk-ppm	bcarb-ppm	carb-ppm	hydr-ppm	F-ppm	F (mV)	F Dilution	Alk Sample Vol (mL)	Temp	mL H2S04 (8.3 pH)	mL H2S04 (4.5 pH)	mL H2S04 (4.2 pH)
L56019-08	12/12/2019	9:58 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.119	201.17	1.00	.00	21.30	-1.000	-1.000	-1.000
rinse-24	12/12/2019	10:06 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.010	264.03	1.00	.00	21.48	-1.000	-1.000	-1.000
L56019-10	12/12/2019	10:14 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.094	207.03	1.00	.00	21.48	-1.000	-1.000	-1.000
rinse-25	12/12/2019	10:22 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.008	270.26	1.00	.00	21.83	-1.000	-1.000	-1.000
WG487964CCV2	12/12/2019	10:27 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	1.891	130.49	1.00	.00	21.19	-1.000	-1.000	-1.000
WG487964CCB2	12/12/2019	10:34 PM	-1.00	-1.000	-1.000	-1.00	-1.00	-1.00	-1.00	-1.00	0.028	238.40	1.00	.00	21.48	-1.000	-1.000	-1.000

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Parameter: Fluoride Instr: ISE

	REAGENT	PCN/SCN	EXPIRATION DATE
Reagents:	TISAB	PCN59889	7/31/2021

Parameter: Fluoride Instr: ISE

	REAGENT	PCN/SCN	EXPIRATION DATE
Reagents:	TISAB	PCN59889	7/31/2021

PC-TitratION PLUS

Calibration Report

Calibration Record # 3571

Calibration Settings

Calibration ID	FLUORIDE	Date	12/12/2019
Channel	2	Time	11:10 AM
Probe Type	ISE	Temperature	-999.00 K -1272.15 C
Probe ID	F ELECTRODE	Analysis Type	Multi Line Fit

Operator

Calibration Results

Standard	Replicate	Set	Reading	Equation	Correlation
1	1	.25	182.25		
2	1	1.00	146.97	y = -58.599 x + 146.970	1.00
3	1	5.00	105.34	y = -59.559 x + 146.970	1.00
4	1	10.00	87.76	y = -58.399 x + 146.159	1.00
5	1	20.00	69.94	y = -59.197 x + 146.957	1.00
6	1	50.00	46.50	y = -58.903 x + 146.575	1.00

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ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487964 **FLUORIDE**

Sample	Date	SCN	F
WG487964ICV	12/12/19 16:40	WC191212-1	X
WG487964ICB	12/12/19 16:47		X
WG487964PQV	12/12/19 16:55	WC191202-7	X
WG487964LFB	12/12/19 17:02	WC191014-1	X
WG487250PBS	12/12/19 17:12		X
L56147-06	12/12/19 17:26		X
L56147-06AS	12/12/19 17:41	WC191014-1	X
L56147-06ASD	12/12/19 17:54	WC191014-1	X
L56147-07	12/12/19 18:04		X
L56147-08	12/12/19 18:14		X
L56147-09	12/12/19 18:26		X
L56147-10	12/12/19 18:40		X
L56147-11	12/12/19 18:53		X
WG487361PBS	12/12/19 19:05		X
L56147-01	12/12/19 19:21		X
L56147-02	12/12/19 19:30		X
L56147-03	12/12/19 19:42		X
L56147-04	12/12/19 19:51		X
WG487964CCV1	12/12/19 20:05	WC191212-1	X
WG487964CCB1	12/12/19 20:11		X
L56147-05	12/12/19 20:17		X
L56147-05DUP	12/12/19 20:31		X
WG487687PBS	12/12/19 20:44		X
L56019-02	12/12/19 20:56		X
L56019-02AS	12/12/19 21:12	WC191014-1	X
L56019-02ASD	12/12/19 21:23	WC191014-1	X

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487964 **FLUORIDE**

Sample	Date	SCN	F
L56019-04	12/12/19 21:33		X
L56019-06	12/12/19 21:45		X
L56019-08	12/12/19 21:58		X
L56019-10	12/12/19 22:14		X
WG487964CCV2	12/12/19 22:27	WC191212-1	X
WG487964CCB2	12/12/19 22:34		X

L56147-2001131042

PHALKCON

QC List Type: QC-ALK-200
QCListMatClass: LIQUID
Bench Sheet List: I-PH
QC Ref: WC-MANIP
Group ID: WC-G-MNP-PHALKONMW
Method Ref: PHALKCON
SOP Ref: SOPWC078

WG487689

ACZ Laboratories, Inc

Instrument ID: MANIP2
Analyst: EMK
ACZ Dept: 37
Create Date: 12/09/2019 10:08
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	ALKMWMT	Comments
1	WG487689PBW	NONE				☑	rerun
2	WG487689LCSW1	WC191203-1				☑	
3	WG487250PBS	NONE				☑	
4	L56147-06	STSB29_6-15				☑	
5	L56147-07	STSB29-FD_6-15				☑	
6	L56147-08	STSB30_0.5-3				☑	
7	L56147-09	STSB30_6-15				☑	
8	L56147-10	STSB31_0.5-3				☑	
9	L56147-10DUP	NONE				☑	
10	L56147-11	STSB31_6-15				☑	
11	WG487361PBS	NONE				☑	
12	L56147-01	STSB27_0.5-3				☑	
13	L56147-02	STSB27_6-15				☑	
14	L56147-03	STSB28_0.5-3				☑	
15	L56147-04	STSB28_6-15				☑	
16	L56147-05	STSB29_0.5-3				☑	
17	~~L56147-05DUP1~~	~~NONE~~	EMK			☑	Soils Dup
18	L56147-05DUP2	NONE	12/9/19			☑	~~Not Needed, 2x DUPS~~ EMK 12/9/19
19	WG487689LCSW2	WC191203-1				☑	

Report Comments:

Internal Comments

AREV: EMK 12/9/19
Initials, Date

SREV: ENB, 12/10/19 ENB ~~tot~~ 12/10/19
Initials, Date

12/9/2019 10:09:07 AM 121719

PHALKCON

QC List Type: QC-ALK-200
QCListMatClass: LIQUID
Bench Sheet List: I-PH
QC Ref: WC-MANIP
Group ID: WC-G-MNP-PHALKONMW
Method Ref: PHALKCON
SOP Ref: SOPWC078

WG487689

ACZ Laboratories, Inc

Instrument ID: MANIP2
Analyst:
ACZ Dept: 37
Create Date: 12/09/2019 10:08
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 10:09:07 AM 121719

ACZ Laboratories, Inc.
AUTO TITRATOR DATA REVIEW CHECKLIST

AREV: EMIC
Date: 12/9/19

SREV: ENR
Date: 12/10/19

Work Group: 487689
Sample Type: PhalKcon
Analysis Date: 12/9/19
Analyst: EMIC

Instrument ID: Manip 2

	Yes	No	N/A
1.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓✓		
2.) Are all of the QC critera listed in LIMS within specified acceptance limits?		✓✓	
3.) **pH ONLY:** Is the difference between the 2 replicates of each sample < 0.1 ?	✓✓		
4.) If new acid was prepared, was it standardized? (Attach standardization report.)			✓✓
5.) **Alk, EC, pH:** All analyses performed on an unaltered sample (not centrifuged, diluted, etc.) *	✓✓		
6.) **Fluoride:** Is any sample analyzed on dilution appropriately "D" qualified (except o-cal)?			✓✓
7.) **Fluoride only**: Were all sx's checked with TISAB?			✓✓
8.) Were all samples run within hold time (other than pH)? Flag if "No."	✓✓		
9.) Is a current standard/reagent sheet attached to the workgroup?	✓✓		
10.) **EC ONLY**:Is the meter calibration reading within acceptable limits (1271.7-1554.3)?	✓		✓
11.) **For WG's containing DW samples**: PQV included for F-, Alk, & EC as applicable?			✓✓
12.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? -

Calibration WG: 487689

Slope (Fluoride only) -

Normality H2SO4 for ALK: 0.0200

Disposable Vessel Lot**: -

For any item listed above that is checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
PBW	out of limits, reran as PBW2	fail 1st run, pass PBW2 ✓

Comments:

* If no, qualify data with ZW. Altering the sample is a modification to the method.

** Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

FRMWC014.10.13.16

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487689

Date Reported: 10-Dec-19
Run ID: R1763522
Date Analyzed: 09-Dec-19
ICAL Workgroup:
Instrument ID: MANIP2

WG487689PBW

Tag: **Measured:** 12/9/2019 10:32:56 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	ALKALINITY	FOUND	46.7 ✓	1		mg/L	ALRT	2	20			

WG487689LCSW1

Tag: **Measured:** 12/9/2019 10:44:32 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	FOUND	789 ✓	1		mg/L	++	2	20			
SREV	ALKALINITY	REC	96	1		%	++	2	20			

WG487250PBS

Tag: **Measured:** 12/9/2019 10:50:55 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	FOUND	3.5	1	B	mg/L	++	2	20			
FAIL	PH	FOUND	7.3	1		units	NEED	0.1	0.1			

L56147-06

Tag: **Measured:** 12/9/2019 10:59:26 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT	54.4	1		mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT	54.4	1		mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-07

Tag: **Measured:** 12/9/2019 11:07:51 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT	59.3	1		mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT	59.3	1		mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

WG487689PBW2

Tag: **Measured:** 12/9/2019 11:22:12 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	FOUND		1	U	mg/L	++	2	20			

L56147-08

Tag: **Measured:** 12/9/2019 11:26:54 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT		1	U	mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-09

Tag: Measured: 12/9/2019 11:33:59 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT	39.7	1		mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT	39.7	1		mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-10

Tag: Measured: 12/9/2019 11:38:10 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT		1	U	mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-10DUP

Tag: Measured: 12/9/2019 11:42:19 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	FOUND		1	U	mg/L	++	2	20			
SREV	ALKALINITY	RPD	0	1		%	++	2	20		RA	

L56147-11

Tag: Measured: 12/9/2019 11:48:44 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT	10.1	1	B	mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT	10.1	1	B	mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

WG487361PBS

Tag: Measured: 12/9/2019 11:54:58 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	FOUND		1	U	mg/L	++	2	20			
FAIL	PH	FOUND	6.5	1		units	NEED	0.1	0.1			

L56147-01

Tag: Measured: 12/9/2019 12:03:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT	89.2	1		mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT	89.2	1		mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-02

Tag: Measured: 12/9/2019 12:12:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT	55.4	1		mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT	55.4	1		mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-03

Tag: Measured: 12/9/2019 12:16:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT		1	U	mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-04

Tag: Measured: 12/9/2019 12:25:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT	76.0	1		mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT	76.0	1		mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-05

Tag: Measured: 12/9/2019 12:29:52 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	ALK-MWMT		1	U	mg/L	++	2	20		Q6 RA TB	
SREV	CO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	HCO3 AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	
SREV	OH AS CACO3	ALK-MWMT		1	U	mg/L	++	2	20		Q6 TB	

L56147-05DUP2

Tag: Measured: 12/9/2019 12:34:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	FOUND		1	U	mg/L	++	2	20			
SREV	ALKALINITY	RPD	0	1	✓	%	++	2	20		RA	

WG487689LCSW2

Tag: Measured: 12/9/2019 12:46:54 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	ALKALINITY	FOUND	799 ✓	1		mg/L	++	2	20			
SREV	ALKALINITY	REC	97	1		%	++	2	20			

ACZ Labs

Report Date: 12/9/2019

Report Time: 1:36 PM

RunNumber 17116

OrderNumber 20191209-2

SampleID	RunDate	RunTime	cond (uS)	Cond Temp (C)	pH	ph2	pH (mV)	palk-ppm	talk-ppm	bcarb-ppm	carb-ppm	hydr-ppm	Alk Sample Vol (mL)	Temp	mL H2SO4 (8.3 pH)	mL H2SO4 (4.5 pH)	mL H2SO4 (4.2 pH)
WG487689PBW	12/9/2019	10:32 AM	-1.00	-1.00	9.14	9.14	-115.35	2.76	46.73	41.21	5.53	.00	25.00	22.57	.07	1.17	1.21
WG487689LCSW1	12/9/2019	10:44 AM	-1.00	-1.00	9.06	9.06	-110.83	67.30	788.72	654.13	134.59	.00	25.00	22.23	1.68	19.72	19.86
WG487250PBS	12/9/2019	10:50 AM	-1.00	-1.00	7.26	7.26	-6.22	.00	3.49	3.49	.00	.00	25.00	20.48	.00	.13	.16
L56147-06	12/9/2019	10:59 AM	-1.00	-1.00	7.71	7.72	-33.08	.00	54.39	54.39	.00	.00	25.00	20.23	.00	1.36	1.44
L56147-07	12/9/2019	11:07 AM	-1.00	-1.00	7.80	7.80	-37.96	.00	59.30	59.30	.00	.00	25.00	20.38	.00	1.48	1.57
WG487689PBW2	12/9/2019	11:22 AM	-1.00	-1.00	6.09	6.10	60.79	.00	.60	.60	.00	.00	25.00	22.70	.00	.06	.10
L56147-08	12/9/2019	11:26 AM	-1.00	-1.00	4.54	4.53	150.14	.00	-2.00	-2.00	.00	.00	25.00	21.03	.00	.02	.08
L56147-09	12/9/2019	11:33 AM	-1.00	-1.00	6.27	6.28	49.92	.00	39.75	39.75	.00	.00	25.00	21.56	.00	.99	1.05
L56147-10	12/9/2019	11:38 AM	-1.00	-1.00	4.17	4.18	171.26	.00	.00	.00	.00	.00	25.00	21.93	.00	.00	.00
L56147-10DUP	12/9/2019	11:42 AM	-1.00	-1.00	4.10	4.11	175.17	.00	.00	.00	.00	.00	25.00	21.69	.00	.00	.00
L56147-11	12/9/2019	11:48 AM	-1.00	-1.00	6.12	6.13	58.71	.00	10.09	10.09	.00	.00	25.00	21.82	.00	.30	.35
WG487361PBS	12/9/2019	11:54 AM	-1.00	-1.00	6.46	6.46	39.30	.00	.76	.76	.00	.00	25.00	21.96	.00	.08	.14
L56147-01	12/9/2019	12:03 PM	-1.00	-1.00	7.90	7.90	-43.70	.00	89.15	89.15	.00	.00	25.00	22.05	.00	2.23	2.33
L56147-02	12/9/2019	12:12 PM	-1.00	-1.00	7.80	7.80	-38.08	.00	55.37	55.37	.00	.00	25.00	22.22	.00	1.38	1.47
L56147-03	12/9/2019	12:16 PM	-1.00	-1.00	4.75	4.75	138.06	.00	-1.09	-1.09	.00	.00	25.00	22.29	.00	.05	.12
L56147-04	12/9/2019	12:25 PM	-1.00	-1.00	7.51	7.52	-21.72	.00	75.97	75.97	.00	.00	25.00	22.74	.00	1.90	1.99
L56147-05	12/9/2019	12:29 PM	-1.00	-1.00	4.48	4.48	153.93	.00	-3.69	-3.69	.00	.00	25.00	22.66	.00	.00	.09
L56147-05DUP	12/9/2019	12:34 PM	-1.00	-1.00	4.41	4.41	157.83	.00	-2.87	-2.87	.00	.00	25.00	22.55	.00	.00	.07
WG487689LCSW2	12/9/2019	12:46 PM	-1.00	-1.00	9.06	9.06	-110.83	64.39	798.72	669.95	128.77	.00	25.00	22.48	1.61	19.97	20.13

GENERAL RESULTS REPORT.SRW

PC-TitratION PLUS by Man-Tech Associates, Inc.

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PC-TitratION PLUS
Calibration Report

Calibration Record # 5987

Calibration Settings

Calibration ID	CONDUCTIVITY 1413	Date	12/09/2019
Channel		Time	9:35 AM
Probe Type	Linear	Temperature	-999.00 K -1272.15 C
Probe ID	3, Device Man-Tech 991	Analysis Type	Single Line Fit

Calibration Results

Slope	0.986	CorrCoeff	0.0000
Intercept	0.000	Equation:	Y = (0.986) X + (0.000)

Calibration Validity **True** Operator

	Result	Minimum	Maximum
Slope	0.986	0.00	0.00
Intercept	0.000	0.00	0.00
Correlation Coefficient	0.0000	0.00	1.00

Note: "True" means the calibration was within the specified ranges
"False" means the calibration was NOT within the specified ranges

Calibration Data	**Standard**	**Reading**
	1413.00	1393.00

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PC-TitratION PLUS
Calibration Report

Calibration Record # 5988

Calibration Settings

Calibration ID	PH CAL 4-7-10	Date	12/09/2019	
Channel	1	Time	9:54 AM	
Probe Type	pH	Temperature	295.26 K	22.11 C
Probe ID	PH ELECTRODE	Analysis Type	Single Line Fit	

Calibration Results

Slope	-57.755	CorrCoeff	0.9999 ✓
Intercept	8.229	Equation:	Y = (-57.755) X + (8.229)

Calibration Validity **True** Operator

	Result	Minimum	Maximum
Slope	-57.755	-65.00	-53.00
Intercept	8.229	-100.00	100.00
Correlation Coefficient	0.9999	0.99	1.00

Note: "True" means the calibration was within the specified ranges
"False" means the calibration was NOT within the specified ranges

Calibration Data	**Standard**	**Reading**
	2.00	298.95
	4.00	181.76
	7.00	6.95
	10.00	-170.41
	13.00	-333.86

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Parameter: PHALKCON

Instr: Man-Tech

	REAGENT	PCN/SCN	EXPIRATION DATE
Titration Reagents:	0.02 N H_2SO4	PCN59912	**12/21/2019**
	0.2 N H_2SO4		
	1 N H_2SO4		
	2 N H_2SO4		
Ph probe reagents:	2.0 Buffer	PCN58293	12/31/2020
	4.0 Buffer	PCN58503	11/30/2020
	7.0 Buffer	PCN58542	12/31/2020
	10.0 Buffer	PCN59339	3/31/2021
	13.0 Buffer	PCN57863	5/31/2020
additional reagents:	EC Cal Std.	PCN59739	7/31/2021

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487689 **PHALKCON**

Sample	Date	SCN	ALKALINITY	CO3 AS CACO3	HCO3 AS CACO3	OH AS CACO3	PH
WG487689PBW	12/09/19 10:32		X				
WG487689LCSW1	12/09/19 10:44	WC191203-1	X				
WG487250PBS	12/09/19 10:50						X
WG487250PBS	12/09/19 10:50		X				
L56147-06	12/09/19 10:59		X	X	X	X	
L56147-07	12/09/19 11:07		X	X	X	X	
WG487689PBW2	12/09/19 11:22		X				
L56147-08	12/09/19 11:26		X	X	X	X	
L56147-09	12/09/19 11:33		X	X	X	X	
L56147-10	12/09/19 11:38		X	X	X	X	
L56147-10DUP	12/09/19 11:42		X				
L56147-11	12/09/19 11:48		X	X	X	X	
WG487361PBS	12/09/19 11:54						X
WG487361PBS	12/09/19 11:54		X				
L56147-01	12/09/19 12:03		X	X	X	X	
L56147-02	12/09/19 12:12		X	X	X	X	
L56147-03	12/09/19 12:16		X	X	X	X	
L56147-04	12/09/19 12:25		X	X	X	X	
L56147-05	12/09/19 12:29		X	X	X	X	
L56147-05DUP2	12/09/19 12:34		X				
WG487689LCSW2	12/09/19 12:46	WC191203-1	X				

TKN-H20

WG488144

ACZ Laboratories, Inc

QC List Type: QC-RFA-N-TK
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-N-TK
QC Ref: ICV/B-CCV/B
Group ID: WC-G-RFA-N-TK
Method Ref: M351.2
SOP Ref: SOPWC034

Instrument ID: FIA2
Analyst: PJB
ACZ Dept: 37
Create Date: 12/13/2019 23:47
Start Date/Time: 12/13/19
End Date/Time: 12/14/19

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	N TK	Nitrogen Total Kjeldahl (mg/L)	Sample Volume (mL)	Digestion Solution Volume (mL)	Dilution	Comments
1	WG488144ICV	WI191122-6			1	☑				1	
2	WG488144ICB	NONE			1	☑				1	
3	WG487864LRB1	NONE			1	☑				1	
4	WG487864LFB1	WI191023-2			1	☑				1	
5	L56195-01	549N			1	☑				1	
6	L56195-01DUP	NONE			1	☑				1	
7	L56195-02	MF@LAB			1	☑				1	
8	L56195-02LFM	WI191023-2			1	☑				1	
9	L56199-01	EFFLUENT OUTFALL			1	☑				1	
10	L56221-01	INFLUENT			1	☑				120 -	o-cal
11	L56245-02	GUNN-WWTP EFF			1	☑				12 -	↓
12	L56246-01	REG 85			1	☑				1	
13	WG488144CCV1	WI191122-4			1	☑				1	
14	WG488144CCB1	NONE			1	☑			PJB	1	
15	L56254-01	GROUNDWATER			1	☑			12/14/19	1	
16	L56257-01	EFFLUENT 003A (24HC)			1	☑				1	
17	L56257-02	RIVER UPSTREAM (GR)			1	☑				1	
18	L56257-03	RIVER DOWNSTREAM (GR			1	☑				1	
19	L56265-01	PLANT EFFLUENT			1	☑				13 -	o-cal
20	L56265-01DUP	NONE			1	☑				13 -	↓
21	L56266-01	BG-20-TRASW			1	☑				1	
22	L56266-01LFM	WI191023-2			1	☑				1	
23	L56266-02	CC-10-TRASW			1	☑				1	
24	L56266-03	CC-30-TRASW			1	☑				1	

Report Comments:

Internal Comments

AREV: PJB 12/14/19
Initials, Date

SREV: KRH 12-16-19
Initials, Date

12/13/2019 11:47:50 PM 121319

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: PJB
Date: 12/14/19

SREV: KRH
Date: 12-16-19

Instrument ID FIA1

Work Group: 488144
Sample Type: TKN
Analysis Date: 12/13/19
Analyst: PJB

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	X		
2) Is a current standard/reagent sheet attached to the workgroup?	X		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?			X
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	X		
5) Are all of the QC critera listed in LIMS within specified limits?		X	
6) If applicable, was a passing PQV indcluded in the WG?			X
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	X		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	X		
9) Was sample-analysis completed within the holding time?	X		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?	X		
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			X
12) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? no

Calibration WG: —

Prep WG#: 487894 KRH 12-16-19 6

Disposable Vessel Lot#*: 1265326

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
195-01	DVP <10X MDL	RA
276-06	DVP	

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

TKN-H20

QC List Type: QC-RFA-N-TK
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-N-TK
QC Ref: ICV/B-CCV/B
Group ID: WC-G-RFA-N-TK
Method Ref: M351.2
SOP Ref: SOPWC034

WG488144

ACZ Laboratories, Inc

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/13/2019 23:47
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	NTK	Nitrogen Total Kjeldahl (mg/L)	Sample Volume (mL)	Digestion Solution Volume (mL)	Dilution	Comments
25	WG488144CCV2	WI191122-4			1	☑				1	
26	WG488144CCB2	NONE			1	☑				1	
27	L56266-04	WC-40-TRASW			1	☑				1	
28	L56266-05	WC-45-TRASW			1	☑				1	
29	L56266-06	WC-99-TRASW			1	☑				1	
30	L56266-07	WC-60-TRASHW			1	☑				1	
31	L56266-08	RC-60-TRASW			1	☑				1	
32	L56272-01	UR-006-TRASW			1	☑				1	
33	WG487864LRB2	NONE			1	☑				1	
34	WG487864LFB2	WI191023-2			1	☑				1	
35	L56272-02	UR-04-TRASW			1	☑				1	
36	L56273-01	UR-03-TRASW			1	☑				1	
37	WG488144CCV3	WI191122-4			1	☑				1	
38	WG488144CCB3	NONE			1	☑				1	
39	L56273-02	UR-08-TRASW			1	☑				1	
40	L56273-03	UR-02-TRASW			1	☑				1	
41	L56273-04	NNG-40-TRASW			1	☑				1	
42	L56276-01	RW-1		40	1	☑				1	
43	L56276-02	GW-2		40	1	☑				1	
44	**L56276-03**	HW-1		40	10	☑				RB 12/14/19 ~~10~~ 10	
45	L56276-04	GW-3		40	10	☑				10	
46	L56276-04LFM	~~WI191023-2~~ 10X TKN			10	☑				10	
47	L56276-06	GW-11 RB		40	1	☑				1	
48	L56276-06DUP	NONE 12/14/19			1	☑				1	

Report Comments:

Internal Comments

AREV:
Initials, Date

SREV:
Initials, Date

12/13/2019 11:47:52 PM 121319

TKN-H20

WG488144

ACZ Laboratories, Inc

QC List Type: QC-RFA-N-TK
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-N-TK
QC Ref: ICV/B-CCV/B
Group ID: WC-G-RFA-N-TK
Method Ref: M351.2
SOP Ref: SOPWC034

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/13/2019 23:47
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	N TK	Nitrogen Total Kjeldahl (mg/L)	Sample Volume (mL)	Digestion Solution Volume (mL)	Dilution	Comments
49	WG488144CCV4	WI191122-4			1	☑				1	
50	WG488144CCB4	NONE			1	☑				1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/13/2019 11:47:53 PM 121319

TKN-H20

QC List Type: QC-RFA-N-TK
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-N-TK
QC Ref: ICV/B-CCV/B
Group ID: WC-G-RFA-N-TK
Method Ref: M351.2
SOP Ref: SOPWC034

WG488144

ACZ Laboratories, Inc

Instrument ID: FIA2
Analyst:
ACZ Dept: 37
Create Date: 12/13/2019 23:47
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56195-01	O,U,W,RPC,GPC,Y,T ||
L56195-02	O,U,W,RPC,GPC,Y,T ||
L56199-01	U,WF,W,Y ||
L56221-01	U,Y ||
L56245-02	WF,Y ||
L56246-01	WF,Y ||
L56254-01	P,U,WF,RPC,GPCFA,GPDPC,Y ||
L56257-01	WF,Y ||
L56257-02	WF,Y ||
L56257-03	WF,Y ||
L56265-01	WF,Y ||
L56266-01	U,W,RPC,GPC,Y,BGFA,T ||
L56266-02	U,W,RPC,GPC,Y,BGFA,T ||
L56266-03	U,W,RPC,GPC,Y,BGFA,T ||
L56266-04	U,W,RPC,GPC,Y,BGFA,T ||
L56266-05	U,W,RPC,GPC,Y,BGFA,T ||
L56266-06	U,W,RPC,GPC,Y,BGFA,T ||
L56266-07	U,W,RPC,GPC,Y,BGFA,T ||
L56266-08	U,W,RPC,GPC,Y,BGFA,T ||
L56272-01	U,W,RPC,GPC,Y,BGFA,T || U,W,RPC,GPC,Y,BGFA,T ||
L56272-02	U,W,RPC,GPC,Y,BGFA,T || U,W,RPC,GPC,Y,BGFA,T ||
L56273-01	U,W,RPC,GPC,Y,BGFA,T ||
L56273-02	U,W,RPC,GPC,Y,BGFA,T ||
L56273-03	U,W,RPC,GPC,Y,BGFA,T ||
L56273-04	U,W,RPC,GPC,Y,BGFA,T ||
L56276-01	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56276-02	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56276-03	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56276-04	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56276-06	P,U,W,GPC,Y,B,T,VLUP(3) ||

Report Comments:

Internal Comments

AREV:
Initials, Date

SREV:
Initials, Date

12/13/2019 11:47:53 PM 121319

X-N-TK

QC List Type: I-WCPREP-TKN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-TKN
QC Ref: WC PREP (2)
Group ID: IP-G-WC-N-TK
Method Ref: M351.2
SOP Ref: SOPWC034

WG487864

ACZ Laboratories, Inc

Instrument ID: WCDIG
Analyst: wtc
ACZ Dept: 30
Create Date: 12/11/2019 15:21
Start Date/Time: 12/11/2019 10:00
End Date/Time: 12/11/2019 15:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	N TK	Digestion Solution Volume (mL)	Sample Volume (mL)	final volume (mL)	Dilution	Comments
1	WG487864LRB1	NONE	y		12/11/19 10:00	☑	4	20	20	1	
2	WG487864LFB1	WI191023-2	y		12/11/19 10:07	☑	4	20	20	1	
3	L56195-01	549N	y		12/11/19 10:15	☑	4	20	20	1	
4	L56195-01DUP	NONE	y		12/11/19 10:23	☑	4	20	20	1	
5	L56195-02	MF@LAB	y		12/11/19 10:30	☑	4	20	20	1	
6	L56195-02LFM	WI191023-2	y		12/11/19 10:38	☑	4	20	20	1	
7	L56199-01	EFFLUENT OUTFALL	y		12/11/19 10:46	☑	4	20	20	1	
8	L56221-01	INFLUENT	y		12/11/19 10:53	☑	4	20	20	1	
9	L56245-02	GUNN-WWTP EFF	y		12/11/19 11:01	☑	4	20	20	1	
10	L56246-01	REG 85	y		12/11/19 11:09	☑	4	20	20	1	
11	L56254-01	GROUNDWATER	y		12/11/19 11:17	☑	4	20	20	1	
12	L56257-01	EFFLUENT 003A (24HC)	y		12/11/19 11:24	☑	4	20	20	1	
13	L56257-02	RIVER UPSTREAM (GR)	y		12/11/19 11:32	☑	4	20	20	1	
14	L56257-03	RIVER DOWNSTREAM (GR	y		12/11/19 11:40	☑	4	20	20	1	
15	L56265-01	PLANT EFFLUENT	y		12/11/19 11:47	☑	4	20	20	1	
16	L56265-01DUP	NONE	y		12/11/19 11:55	☑	4	20	20	1	
17	L56266-01	BG-20-TRASW	y		12/11/19 12:03	☑	4	20	20	1	
18	L56266-01LFM	WI191023-2	y		12/11/19 12:10	☑	4	20	20	1	
19	L56266-02	CC-10-TRASW	y		12/11/19 12:18	☑	4	20	20	1	
20	L56266-03	CC-30-TRASW	y		12/11/19 12:26	☑	4	20	20	1	
21	L56266-04	WC-40-TRASW	y		12/11/19 12:34	☑	4	20	20	1	
22	L56266-05	WC-45-TRASW	y		12/11/19 12:41	☑	4	20	20	1	
23	L56266-06	WC-99-TRASW	y		12/11/19 12:49	☑	4	20	20	1	
24	L56266-07	WC-60-TRASHW	y		12/11/19 12:57	☑	4	20	20	1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:10:08 AM 121319

X-N-TK

QC List Type: I-WCPREP-TKN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-TKN
QC Ref: WC PREP (2)
Group ID: IP-G-WC-N-TK
Method Ref: M351.2
SOP Ref: SOPWC034

WG487864

ACZ Laboratories, Inc

Instrument ID: WCDIG
Analyst: wtc
ACZ Dept: 30
Create Date: 12/11/2019 15:21
Start Date/Time: 12/11/2019 10:00
End Date/Time: 12/11/2019 15:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	N TK	Digestion Solution Volume (mL)	Sample Volume (mL)	final volume (mL)	Dilution	Comments
25	L56266-08	RC-60-TRASW	y		12/11/19 13:04	☑	4	20	20	1	
26	L56272-01	UR-006-TRASW	y		12/11/19 13:12	☑	4	20	20	1	
27	WG487864LRB2	NONE	y		12/11/19 13:20	☑	4	20	20	1	
28	WG487864LFB2	WI191023-2	y		12/11/19 13:27	☑	4	20	20	1	
29	L56272-02	UR-04-TRASW	y		12/11/19 13:35	☑	4	20	20	1	
30	L56273-01	UR-03-TRASW	y		12/11/19 13:43	☑	4	20	20	1	
31	L56273-02	UR-08-TRASW	y		12/11/19 13:51	☑	4	20	20	1	
32	L56273-03	UR-02-TRASW	y		12/11/19 13:58	☑	4	20	20	1	
33	L56273-04	NNG-40-TRASW	y		12/11/19 14:06	☑	4	20	20	1	
34	L56276-01	RW-1	y	40	12/11/19 14:14	☑	4	20	20	1	
35	L56276-02	GW-2	y	40	12/11/19 14:21	☑	4	20	20	1	
36	**L56276-03**	HW-1	y	40	12/11/19 14:29	☑	4	2	20	10	
37	**L56276-04**	GW-3	y	40	12/11/19 14:37	☑	4	2	20	10	
38	L56276-04LFM	WI191023-2	y		12/11/19 14:44	☑	4	2	20	10	
39	L56276-06	GW-11	y	40	12/11/19 14:52	☑	4	20	20	1	
40	L56276-06DUP	NONE	y		12/11/19 15:00	☑	4	20	20	1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:10:10 AM 121319

X-N-TK

QC List Type: I-WCPREP-TKN
QCListMatClass: LIQUID
Bench Sheet List: I-WCPREP-TKN
QC Ref: WC PREP (2)
Group ID: IP-G-WC-N-TK
Method Ref: M351.2
SOP Ref: SOPWC034

WG487864

ACZ Laboratories, Inc

Instrument ID: WCDIG
Analyst: wtc
ACZ Dept: 30
Create Date: 12/11/2019 15:21
Start Date/Time: 12/11/2019 10:00
End Date/Time: 12/11/2019 15:00

Sample	Login Comments
L56195-01	O,U,W,RPC,GPC,Y,T ||
L56195-02	O,U,W,RPC,GPC,Y,T ||
L56199-01	U,WF,W,Y ||
L56221-01	U,Y ||
L56245-02	WF,Y ||
L56246-01	WF,Y ||
L56254-01	P,U,WF,RPC,GPCFA,GPDPC,Y ||
L56257-01	WF,Y ||
L56257-02	WF,Y ||
L56257-03	WF,Y ||
L56265-01	WF,Y ||
L56266-01	U,W,RPC,GPC,Y,BGFA,T ||
L56266-02	U,W,RPC,GPC,Y,BGFA,T ||
L56266-03	U,W,RPC,GPC,Y,BGFA,T ||
L56266-04	U,W,RPC,GPC,Y,BGFA,T ||
L56266-05	U,W,RPC,GPC,Y,BGFA,T ||
L56266-06	U,W,RPC,GPC,Y,BGFA,T ||
L56266-07	U,W,RPC,GPC,Y,BGFA,T ||
L56266-08	U,W,RPC,GPC,Y,BGFA,T ||
L56272-01	U,W,RPC,GPC,Y,BGFA,T || U,W,RPC,GPC,Y,BGFA,T ||
L56272-02	U,W,RPC,GPC,Y,BGFA,T || U,W,RPC,GPC,Y,BGFA,T ||
L56273-01	U,W,RPC,GPC,Y,BGFA,T ||
L56273-02	U,W,RPC,GPC,Y,BGFA,T ||
L56273-03	U,W,RPC,GPC,Y,BGFA,T ||
L56273-04	U,W,RPC,GPC,Y,BGFA,T ||
L56276-01	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56276-02	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56276-03	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56276-04	P,U,W,GPC,Y,B,T,VLUP(3) ||
L56276-06	P,U,W,GPC,Y,B,T,VLUP(3) ||

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 9:10:10 AM 121319

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: LACHAT

Parameter: TKN H20 / SOILS

Instrument Reagents

SCN

		Prep By:	
1) Buffer	WIR191213-4	pjb	1/13/2020
2) Hypochlorite Solution *Prepare fresh daily	PCN60227	pjb	12/14/2019
3) Sodium Salicylate	WIR191213-5	pjb	1/13/2020
4) Carrier	WIR191213-6	pjb	12/20/2019
5) 0.8N Sodium Hydroxide	PCN58925	pjb	12/13/2020

*All standards and reagents prepared according top SOP.

Working Standards Preparation (All Standards Digested):

Standard ID	Prep Date
C1	11/22/2019
C2	11/22/2019
C3	11/22/2019
C4	11/22/2019
ICV	11/22/2019
ICB	11/22/2019

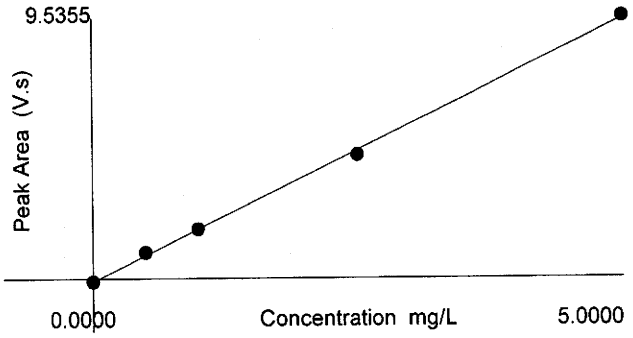
Author: wcins

Date : 12/15/2019

Table : 1 (N-TK)

	Known Conc. (mg/L)	Rep.	Peak Area (V.s)	Peak Height (V)	% RSD	% Residual	Det. Conc (mg/L)	Detection Date	Detection Time
1	5.0000	1	9.5355	0.8094	0.0	-0.8	5.0386	12/13/2019	11:59:59 PM
2	2.5000	1	4.4999	0.3786	0.0	3.8	2.4056	12/14/2019	12:01:05 AM
3	1.0000	1	1.8157	0.1522	0.0	-0.1	1.0020	12/14/2019	12:02:13 AM
4	0.5000	1	0.9611	0.0792	0.0	-12.1	0.5552	12/14/2019	12:03:20 AM
5	0.0000	1	-0.1033	-0.0056			-0.0014	12/14/2019	12:04:29 AM

Figure : 1 (N-TK)



Area = 1.9109 * Conc - 0.0979
Conc = 0.5229 * Area + 0.0527
Correlation Coefficient (r) = 0.99959

Weighting : None

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488144

Date Reported: 16-Dec-19
Run ID: R1764578
Date Analyzed: 14-Dec-19
ICAL Workgroup:
Instrument ID: FIA1

WG488144ICV

Tag: Measured: 12/14/2019 12:05:37 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	3.77 ✓	1		mg/L	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	REC	94	1		%	++	0.1	0.5			

WG488144ICB

Tag: Measured: 12/14/2019 12:06:45 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND		1	U ✓	mg/L	++	0.1	0.5			

WG487864LRB1

Tag: Measured: 12/14/2019 12:07:54 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND		1	U	mg/L	++	0.1	0.5			

WG487864LFB1

Tag: Measured: 12/14/2019 12:09:02 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	2.43	1		mg/L	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	REC	97	1		%	++	0.1	0.5			

L56195-01

Tag: Measured: 12/14/2019 12:10:10 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	N-TK	.2	1	B	mg/L	++	0.1	0.5		RA	

L56195-01DUP

Tag: Measured: 12/14/2019 12:11:18 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	0.16	1	B	mg/L	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	RPD	22	1	B	%	ALRT	0.1	0.5		RA	

L56195-02

Tag: Measured: 12/14/2019 12:12:26 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	N-TK	.2	1	B	mg/L	++	0.1	0.5		RA	

L56195-02LFM

Tag: Measured: 12/14/2019 12:13:34 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	2.6	1		mg/L	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	REC	96	1		%	++	0.1	0.5			

L56199-01

Tag: Measured: 12/14/2019 12:14:41 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	N-TK	.9	1		mg/L	++	0.1	0.5		RA	

L56147-2006231159

TKN-MWMT

QC List Type: QC-RFA-N-TK
QCListMatClass: SOLID
Bench Sheet List:
QC Ref: ICV/B-CCV/B
Group ID: WC-G-RFA-N-TK-MWMT
Method Ref: M351.2
SOP Ref: SOPWC034

WG488147

ACZ Laboratories, Inc

Instrument ID: FIA1
Analyst: PJB
ACZ Dept: 37
Create Date: 12/14/2019 1:22
Start Date/Time: 12/14/19
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	NTKMWMT	Nitrogen Total Kjeldahl (mg/Kg)	Sample Volume (mL)	Digestion Solution Volume (mL)	Dilution	Comments
1	WG488147ICV	WI191122-6			1	☑				1	
2	WG488147ICB	NONE			1	☑				1	
3	WG487250PBS	NONE			1	☑				1	
4	L56147-06 /MS	STSB29_6-15			1	☑				1	
5	~~L56147-06MS1~~	WI191023-2			1	☑				1	
6	~~L56147-06MSD~~	II191127-2			1	☑				1	
7	L56147-07	STSB29-FD_6-15			1	☑				1	
8	~~L56147-07MS~~	MS190905-3			1	☑				1	
9	~~L56147-07MSD~~	MS190905-3			1	☑				1	
10	L56147-08	STSB30_0.5-3			1	☑				1	
11	L56147-09	STSB30_6-15			1	☑				1	
12	L56147-10	STSB31_0.5-3			1	☑				1	
13	WG488147CCV1	WI191122-4			1	☑				1	
14	WG488147CCB1	NONE			1	☑				1	
15	L56147-11	STSB31_6-15			1	☑				1	
16	L56147-02	STSB27_6-15			1	☑				1	
16	WG487361PBS	NONE			1	☑				1	
16	L56147-01	STSB27_0.5-3			1	☑				1	
17	L56147-03	STSB28_0.5-3			1	☑				1	
18	L56147-04	STSB28_6-15			1	☑				1	
19	L56147-05	STSB29_0.5-3			1	☑				1	
20	~~L56147-05MS1~~	MS191119-5			1	☑				1	

PJB 12/14/19

Report Comments:

Internal Comments

AREV: PJB 12/14/19
Initials, Date

SREV: KRH 12-16-19
Initials, Date

12/14/2019 1:22:30 AM 121719

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: PJJ
Date: 12/14/19

SREV: KRH
Date: 12-16-19

Instrument ID FIA1

Work Group: 488147
Sample Type: TKN MWMT
Analysis Date: 12/14/19
Analyst: PJJ

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	X		
2) Is a current standard/reagent sheet attached to the workgroup?	X		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?			X
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	X		
5) Are all of the QC critera listed in LIMS within specified limits?	X		
6) If applicable, was a passing PQV indcluded in the WG?			X
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	X		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	~~X~~	KRH 12-16-19 ok @ SREV	✓
9) Was sample analysis completed within the holding time?	X		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?	X		
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			X
12) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? Yes Calibration WG: 488144

Prep WG#: 487708 Disposable Vessel Lot#*: N/A

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

TKN-MWMT

QC List Type: QC-RFA-N-TK
QCListMatClass: SOLID
Bench Sheet List:
QC Ref: ICV/B-CCV/B
Group ID: WC-G-RFA-N-TK-MWMT
Method Ref: M351.2
SOP Ref: SOPWC034

WG488147

ACZ Laboratories, Inc

Instrument ID: FIA1
Analyst:
ACZ Dept: 37
Create Date: 12/14/2019 1:22
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	NTKMWMT	Nitrogen Total Kjeldahl (mg/Kg)	Sample Volume (mL)	Digestion Solution Volume (mL)	Dilution	Comments
21	L56147-05MSD1	MS191119-5			1	☑				1	
22	L56147-05MS2	II191127-2			1	☑				1	
23	L56147-05MSD2	II191127-2			1	☑				1	
24	L56147-05DUP1	NONE			1	☑				1	
25	WG488147CCV2	WI191122-4			1	☑				1	
26	WG488147CCB2	NONE			1	☑				1	
29	WG487708PBS	NONE			1	☑				1	
30	WG487708LFB	WI191023-2			1	☑				1	
31	L56147-06MS	WI191023-2			1	☑				1	
32	L56147-05DUP2	NONE			1	☑				1	
33	WG488147CCV3	WI191122-4			1	☑				1	
34	WG488147CCB3	NONE			1	☑				1	

PB 12/14/19

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/14/2019 1:22:31 AM 121719

TKN-MWMT

QC List Type: QC-RFA-N-TK
QCListMatClass: SOLID
Bench Sheet List:
QC Ref: ICV/B-CCV/B
Group ID: WC-G-RFA-N-TK-MWMT
Method Ref: M351.2
SOP Ref: SOPWC034

WG488147

ACZ Laboratories, Inc

Instrument ID: FIA1
Analyst:
ACZ Dept: 37
Create Date: 12/14/2019 1:22
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MS2	ICP Spike
L56147-05MSD1	ICPMS Spike
L56147-05MSD2	ICP Spike
L56147-06	BUCKET || Stored in soil's hallway.
L56147-06MSD	ICP Spike
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/14/2019 1:22:31 AM 121719

X-N-TK-MWMT

QC List Type: I-WCPREP-TKN
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-N-TK
QC Ref: WC PREP SP (2)
Group ID: IP-G-WC-N-TK-MWMT
Method Ref: M351.2
SOP Ref: SOPWC034

WG487708

ACZ Laboratories, Inc

Instrument ID: WCDIG
Analyst: mss2
ACZ Dept: 30
Create Date: 12/09/2019 12:07
Start Date/Time: 12/09/2019 12:07
End Date/Time: 12/09/2019 17:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	N TKMWMT	Digestion Solution Volume (mL)	Sample Volume (mL)	final volume (mL)	Dilution	Comments
1	WG487708PBS	NONE	Y		12/09/19 12:07	☑	4	20	20	1	
2	WG487708LFB	WI191023-2	Y		12/09/19 12:25	☑	4	20	20	1	
3	WG487250PBS	NONE	Y		12/09/19 12:43	☑	4	20	20	1	
4	L56147-06	STSB29_6-15	Y		12/09/19 13:01	☑	4	20	20	1	
5	L56147-06MS	WI191023-2	Y		12/09/19 13:20	☑	4	20	20	1	
6	L56147-07	STSB29-FD_6-15	Y		12/09/19 13:38	☑	4	20	20	1	
7	L56147-08	STSB30_0.5-3	Y		12/09/19 13:56	☑	4	20	20	1	
8	L56147-09	STSB30_6-15	Y		12/09/19 14:15	☑	4	20	20	1	
9	L56147-10	STSB31_0.5-3	Y		12/09/19 14:33	☑	4	20	20	1	
10	L56147-11	STSB31_6-15	Y		12/09/19 14:51	☑	4	20	20	1	
11	WG487361PBS	NONE	Y		12/09/19 15:10	☑	4	20	20	1	
12	L56147-01	STSB27_0.5-3	Y		12/09/19 15:28	☑	4	20	20	1	
13	L56147-02	STSB27_6-15	Y		12/09/19 15:46	☑	4	20	20	1	
14	L56147-03	STSB28_0.5-3	Y		12/09/19 16:05	☑	4	20	20	1	
15	L56147-04	STSB28_6-15	Y		12/09/19 16:23	☑	4	20	20	1	
16	L56147-05	STSB29_0.5-3	Y		12/09/19 16:41	☑	4	20	20	1	
17	L56147-05DUP	NONE	Y		12/09/19 17:00	☑	4	20	20	1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 5:33:32 PM 121719

X-N-TK-MWMT

WG487708

ACZ Laboratories, Inc

QC List Type: I-WCPREP-TKN
QCListMatClass: LIQUID
Bench Sheet List: I-RFA-N-TK
QC Ref: WC PREP SP (2)
Group ID: IP-G-WC-N-TK-MWMT
Method Ref: M351.2
SOP Ref: SOPWC034

Instrument ID: WCDIG
Analyst: mss2
ACZ Dept: 30
Create Date: 12/09/2019 12:07
Start Date/Time: 12/09/2019 12:07
End Date/Time: 12/09/2019 17:00

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/9/2019 5:33:32 PM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488147

Date Reported: 16-Dec-19
Run ID: R1764575
Date Analyzed: 14-Dec-19
ICAL Workgroup: WG488144
Instrument ID: FIA1

WG488147CCV1

Tag:

Measured: 12/14/2019 1:45:12 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	2.33	1		mg/L	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	REC	93	1		%	++	0.1	0.5			

WG488147CCB1

Tag:

Measured: 12/14/2019 1:46:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND		1	U	mg/L	++	0.1	0.5			

WG487708PBS

Tag:

Measured: 12/14/2019 1:47:29 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND		1	U	mg/Kg	++	0.1	0.5			

WG487708LFB

Tag:

Measured: 12/14/2019 1:48:37 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	2.46	1		mg/Kg	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	REC	98	1		%	++	0.1	0.5			

WG487250PBS

Tag:

Measured: 12/14/2019 1:49:45 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND		1	U	mg/Kg	++	0.1	0.5			

L56147-06

Tag:

Measured: 12/14/2019 1:50:53 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	.2	1	B	mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-06MS

Tag:

Measured: 12/14/2019 1:52:01 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	2.55	1		mg/Kg	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	REC	94	1		%	++	0.1	0.5			

L56147-07

Tag:

Measured: 12/14/2019 1:53:09 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	.2	1	B	mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-08

Tag:

Measured: 12/14/2019 1:54:16 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	2.4	1		mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-09

Tag: Measured: 12/14/2019 1:55:24 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	.4	1	B	mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-10

Tag: Measured: 12/14/2019 1:56:31 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	2.3	1		mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-11

Tag: Measured: 12/14/2019 1:57:38 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	.5	1		mg/Kg	++	0.1	0.5		HD Q6 TB	

WG488147CCV2

Tag: Measured: 12/14/2019 1:58:45 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	2.43 ✓	1		mg/L	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	REC	97	1		%	++	0.1	0.5			

WG488147CCB2

Tag: Measured: 12/14/2019 1:59:54 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND		1	U	mg/L	++	0.1	0.5			

WG487361PBS

Tag: Measured: 12/14/2019 2:01:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND		1	U ✓	mg/Kg	++	0.1	0.5			

L56147-01

Tag: Measured: 12/14/2019 2:02:07 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	.3	1	B	mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-02

Tag: Measured: 12/14/2019 2:03:14 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	.2	1	B	mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-03

Tag: Measured: 12/14/2019 2:04:21 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	1.5	1		mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-04

Tag: Measured: 12/14/2019 2:05:28 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	.5	1		mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-05

Tag: Measured: 12/14/2019 2:06:36 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	K-MWMT	1.0	1		mg/Kg	++	0.1	0.5		HD Q6 TB	

L56147-05DUP

Tag:

Measured: 12/14/2019 2:07:44 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	0.98	1		mg/Kg	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	RPD	2	1		%	++	0.1	0.5			

WG488147CCV3

Tag:

Measured: 12/14/2019 2:10:19 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND	2.42	1		mg/L	++	0.1	0.5			
SREV	NITROGEN TOTAL KJELDAHL	REC	97	1		%	++	0.1	0.5			

WG488147CCB3

Tag:

Measured: 12/14/2019 2:11:27 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	NITROGEN TOTAL KJELDAHL	FOUND		1	U	mg/L	++	0.1	0.5			

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG488147 **TKN-MWMT**

Sample	Date	SCN	OGEN TOTAL KJEL
WG488147CCV1	12/14/19 01:45	WI191122-4	X
WG488147CCB1	12/14/19 01:46		X
WG487708PBS	12/14/19 01:47		X
WG487708LFB	12/14/19 01:48	WI191023-2	X
WG487250PBS	12/14/19 01:49		X
L56147-06	12/14/19 01:50		X
L56147-06MS	12/14/19 01:52	WI191023-2	X
L56147-07	12/14/19 01:53		X
L56147-08	12/14/19 01:54		X
L56147-09	12/14/19 01:55		X
L56147-10	12/14/19 01:56		X
L56147-11	12/14/19 01:57		X
WG488147CCV2	12/14/19 01:58	WI191122-4	X
WG488147CCB2	12/14/19 01:59		X
WG487361PBS	12/14/19 02:01		X
L56147-01	12/14/19 02:02		X
L56147-02	12/14/19 02:03		X
L56147-03	12/14/19 02:04		X
L56147-04	12/14/19 02:05		X
L56147-05	12/14/19 02:06		X
L56147-05DUP	12/14/19 02:07		X
WG488147CCV3	12/14/19 02:10	WI191122-4	X
WG488147CCB3	12/14/19 02:11		X

Sulfate - Turbidimetric MWMT

QC List Type: QC-SO4-TURB
QCListMatClass: LIQUID
Bench Sheet List: I-SO4-TURB
QC Ref: SO4-TURB
Group ID: WC-G-RFA-SO4-TURB-M
Method Ref: D516-02
SOP Ref: SOPWC070

WG487929

ACZ Laboratories, Inc

Instrument ID: KONELAB
Analyst: JTG
ACZ Dept: 37
Create Date: 12/12/2019 9:26
Start Date/Time: 12.12.19 11:00
End Date/Time: 12.12.19 12:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	Analysis Date	SO4MWMTTURB	Dilution	Comments
1	WG487929ICV	WI191204-6	W		1				✔	1	
2	WG487929ICB	NONE			1				✔	1	
3	WG487929LFB	WI190801-3			1				✔	1	
4	WG486679PBS	NONE			1				✔	1	
5	L55377-01	LPT-1			1		724		✔	1	
6	L55964-01	LPT-1			1		708		✔	1	
7	WG486802PBS	NONE			1				✔	1	
8	L55827-01	BENSON R-1			1				✔	1	
9	L55827-02	BENSON R-2			1				✔	1	
10	L55827-03	BENSON R-3			1				✔	1	
11	L55827-03DUP	NONE			1				✔	1	
13	WG487929CCV1	WI191204-5			1				✔	1 JTG	
14	L56147-06	STSB29_6-15			1		2440		✔	1 ~~2~~ 12-12-19	
14	WG487929CCB1	NONE			1				✔	1 JTG	
15	L56147-07	STSB29-FD_6-15			1		2430		✔	1 ~~2~~ 12-12-19	
16	L56147-08	STSB30_0.5-3			1		2730		✔	~~2~~	
17	WG487929CCB2	WI190801-3			1				✔	~~2~~	
18	L56147-09	STSB30_6-15			1		3670		✔	~~2~~	
19	L56147-10	STSB31_0.5-3			1		5130		✔	~~5~~	
20	L56147-01	STSB27_0.5-3			1		2940		✔	~~2~~	

Report Comments: added L55377-01 AS after WC creation 12-12-19 JTG - Δ SCN to sou turb 5X

Internal Comments

AREV: JTG 12-13-19
Initials, Date

SREV:
Initials, Date

12/12/2019 2:50:33 PM 110419

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: TTG
Date: 12-13-19

SREV:
Date:

Instrument ID Kimel06

Work Group: 487929
Sample Type: SOY-Turb MWMT
Analysis Date: 12-13-19
Analyst: TTG

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	X		
2) Is a current standard/reagent sheet attached to the workgroup?	X		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?			X
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	X		
5) Are all of the QC critera listed in LIMS within specified limits?		X	
6) If applicable, was a passing PQV indcluded in the WG?			X
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	X		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	X		
9) Was sample-analysis completed within the holding time?	X		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?			X
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			X
12) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? NO Calibration WG: ——

Prep WG#: 486679 / 486802 / 487361 / 487687 / 487250 Disposable Vessel Lot#*: A106310-97

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
LCB12 / LCB13	ALERT - High recovery	~~send ASS. samples to HERO~~ BA FLAGGED ASS. SX
377-1	FORGOT ASS. SPIKE	RE-ANALYZED W/ SPIKE @ END
377-1/AS	ALERT-LOW SPIKE RECOVERY	M3 FLAGGED ASS. SXS

IRH 12-13-19

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

Sulfate - Turbidimetric MWMT

QC List Type: QC-SO4-TURB
QCListMatClass: LIQUID
Bench Sheet List: I-SO4-TURB
QC Ref: SO4-TURB
Group ID: WC-G-RFA-SO4-TURB-M
Method Ref: D516-02
SOP Ref: SOPWC070

WG487929

ACZ Laboratories, Inc

Instrument ID: KONELAB
Analyst:
ACZ Dept: 37
Create Date: 12/12/2019 9:26
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	Analysis Date	SO4 MWMTURB	Dilution	Comments
20	L56147-02	STSB27_6-15	W		1		2760		✓	1 ~~2~~ TR 12-12-19	
20	WG487361PBS	NONE			1				✓	1	
21	L56147-03	STSB28_0.5-3			1		2750		✓	1 ~~2~~ TR 12-12-19	
22	L56147-04	STSB28_6-15			1		3040		✓	2	
23	L56147-05	STSB29_0.5-3			1		3540		✓	~~2~~	
24	L56147-05DUP	NONE			1				✓	1	
25	WG487687PBS	NONE			1				✓	1	
26	WG487929CCV2	WI191204-5			1				✓	1	
27	WG487929CCB3	NONE			1				✓	1	
28	L56019-02	TOP01			1				✓	1	
28	L56019-04	SLOPE-01			1				✓	1	
29	L56019-06	SLOPE-02			1				✓	1	
30	L56019-08	SLOPE-03			1				✓	1	
31	L56019-10	SLOPE-SE			1				✓	1	
32	WG487929CCV3	WI191204-5			1				✓	1	
33	WG487929CCB4	NONE			1				✓	1	

Report Comments:

Internal Comments

AREV:
Initials, Date

SREV:
Initials, Date

12/12/2019 2:50:35 PM 110419

Sulfate - Turbidimetric MWMT

QC List Type: QC-SO4-TURB
QCListMatClass: LIQUID
Bench Sheet List: I-SO4-TURB
QC Ref: SO4-TURB
Group ID: WC-G-RFA-SO4-TURB-M
Method Ref: D516-02
SOP Ref: SOPWC070

WG487929

ACZ Laboratories, Inc

Instrument ID: KONELAB
Analyst:
ACZ Dept: 37
Create Date: 12/12/2019 9:26
Start Date/Time:
End Date/Time:

Sample	Login Comments
L55377-01	SJ(2) || on quarantine shelves
L55827-01	BUCKET || BUCKET ||Orange bucket, in the Organic Cooler
L55827-02	BUCKET || BUCKET |||Orange bucket in the Organic Cooler
L55827-03	BUCKET || BUCKET ||||Orange bucket in the Organic Cooler
L55964-01	SJ(2) || SJ(2) ||quarantined
L56019-02	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-04	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-06	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-08	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56019-10	ZIPLOCK || Samples are in Grey Buckets in the Soils Hallway
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-06	BUCKET || Stored in soil's hallway.
L56147-07	BUCKET || Stored in soil's hallway.
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/12/2019 2:50:35 PM 110419

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

WET CHEMISTRY INSTRUMENT REAGENTS INFORMATION

Instrument: Konelab

Parameter: SO4 Turbidimetric

Working Standards Preparation: See SOP

Instrument Reagents	**SCN**	**Open By:**	**Expiration Date:**
1) Barium Chloride Conditioning Rgt	PCN60140	wtc	6/30/2020

*All Standards and Reagents prepared according to effective version of SOPWC070.

Standard	Creation Date	Exp Date
C1	12/4/2019	12/18/2019
C2	12/4/2019	12/18/2019
C3	12/4/2019	12/18/2019
C4	12/4/2019	12/18/2019
C5	12/4/2019	12/18/2019
C6	12/4/2019	12/18/2019
C7	12/4/2019	12/18/2019
ICV	12/4/2019	12/18/2019

ACZ Laboratory
Konelab User

12.12.2019 12:55

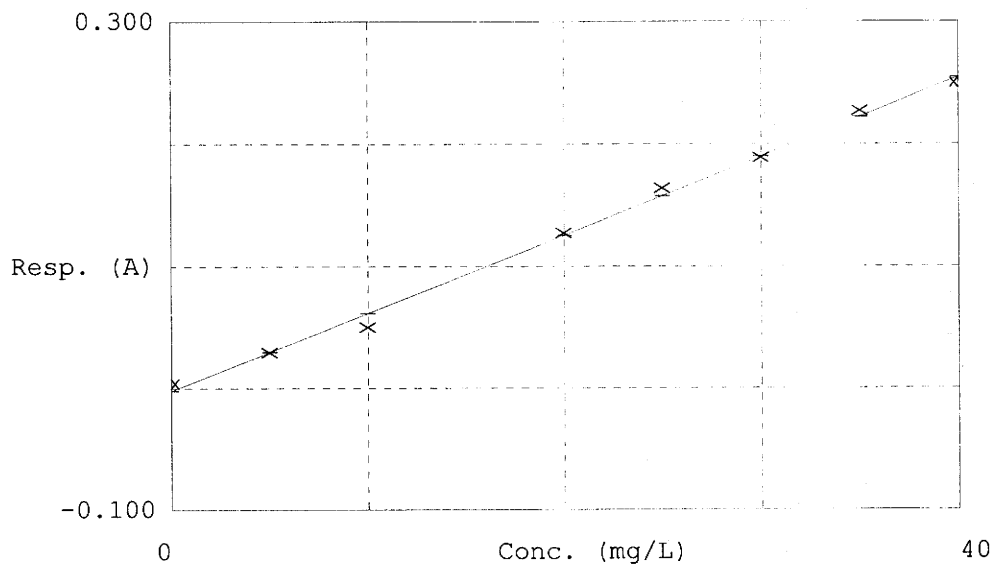
Test Sulfate

Accepted 12.12.2019 12:55

Resp. = A * Conc. ^ 2 + B * Conc. + C
A = 0
B = 0.006
C = -0.002

Coeff. of det. 0.995792

Errors



	Calibrator	Response	Calc. con.	Conc.	Errors
1	SO4-0	0.004	0.884655	0.000000	
2	SO4-5	0.029	4.898495	5.000000	
3	SO4-10	0.050	8.203191	10.000000	
4	SO4-20	0.127	20.286745	20.000000	
5	SO4-25	0.164	25.951834	25.000000	
6	SO4-30	0.189	29.826637	30.000000	
7	SO4-35	0.227	35.749958	35.000000	
8	SO4-40	0.249	39.196556	40.000000	
9	SO4-ICB(control	0.004	0.908748	0.000000	
10	SO4-ICV(control	0.129	20.568930	20.000000	

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487929

Date Reported: 13-Dec-19
Run ID: R1764414
Date Analyzed: 12-Dec-19
ICAL Workgroup:
Instrument ID: KONELAB

WG487929ICB

Tag: Measured: 12/12/2019 12:55:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U ✓	mg/L	++	1	5			

WG487929ICV

Tag: Measured: 12/12/2019 12:55:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	20.6 ✓	1		mg/L	++	1	5			
SREV	SULFATE	REC	103	1		%	++	1	5			

WG487929CCV1

Tag: Measured: 12/12/2019 1:06:22 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	25.7	1		mg/L	++	1	5			
SREV	SULFATE	REC	103	1		%	++	1	5			

WG487929CCB1

Tag: Measured: 12/12/2019 1:06:23 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487929CCV2

Tag: Measured: 12/12/2019 1:10:36 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	26.4	1		mg/L	++	1	5			
SREV	SULFATE	REC	105	1		%	++	1	5			

WG487929CCB2

Tag: Measured: 12/12/2019 1:10:37 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

L56019-04

Tag: Measured: 12/12/2019 1:10:41 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	4.8	1	B	mg/L	++	1	5		HD M3 TA TB	

L56019-02

Tag: Measured: 12/12/2019 1:10:42 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	3.1	1	B	mg/L	++	1	5		HD M3 TA TB	

L56019-06

Tag: Measured: 12/12/2019 1:10:43 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	2.1	1	B	mg/L	++	1	5		HD M3 TA TB	

L56019-08 Tag: Measured: 12/12/2019 1:10:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	2.3	1	B	mg/L	++	1	5		HD M3 TA TB	

L56019-10 Tag: Measured: 12/12/2019 1:10:45 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1.7	1	B	mg/L	++	1	5		HD M3 TA TB	

WG487929CCV3 Tag: Measured: 12/12/2019 1:11:43 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	26.7	1		mg/L	++	1	5			
SREV	SULFATE	REC	107	1		%	++	1	5			

WG487929CCB3 Tag: Measured: 12/12/2019 1:11:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

L55377-01 Tag: Measured: 12/12/2019 1:14:01 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
FAIL	SULFATE	MT-TURB	164	5		mg/L	++	5	25		HD M3 TB	

L55964-01 Tag: Measured: 12/12/2019 1:14:02 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	152	5		mg/L	++	5	25		HD M3 TB	

L55827-02 Tag: Measured: 12/12/2019 1:14:03 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	56.6	5		mg/L	++	5	25		HD M3 TB	

WG487929CCV4 Tag: Measured: 12/12/2019 1:14:47 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	26.5	1		mg/L	++	1	5			
SREV	SULFATE	REC	106	1		%	++	1	5			

WG487929CCB4 Tag: Measured: 12/12/2019 1:14:48 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487929CCV5 Tag: Measured: 12/12/2019 1:53:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	26.9	1		mg/L	++	1	5			
SREV	SULFATE	REC	107	1		%	++	1	5			

WG487929CCB5 Tag: Measured: 12/12/2019 1:53:34 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487929LFB

Tag: Measured: 12/12/2019 1:57:01 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	9.6	1		mg/L	++	1	5			
SREV	SULFATE	REC	96	1		%	++	1	5			

WG486679PBS

Tag: Measured: 12/12/2019 1:57:02 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG486802PBS

Tag: Measured: 12/12/2019 1:57:03 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

L55827-01

Tag: Measured: 12/12/2019 1:57:04 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	16.1	1		mg/L	++	1	5		HD M3 TB	

L55827-03

Tag: Measured: 12/12/2019 1:57:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	11.3	1		mg/L	++	1	5		HD M3 TB	

L55827-03DUP

Tag: Measured: 12/12/2019 1:57:06 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	12.8	1		mg/L	++	1	5			
SREV	SULFATE	RPD	12	1		%	++	1	5			

WG487250PBS

Tag: Measured: 12/12/2019 1:57:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487361PBS

Tag: Measured: 12/12/2019 1:57:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487687PBS

Tag: Measured: 12/12/2019 1:57:09 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487929CCV6

Tag: Measured: 12/12/2019 1:59:06 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	27.4	1		mg/L	++	1	5			
SREV	SULFATE	REC	109	1		%	++	1	5			

WG487929CCB6

Tag: Measured: 12/12/2019 1:59:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487929CCV7

Tag: Measured: 12/12/2019 2:04:52 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	26.5 ✓	1		mg/L	++	1	5			
SREV	SULFATE	REC	106	1		%	++	1	5			

WG487929CCB7

Tag: Measured: 12/12/2019 2:04:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U ✓	mg/L	++	1	5			

L56147-09

Tag: Measured: 12/12/2019 2:05:47 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	2050	100		mg/L	++	100	500		HD M3 TB	

L56147-10

Tag: Measured: 12/12/2019 2:05:48 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	3060	100		mg/L	++	100	500		HD M3 TB	

WG487929CCV8

Tag: Measured: 12/12/2019 2:06:38 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	25.2 ✓	1		mg/L	++	1	5			
SREV	SULFATE	REC	101	1		%	++	1	5			

WG487929CCB8

Tag: Measured: 12/12/2019 2:06:39 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U ✓	mg/L	++	1	5			

L56147-06

Tag: Measured: 12/12/2019 2:07:57 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1460	100		mg/L	++	100	500		HD M3 TB	

L56147-07

Tag: Measured: 12/12/2019 2:07:58 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1400	100		mg/L	++	100	500		HD M3 TB	

L56147-08

Tag: Measured: 12/12/2019 2:07:59 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1590	100		mg/L	++	100	500		HD M3 TB	

L56147-02

Tag: Measured: 12/12/2019 2:08:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1710	100		mg/L	++	100	500		HD M3 TB	

WG487929CCV9

Tag: Measured: 12/12/2019 2:09:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	25 ✓	1		mg/L	++	1	5			
SREV	SULFATE	REC	100	1		%	++	1	5			

WG487929CCB9

Tag: Measured: 12/12/2019 2:09:15 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487929CCV10

Tag: Measured: 12/12/2019 2:29:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	26.6	1		mg/L	++	1	5			
SREV	SULFATE	REC	106	1		%	++	1	5			

WG487929CCB10

Tag: Measured: 12/12/2019 2:29:34 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

L56147-01

Tag: Measured: 12/12/2019 2:29:35 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1620	100		mg/L	++	100	500		HD M3 TB	

L56147-03

Tag: Measured: 12/12/2019 2:29:36 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1610	100		mg/L	++	100	500		HD M3 TB	

L56147-04

Tag: Measured: 12/12/2019 2:29:37 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1730	100		mg/L	++	100	500		HD M3 TB	

L56147-05

Tag: Measured: 12/12/2019 2:29:38 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	1960	100		mg/L	++	100	500		HD M3 TB	

L56147-05DUP

Tag: Measured: 12/12/2019 2:30:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	2130	100		mg/L	++	100	500			
SREV	SULFATE	RPD	8	100		%	++	100	500			

WG487929CCV11

Tag: Measured: 12/12/2019 2:31:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	25.1	1		mg/L	++	1	5			
SREV	SULFATE	REC	100	1		%	++	1	5			

WG487929CCB11

Tag: Measured: 12/12/2019 2:31:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487929CCV12

Tag: Measured: 12/12/2019 5:20:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	26.6	1		mg/L	++	1	5			
SREV	SULFATE	REC	106	1		%	++	1	5			

WG487929CCB12

Tag: Measured: 12/12/2019 5:20:41 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	1.8	1	B	mg/L	++	1	5		BA	

L55377-01

Tag: 1 Measured: 12/12/2019 5:25:52 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	161	5		mg/L	++	5	25		BA HD M3 TB	

L55377-01AS

Tag: Measured: 12/12/2019 5:25:53 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	155	5		mg/L	++	5	25		BA	
SREV	SULFATE	REC	-60	5		%	ALRT	5	25		M3	

WG487929CCV13

Tag: Measured: 12/12/2019 5:26:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	25.7	1		mg/L	++	1	5			
SREV	SULFATE	REC	103	1		%	++	1	5			

WG487929CCB13

Tag: Measured: 12/12/2019 5:26:45 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	1.7	1	B	mg/L	++	1	5		BA	

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487929 **Sulfate - Turbidimetric MWMT**

Sample	Date	SCN	SULFATE
WG487929ICB	12/12/19 12:55		X
WG487929ICV	12/12/19 12:55	WI191204-6	X
WG487929CCV1	12/12/19 13:06	WI191204-5	X
WG487929CCB1	12/12/19 13:06		X
L56019-02	12/12/19 13:10		X
WG487929CCV2	12/12/19 13:10	WI191204-5	X
L56019-06	12/12/19 13:10		X
L56019-04	12/12/19 13:10		X
L56019-10	12/12/19 13:10		X
L56019-08	12/12/19 13:10		X
WG487929CCB2	12/12/19 13:10		X
WG487929CCB3	12/12/19 13:11		X
WG487929CCV3	12/12/19 13:11	WI191204-5	X
L55964-01	12/12/19 13:14		X
WG487929CCB4	12/12/19 13:14		X
L55827-02	12/12/19 13:14		X
WG487929CCV4	12/12/19 13:14	WI191204-5	X
L55377-01	12/12/19 13:14		X
WG487929CCB5	12/12/19 13:53		X
WG487929CCV5	12/12/19 13:53	WI191204-5	X
WG487687PBS	12/12/19 13:57		X
WG487929LFB	12/12/19 13:57	WI190801-3	X
L55827-03DUP	12/12/19 13:57		X
L55827-01	12/12/19 13:57		X
WG486802PBS	12/12/19 13:57		X
WG487250PBS	12/12/19 13:57		X

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487929 **Sulfate - Turbidimetric MWMT**

Sample	Date	SCN	SULFATE
L55827-03	12/12/19 13:57		X
WG487361PBS	12/12/19 13:57		X
WG486679PBS	12/12/19 13:57		X
WG487929CCB6	12/12/19 13:59		X
WG487929CCV6	12/12/19 13:59	WI191204-5	X
WG487929CCV7	12/12/19 14:04	WI191204-5	X
WG487929CCB7	12/12/19 14:04		X
L56147-10	12/12/19 14:05		X
L56147-09	12/12/19 14:05		X
WG487929CCV8	12/12/19 14:06	WI191204-5	X
WG487929CCB8	12/12/19 14:06		X
L56147-07	12/12/19 14:07		X
L56147-08	12/12/19 14:07		X
L56147-06	12/12/19 14:07		X
L56147-02	12/12/19 14:08		X
WG487929CCV9	12/12/19 14:09	WI191204-5	X
WG487929CCB9	12/12/19 14:09		X
L56147-01	12/12/19 14:29		X
L56147-05	12/12/19 14:29		X
WG487929CCB10	12/12/19 14:29		X
L56147-04	12/12/19 14:29		X
L56147-03	12/12/19 14:29		X
WG487929CCV10	12/12/19 14:29	WI191204-5	X
L56147-05DUP	12/12/19 14:30		X
WG487929CCB11	12/12/19 14:31		X
WG487929CCV11	12/12/19 14:31	WI191204-5	X

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487929 **Sulfate - Turbidimetric MWMT**

Sample	Date	SCN	SULFATE
WG487929CCV12	12/12/19 17:20	WI191204-5	X
WG487929CCB12	12/12/19 17:20		X
L55377-01AS	12/12/19 17:25	SO4TURB5X	X
L55377-01	12/12/19 17:25		X
WG487929CCV13	12/12/19 17:26	WI191204-5	X
WG487929CCB13	12/12/19 17:26		X

Sulfate - Turbidimetric MWMT

QC List Type: QC-SO4-TURB
QCListMatClass: LIQUID
Bench Sheet List: I-SO4-TURB
QC Ref: SO4-TURB
Group ID: WC-G-RFA-SO4-TURB-M
Method Ref: D516-02
SOP Ref: SOPWC070

WG487938

ACZ Laboratories, Inc

Instrument ID: KONELAB
Analyst: JTG
ACZ Dept: 37
Create Date: 12/12/2019 9:43
Start Date/Time: 12-12-19 12:30
End Date/Time: 12-12-19 13:20

SEQ	ACZ ID	Client ID	SubSX	Pri	Prep Dil	EC	TDS	Analysis Date	SO4MWMTTURB	Dilution	Comments
1	WG487938ICV	WI191204-6	W		1				☑	1	
2	WG487938ICB	NONE			1				☑	1	
3	WG487938LFB	WI190801-3			1				☑	1	
4	WG487250PBS	NONE			1				☑	1	
7	L56147-11	STSB31_6-15			1		3740		☑	1 ~~2~~ 12-12-19 JTG	
8	L56147-11AS	WI190801-3			1				☑	~~2~~	Δ SGN to SOUTURB/WX
9	L56147-11DUP	NONE			1				☑	~~2~~	
10	WG487938CCV	WI191204-5			1				☑	1	
11	WG487938CCB	NONE			1				☑	1	

Sample	Login Comments
L56147-11	BUCKET || Stored in soil's hallway.

Report Comments: _____

Internal Comments _____

AREV: JTG 12-12-19
Initials, Date

SREV: KRH 12-13-19
Initials, Date

12/12/2019 9:44:11 AM 121719

ACZ Laboratories, Inc.
WET CHEM INSTRUMENT DATA REVIEW CHECKLIST

AREV: TJC
Date: 12-11-19

SREV: KRH
Date: 12-13-19

Instrument ID Kunelab

Work Group: 487938
Sample Type: soy-turb mw mt
Analysis Date: 12-12-19
Analyst: TJC

	Yes	No	N/A
1) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	X		
2) Is a current standard/reagent sheet attached to the workgroup?	X		
3) If applicable, was sample pH at log-in receipt and/or analysis within method criteria?			X
4) Does the instrument calibration meet the specified method criteria? (r or $r^2 \geq 0.995$)	X		
5) Are all of the QC critera listed in LIMS within specified limits?		X	
6) If applicable, was a passing PQV indcluded in the WG?			X
7) Are all dilution factors correctly calculated and uploaded? (Soil, Sludges, Water)	X		
8) Are dilutions in the appropriate range? (explain if "B" or "U" reported for sample)	X		
9) Was sample analysis completed within the holding time?	X		
10) Are all applicable qualifiers transferred from bench sheet to LIMS?	X		
11) **For soil/sludge analyses:** Was a hand calculated % recovery performed for LFM/MS/AS?			X
12) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

Continuing Calibration? NO Calibration WG: —

Prep WG#: 487250 Disposable Vessel Lot#*: A106310.97

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
147-11/AS	ALERT - Sample disproportionate	M3 Flag ASS. Sample
↓	to spike level	↓

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487938

Date Reported: 13-Dec-19
Run ID: R1764365
Date Analyzed: 12-Dec-19
ICAL Workgroup:
Instrument ID: KONELAB

WG487938ICB

Tag: Measured: 12/12/2019 12:55:13 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

WG487938ICV

Tag: Measured: 12/12/2019 12:55:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	20.6	1		mg/L	++	1	5			
SREV	SULFATE	REC	103 ✓	1		%	++	1	5			

WG487938CCV1

Tag: Measured: 12/12/2019 2:39:27 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	25.4 ✓	1		mg/L	++	1	5			
SREV	SULFATE	REC	101	1		%	++	1	5			

WG487938CCB1

Tag: Measured: 12/12/2019 2:39:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U ✓	mg/L	++	1	5			

WG487938LFB

Tag: Measured: 12/12/2019 2:39:29 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	9.6 ✓	1		mg/L	++	1	5			
SREV	SULFATE	REC	96	1		%	++	1	5			

WG487250PBS

Tag: 1 Measured: 12/12/2019 2:39:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U ✓	mg/L	++	1	5			

WG487938CCV2

Tag: Measured: 12/12/2019 2:46:27 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	26.5 ✓	1		mg/L	++	1	5			
SREV	SULFATE	REC	106	1		%	++	1	5			

WG487938CCB2

Tag: Measured: 12/12/2019 2:46:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U ✓	mg/L	++	1	5			

L56147-11

Tag: Measured: 12/12/2019 2:52:16 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	MT-TURB	2300	100		mg/L	++	100	500		HD M3 TB	

L56147-11AS

Tag:

Measured: 12/12/2019 2:52:17 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	2350	100		mg/L	++	100	500			
SREV	SULFATE	REC	500	100		%	ALRT	100	500	4x	M3	

L56147-11DUP

Tag:

Measured: 12/12/2019 2:52:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	2080	100		mg/L	++	100	500			
SREV	SULFATE	RPD	10	100		%	++	100	500			

WG487938CCV3

Tag:

Measured: 12/12/2019 2:53:07 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND	25.2	1		mg/L	++	1	5			
SREV	SULFATE	REC	101	1		%	++	1	5			

WG487938CCB3

Tag:

Measured: 12/12/2019 2:53:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	SULFATE	FOUND		1	U	mg/L	++	1	5			

Wood - E&I Solutions, Inc.

Project ID: L56147

Wet Chemistry

WG487938 **Sulfate - Turbidimetric MWMT**

Sample	Date	SCN	SULFATE
WG487938ICV	12/12/19 12:55	WI191204-6	X
WG487938ICB	12/12/19 12:55		X
WG487938CCV1	12/12/19 14:39	WI191204-5	X
WG487938LFB	12/12/19 14:39	WI190801-3	X
WG487250PBS	12/12/19 14:39		X
WG487938CCB1	12/12/19 14:39		X
WG487938CCV2	12/12/19 14:46	WI191204-5	X
WG487938CCB2	12/12/19 14:46		X
L56147-11DUP	12/12/19 14:52		X
L56147-11AS	12/12/19 14:52	SO4TURB100 X	X
L56147-11	12/12/19 14:52		X
WG487938CCB3	12/12/19 14:53		X
WG487938CCV3	12/12/19 14:53	WI191204-5	X

L56147-2001131042

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487250

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 8:00
End Date/Time: 12/06/2019 10:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487250CSTD1	NONE	As Rec		12/04/19 8:00		10.04		10.05	10.05							21.3
2	WG487250CSTD2	NONE	As Rec		12/04/19 10:46		7.06		7.04	7.04							21.2
3	WG487250CSTD3	NONE	As Rec		12/04/19 13:33		2.07		2.05	2.05							21.3
4	WG487250ICV	PCN58503	As Rec		12/04/19 16:20		4.04		4.04	4.04							21.5
5	WG487250PBS	NONE	As Rec		12/04/19 19:06		5.95	23	6.39	6.40	0	5000.2	0	12/4/2019 2:20:00 PM	12/5/2019 2:30:00 PM	24.16666666669	21.1
6	L56147-06	STSB29_6-15	As Rec		12/04/19 21:53	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/4/2019 10:45:00 AM	12/5/2019 4:25:00 PM	29.66666666680	20.9
7	L56147-06MS	II191127-2	As Rec		12/05/19 0:40	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/4/2019 10:45:00 AM	12/5/2019 4:25:00 PM	29.66666666680	20.9
8	L56147-06MSD	II191127-2	As Rec		12/05/19 3:26	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/4/2019 10:45:00 AM	12/5/2019 4:25:00 PM	29.66666666680	20.9
9	L56147-07	STSB29-FD_6-15	As Rec		12/05/19 6:13	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/4/2019 10:45:00 AM	12/5/2019 4:15:00 PM	29.50000000012	20.9
10	L56147-07MS	MS190905-3	As Rec		12/05/19 9:00	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/4/2019 10:45:00 AM	12/5/2019 4:15:00 PM	29.50000000012	20.9
11	L56147-07MSD	MS190905-3	As Rec		12/05/19 11:46	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/4/2019 10:45:00 AM	12/5/2019 4:15:00 PM	29.50000000012	20.9
12	L56147-08	STSB30_0.5-3	As Rec		12/05/19 14:33	0	5.95	23	4.09	4.35	5000	5014.1	8.24	12/4/2019 10:45:00 AM	12/5/2019 2:25:00 PM	27.66666666674	20.8
13	L56147-09	STSB30_6-15	As Rec		12/05/19 17:20	0	5.95	23	5.85	5.87	5000	5006.3	21.66	12/4/2019 10:45:00 AM	12/5/2019 4:15:00 PM	29.50000000012	20.6
14	L56147-10	STSB31_0.5-3	As Rec		12/05/19 20:06	0	5.95	23	4.1	4.04	5000	5004.3	11.31	12/4/2019 10:45:00 AM	12/5/2019 2:20:00 PM	27.58333333331	20.5
15	L56147-11	STSB31_6-15	As Rec		12/05/19 22:53	0	5.95	23	5.66	5.71	5000	5000.7	28.21	12/4/2019 10:45:00 AM	12/5/2019 4:05:00 PM	29.33333333343	20.6
16	WG487250CCV1	PCN58503	As Rec		12/06/19 1:40		4.05		4.05	4.05							21.5
17	WG487250LFB1	II191127-2	As Rec		12/06/19 4:26	0	5.95	23	6.39	6.4	0	5000.2	0	12/4/2019 2:20:00 PM	12/5/2019 2:30:00 PM	24.16666666669	21.1
18	WG487250LFB2	MS190905-3	As Rec		12/06/19 7:13	0	5.95	23	6.39	6.4	0	5000.2	0	12/4/2019 2:20:00 PM	12/5/2019 2:30:00 PM	24.16666666669	21.1
19	WG487250CCV2	PCN58503	As Rec		12/06/19 10:00		4.05		4.04	4.04							21.4

Report Comments: _____

Internal Comments _____

AREV: GKH 12/6/19
Initials, Date

SREV: ERA 12-10-19
Initials, Date

12/6/2019 11:39:04 AM 121719

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487250

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 8:00
End Date/Time: 12/06/2019 10:00

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-06MS	ICP Spike
L56147-06MSD	ICP Spike
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250CCV1	pH QC
WG487250CSTD1	pH QC
WG487250CSTD2	pH QC
WG487250CSTD3	pH QC
WG487250ICV	pH QC
WG487250LFB1	ICP LFB
WG487250LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 11:39:04 AM 121719

ACZ Laboratories, Inc.
Geochemistry Department
Data Review and Reagents

Data Reviewer: GKH
Date: 12/6/19

Approved: GRA
Date: 12-10-19

Analyst: GKH

Workgroup: WG487250

Analysis Date: 12/4/19 - 12/6/19

Sample type used: SO

Extraction / Digestion / Analysis / Prep / Calc:

	Yes	No	N/A
1. Is the raw data checked to the computer printout for transcription errors?	✓		
2. Is the %solid or TS attached for dilution factors?			✓
3. Were proper volumes of reagents used per final volume?	✓		
4. Was the proper sub-sample used (as received, client prep,<2000, <500, <250, dry, R&P, RPLL)?	✓		
5.Were the dilution factor calculation checked (final volume, weight, %solid)?			✓
6. Did the RPD pass?			✓
7. Does all the spike information correlate with each other?	✓		
8. Is the appropriate spike in the computer-designated line?	✓		
9. Are all errors properly corrected (single-line crossout, dated & initialed)?	✓		
10. Is the standard/reagent information complete and current?	✓		
11. Is your instrument calibration passing (and included in the data package if needed)?	✓		
FOR SREV: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?			

Standard/Reagent/Equipment*	PCN/SCN/LOT #*	Expiration Date
BUFFER 10	59339	3/31/21
↓ 7	58542	12/31/20
↓ 2	58293	12/31/20

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

Comments:

FRMSO010.02.14.08

METEORIC WATER MOBILITY TEST

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487

Analyst: **GKH**
Date:
Start Time: **12/4/19 8a**
End Time: **12/6/19 10a**

Workgroup Number:

Loaded Sample Wet Weight

Sx Number	Sx Wet Weight (g)
L56147-06	5432
L56147-07	5475
L56147-08	5251
L56147-09	5563
L56147-10	5302
L56147-11	5972
0	

H2O rate start: 3.5 mL/Min
H2O rate finish: 3.5mL/Min

Filter Type/pore size: 0.45 um Filter
Special Comments:

Dry Weight Calculations

Sx Number	Sx Weight (g) (From above)	(x)	% Solid	=	Dry Sx Weight (g)	+	Cubetainer Weight (g)	=	Target Leachate & Cubtainer Wt (g)
L56147-06	5432	x	0.920521121	=	5000.270729	+	138.1	=	5138.37073
L56147-07	5475	x	0.91337892	=	5000.749586	+	132.8	=	5133.54959
L56147-08	5251	x	0.952354625	=	5000.814138	+	136.1	=	5136.91414
L56147-09	5563	x	0.898853014	=	5000.319315	+	133.4	=	5133.71931
L56147-10	5302	x	0.943206997	=	5000.883499	+	134.8	=	5135.6835
L56147-11	5972	x	0.837338042	=	5000.582789	+	131.6	=	5132.18279
0	0	x	#DIV/0!	=	#DIV/0!	+		=	#DIV/0!
		x	#DIV/0!	=	#DIV/0!	+		=	#DIV/0!

Final Leachate Weight

Sx Number	Actual Leachate & Cubetainer	-	Cubetainer Wt (g)	=	Final Leachate Volume (mL)
L56147-06	5149.6	-	138.1	=	5011.5
L56147-07	5141.2	-	132.8	=	5008.4
L56147-08	5150.2	-	136.1	=	5014.1
L56147-09	5139.7	-	133.4	=	5006.3
L56147-10	5139.1	-	134.8	=	5004.3
L56147-11	5132.3	-	131.6	=	5000.7
0		-	0	=	0
		-	0	=	0

Comments: Insf sx volume to do a duplicate in workgroup.

METEORIC WATER MOBILITY TEST

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487

Analyst: **GKH**
Date:
Start Time: 12/4/19 8a
End Time: 12/6/19 10a

Workgroup Number: WG487250

Feed Moisture

Sx Number	Pan Weight (g)	Wet Sx + Pan Weight (g)	Dry Sx + Pan Weight (g)	% Solid	% Feed Moisture
L56147-06	137.3	640.83	600.81	92.05211209	7.947887911
L56147-07	160.85	662.46	619.01	91.33789199	8.662108012
L56147-08	151.37	657.82	633.69	95.23546253	4.764537467
L56147-09	141.6	641.17	590.64	89.88530136	10.11469864
L56147-10	150.65	665.15	635.93	94.32069971	5.679300292
L56147-11	153.41	657.4	575.42	83.73380424	16.26619576
				#DIV/0!	#DIV/0!
				#DIV/0!	#DIV/0!

Screening-Particle Size

Sx Number	Sx Weight (g)	Sx > 5 cm (g)	Sx < 5 cm (g)	%Sx > 5cm	%Sx < 5cm
L56147-06	5432	0	5432	0	100
L56147-07	5475	0	5475	0	100
L56147-08	5251	0	5251	0	100
L56147-09	5563	0	5563	0	100
L56147-10	5302	0	5302	0	100
L56147-11	5972	0	5972	0	100
0			0	#DIV/0!	#DIV/0!
0			0	#DIV/0!	#DIV/0!

Residual Moisture

Sx Number	Pan Weight (g)	Wet Sx + Pan Weight (g)	Dry Sx + Pan Weight (g)	% Solid	% Res. Moisture
L56147-06	137.33	693.36	586.6	80.79959714	19.20040286
L56147-07	160.85	656.72	564.21	81.34390062	18.65609938
L56147-08	137.34	567.55	532.12	91.76448711	8.235512889
L56147-09	141.71	696.02	575.97	78.34244376	21.65755624
L56147-10	150.7	646.26	590.19	88.68552748	11.31447252
L56147-11	153.46	716.14	557.41	71.79036042	28.20963958
0				#DIV/0!	#DIV/0!
0				#DIV/0!	#DIV/0!

Time and Temperature for Residual Moisture:
Sample Description: Sand/ Small Aggregate
Centrifuge or pre-filter? N/A
Observation of changes: N/A
Storage Conditions of "as rec" sample: Room

Meteoric Water Mobility

WG487250

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst:
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487250CSTD1	NONE	AcRec				10.04		10.05								21.3
2	WG487250CSTD2	NONE					7.06		7.04								21.2
3	WG487250CSTD3	NONE					2.07		2.05								21.3
4	WG487250ICV	PCN58503					4.04		4.04								21.5
5	WG487250PBS	NONE					5.95	23	6.39	6.40	0	5000.2	0	2:20p	2:30p		21.1
6	L56147-06	STSB29_6-15							7.15	7.23	5000	5011.5	19.20	10:45	4:25p		20.9
7	L56147-06MS	II191127-2															
8	L56147-06MSD	II191127-2															
9	L56147-07	STSB29_FD_6-15							7.26	7.44		5008.4	18.66		4:15p		20.9
10	L56147-07MS	MS190905-3															
11	L56147-07MSD	MS190905-3															
12	L56147-08	STSB30_0.5-3							4.09	4.35		5014.1	8.24		2:25p		20.8
13	L56147-09	STSB30_6-15							5.85	5.87		5006.3	21.66		4:15p		20.6
14	L56147-10	STSB31_0.5-3							4.10	4.04		5004.3	11.31		2:20p		20.5
15	L56147-11	STSB31_6-15							5.66	5.71		~~5007~~	28.21		4:05p		20.6
16	WG487250CCV1	PCN58503					4.05		4.05								21.5
17	WG487250LFB1	II191127-2					5.95		6.39	6.40	0	5000.2	0	2:20p	2:30p		21.1
18	WG487250LFB2	MS190905-3									0		0				
19	WG487250CCV2	PCN58503					4.05		4.04								21.4

5000.7
GKH 12/6/19

Report Comments: PBS STARTED LATER B/C ALL SLOTS WERE BEING USED FROM PREVIOUS DAY

Internal Comments

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/3/2019 11:49:28 AM 121719

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487250

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst:
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-06MS	ICP Spike
L56147-06MSD	ICP Spike
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250CCV1	pH QC
WG487250CSTD1	pH QC
WG487250CSTD2	pH QC
WG487250CSTD3	pH QC
WG487250ICV	pH QC
WG487250LFB1	ICP LFB
WG487250LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/3/2019 11:49:28 AM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487250

Date Reported: 10-Dec-19
Run ID: R1763173
Date Analyzed: 04-Dec-19
ICAL Workgroup:
Instrument ID: SOILSPREP

WG487250ICV

Tag: **Measured:** 12/4/2019 4:20:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	NEED			4.04		
SREV	POST FILTER PH	TEXT		1		units	NEED			4.04		
SREV	PRE FILTER PH	TEXT		1		units	NEED			4.04		
SREV	TEMPERATURE	PREP	21.5	1		C	NEED	0.1	0.1			

WG487250PBS

Tag: **Measured:** 12/4/2019 7:06:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	36666666861	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5000.2	1		mL	++					
SREV	POST FILTER PH	TEXT		1		units	++			6.40		
SREV	PRE FILTER PH	TEXT		1		units	++			6.39		
SREV	RETAINED MOISTURE	TEXT		1		%	++			0		
SREV	TEMPERATURE	PREP	21.1	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	0	1		g	++					

L56147-06

Tag: **Measured:** 12/4/2019 9:53:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	WMT-96		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	WMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	WMT-96	29.66667	1		hrs	++					
SREV	LEACHATE VOLUME	WMT-96	5011.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	WMT-96	0	1		%	++					
SREV	POST FILTER PH	WMT-96		1		units	++			7.23		
SREV	PRE FILTER PH	WMT-96		1		units	++			7.15		
SREV	RETAINED MOISTURE	WMT-96		1		%	++			19.2		
SREV	TEMPERATURE	WMT-96	20.9	1		C	++	0.1	0.1			
SREV	TIME IN	WMT-96		1			++					
SREV	TIME OUT	WMT-96		1			++					
SREV	WEIGHT, DRY	WMT-96	5000	1		g	++					

L56147-06MS

Tag: Measured: 12/5/2019 12:40:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	36666668025	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5011.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			7.23		
SREV	PRE FILTER PH	TEXT		1		units	++			7.15		
SREV	RETAINED MOISTURE	TEXT		1		%	++			19.2		
SREV	TEMPERATURE	PREP	20.9	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

L56147-06MSD

Tag: Measured: 12/5/2019 3:26:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	36666668025	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5011.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			7.23		
SREV	PRE FILTER PH	TEXT		1		units	++			7.15		
SREV	RETAINED MOISTURE	TEXT		1		%	++			19.2		
SREV	TEMPERATURE	PREP	20.9	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

L56147-07

Tag: Measured: 12/5/2019 6:13:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	29.5	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5008.4	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			7.44		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			7.26		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			18.66		
SREV	TEMPERATURE	ıWMT-96	20.9	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-07MS

Tag:

Measured: 12/5/2019 9:00:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	)0000001164	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5008.4	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			7.44		
SREV	PRE FILTER PH	TEXT		1		units	++			7.26		
SREV	RETAINED MOISTURE	TEXT		1		%	++			18.66		
SREV	TEMPERATURE	PREP	20.9	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

L56147-07MSD

Tag:

Measured: 12/5/2019 11:46:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	)0000001164	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5008.4	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			7.44		
SREV	PRE FILTER PH	TEXT		1		units	++			7.26		
SREV	RETAINED MOISTURE	TEXT		1		%	++			18.66		
SREV	TEMPERATURE	PREP	20.9	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

L56147-08

Tag:

Measured: 12/5/2019 2:33:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	27.66667	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5014.1	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			4.35		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			4.09		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			8.24		
SREV	TEMPERATURE	ıWMT-96	20.8	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-09

Tag: Measured: 12/5/2019 5:20:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	29.5	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5006.3	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			5.87		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			5.85		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			21.66		
SREV	TEMPERATURE	ıWMT-96	20.6	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-10

Tag: Measured: 12/5/2019 8:06:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	27.58333	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5004.3	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			4.04		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			4.1		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			11.31		
SREV	TEMPERATURE	ıWMT-96	20.5	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-11

Tag: Measured: 12/5/2019 10:53:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	29.33333	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5000.7	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			5.71		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			5.66		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			28.21		
SREV	TEMPERATURE	ıWMT-96	20.6	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

WG487250CCV1

Tag: Measured: 12/6/2019 1:40:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	NEED			4.05		
SREV	POST FILTER PH	TEXT		1		units	NEED			4.05		
SREV	PRE FILTER PH	TEXT		1		units	NEED			4.05		
SREV	TEMPERATURE	PREP	21.5	1		C	NEED	0.1	0.1			

WG487250LFB1

Tag:

Measured: 12/6/2019 4:26:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	36666666861	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5000.2	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			6.4		
SREV	PRE FILTER PH	TEXT		1		units	++			6.39		
SREV	RETAINED MOISTURE	TEXT		1		%	++			0		
SREV	TEMPERATURE	PREP	21.1	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	0	1		g	++					

WG487250LFB2

Tag:

Measured: 12/6/2019 7:13:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.95		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	36666666861	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5000.2	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			6.4		
SREV	PRE FILTER PH	TEXT		1		units	++			6.39		
SREV	RETAINED MOISTURE	TEXT		1		%	++			0		
SREV	TEMPERATURE	PREP	21.1	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	0	1		g	++					

WG487250CCV2

Tag:

Measured: 12/6/2019 10:00:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	NEED			4.05		
SREV	POST FILTER PH	TEXT		1		units	NEED			4.04		
SREV	PRE FILTER PH	TEXT		1		units	NEED			4.04		
SREV	TEMPERATURE	PREP	21.4	1		C	NEED	0.1	0.1			

Wood - E&I Solutions, Inc.

Project ID: L56147

Soil Preparation

WG487250 **Meteoric Water Mobility**

Sample	Date	SCN	ACTION TEMPERA	EXTRACTION PH	POST FILTER PH	PRE FILTER PH	ETAINED MOISTUR
WG487250ICV	12/04/19 16:20			X	X	X	
WG487250PBS	12/04/19 19:06		X	X	X	X	X
L56147-06	12/04/19 21:53		X	X	X	X	X
L56147-06MS	12/05/19 00:40		X	X	X	X	X
L56147-06MSD	12/05/19 03:26		X	X	X	X	X
L56147-07	12/05/19 06:13		X	X	X	X	X
L56147-07MS	12/05/19 09:00		X	X	X	X	X
L56147-07MSD	12/05/19 11:46		X	X	X	X	X
L56147-08	12/05/19 14:33		X	X	X	X	X
L56147-09	12/05/19 17:20		X	X	X	X	X
L56147-10	12/05/19 20:06		X	X	X	X	X
L56147-11	12/05/19 22:53		X	X	X	X	X
WG487250CCV1	12/06/19 01:40			X	X	X	
WG487250LFB1	12/06/19 04:26		X	X	X	X	X
WG487250LFB2	12/06/19 07:13		X	X	X	X	X
WG487250CCV2	12/06/19 10:00			X	X	X	

L56147-2001131042

Meteoric Water Mobility

WG487361

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/02/2019 14:00
End Date/Time: 12/05/2019 13:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487361CSTD1	NONE	As Rec		12/02/19 14:00		10.04		10.05	10.05							20.5
2	WG487361CSTD2	NONE	As Rec		12/02/19 17:56		7.01		7.01	7.01							20.6
3	WG487361CSTD3	NONE	As Rec		12/02/19 21:53		2.04		2.05	2.05							20.5
4	WG487361ICV	PCN58503	As Rec		12/03/19 1:50		4.01		4.01	4.01							20.7
5	WG487361PBS	NONE	As Rec		12/03/19 5:46	0	5.19	23	5.93	6.06	0	5001.5	0	12/3/2019 9:45:00 AM	12/4/2019 10:20:00 AM	24.58333333331	20.7
6	L56147-01	STSB27_0.5-3	As Rec		12/03/19 9:43	0	5.19	23	7.70	7.78	5000	5005.7	13.12	12/3/2019 9:45:00 AM	12/4/2019 2:15:00 PM	28.5	20.8
7	L56147-02	STSB27_6-15	As Rec		12/03/19 13:40	0	5.19	23	7.59	7.66	5000	5001.4	20.4	12/3/2019 9:45:00 AM	12/4/2019 2:20:00 PM	28.58333333326	20.7
8	L56147-03	STSB28_0.5-3	As Rec		12/03/19 17:36	0	5.19	23	4.63	4.58	5000	5002.4	8.77	12/3/2019 9:45:00 AM	12/4/2019 12:40:00 PM	26.91666666674	20.9
9	L56147-04	STSB28_6-15	As Rec		12/03/19 21:33	0	5.19	23	6.91	6.93	5000	5005.8	26.92	12/3/2019 9:45:00 AM	12/4/2019 2:35:00 PM	28.83333333337	20.8
10	L56147-05	STSB29_0.5-3	As Rec		12/04/19 1:30	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
11	L56147-05MS1	MS190905-3	As Rec		12/04/19 5:26	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
12	L56147-05MSD1	MS190905-3	As Rec		12/04/19 9:23	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
13	L56147-05MS2	II191127-2	As Rec		12/04/19 13:20	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
14	L56147-05MSD2	II191127-2	As Rec		12/04/19 17:16	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
15	WG487361CCV1	PCN58503	As Rec		12/04/19 21:13		4.04		4.03	4.03							20.5
16	L56147-05DUP	NONE	As Rec		12/05/19 1:10	0	5.19	23	4.32	4.31	5000	5001.6	12.17	12/3/2019 9:45:00 AM	12/4/2019 1:45:00 PM	27.99999999994	20.8
17	WG487361LFB1	II191127-2	As Rec		12/05/19 5:06	0	5.19	23	5.93	6.06	0	5001.5	0	12/3/2019 9:45:00 AM	12/4/2019 10:20:00 AM	24.58333333331	20.7
18	WG487361LFB2	MS190905-3	As Rec		12/05/19 9:03	0	5.19	23	5.93	6.06	0	5001.5	0	12/3/2019 9:45:00 AM	12/4/2019 10:20:00 AM	24.58333333331	20.7
19	WG487361CCV2	PCN58503	As Rec		12/05/19 13:00		4.02		4.01	4.01							20.5

Report Comments: _____

Internal Comments _____

AREV: GKH 12/5/19
Initials, Date

SREV: ERA 12-5-19
Initials, Date

12/5/2019 1:50:58 PM 121719

008

Meteoric Water Mobility

WG487361

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/03/2019 1:50
End Date/Time: 12/05/2019 13:00

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MS2	ICP Spike
L56147-05MSD1	ICPMS Spike
L56147-05MSD2	ICP Spike
WG487361CCV1	pH QC
WG487361CSTD1	pH QC
WG487361CSTD2	pH QC
WG487361CSTD3	pH QC
WG487361ICV	pH QC
WG487361LFB1	ICP LFB
WG487361LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 11:39:59 AM 121719

ACZ Laboratories, Inc.
Geochemistry Department
Data Review and Reagents

Data Reviewer: GKH
Date: 12/5/19

Approved: QA
Date: 12-5-19

Analyst: GKH

Workgroup: WG487361

Analysis Date: 12/2/19 - 12/5/19

Sample type used: SO

Extraction / Digestion / Analysis / Prep / Calc:

	Yes	No	N/A
1. Is the raw data checked to the computer printout for transcription errors?	✓		
2. Is the %solid or TS attached for dilution factors?			✓
3. Were proper volumes of reagents used per final volume?	✓		
4. Was the proper sub-sample used (as received, client prep,<2000, <500, <250, dry, R&P, RPLL)?	✓		
5.Were the dilution factor calculation checked (final volume, weight, %solid)?			✓
6. Did the RPD pass?			✓
7. Does all the spike information correlate with each other?	✓		
8. Is the appropriate spike in the computer-designated line?	✓		
9. Are all errors properly corrected (single-line crossout, dated & initialed)?	✓		
10. Is the standard/reagent information complete and current?	✓		
11. Is your instrument calibration passing (and included in the data package if needed)?	✓		
FOR SREV: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?			

Standard/Reagent/Equipment*	PCN/SCN/LOT #*	Expiration Date
BUFFER 10	59339	3/31/21
7	58532	12/31/20
2	58293	12/31/20

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

Comments:

FRMSO010.02.14.08

METEORIC WATER MOBILITY TEST

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487

Analyst: **GKH**
Date:
Start Time: **12/2/19 2:00pm**
End Time: **12/5/19 9:00am**

Workgroup Number: WG487150

Loaded Sample Wet Weight

Sx Number	Sx Wet Weight (g)
L56147-01	5169
L56147-02	5479
L56147-03	5240
L56147-04	6096
L56147-05	5243
L56147-05 DUP	5227
0	

H2O rate start: 3.5 mL/Min
H2O rate finish: 3.5mL/Min

Filter Type/pore size: 0.45 um Filter
Special Comments:

Dry Weight Calculations

Sx Number	Sx Weight (g) (From above)	(x)	% Solid	=	Dry Sx Weight (g)	+	Cubetainer Weight (g)	=	Target Leachate & Cubtainer Wt (g)
L56147-01	5169	x	0.967405348	=	5000.518245	+	141.1	=	5141.61825
L56147-02	5479	x	0.912674276	=	5000.542359	+	137.4	=	5137.94236
L56147-03	5240	x	0.954379632	=	5000.949272	+	137	=	5137.94927
L56147-04	6096	x	0.820342633	=	5000.808693	+	142.8	=	5143.60869
L56147-05	5243	x	0.953787851	=	5000.709702	+	141	=	5141.7097
L56147-05 DUP	5227	x	0.956663299	=	5000.479061	+	133.7	=	5134.17906
		x	#DIV/0!	=	#DIV/0!	+		=	#DIV/0!
		x	#DIV/0!	=	#DIV/0!	+		=	#DIV/0!

Final Leachate Weight

Sx Number	Actual Leachate & Cubetainer	-	Cubetainer Wt (g)	=	Final Leachate Volume (mL)
L56147-01	5146.8	-	141.1	=	5005.7
L56147-02	5138.8	-	137.4	=	5001.4
L56147-03	5139.4	-	137	=	5002.4
L56147-04	5148.6	-	142.8	=	5005.8
L56147-05	5148.5	-	141	=	5007.5
L56147-05 DUP	5135.3	-	133.7	=	5001.6
0		-	0	=	0
		-	0	=	0

Comments: L56147-05 has two separate buckets for QC. Two separate feed moistures were conducted in order to fully represent the sample in each bucket.

METEORIC WATER MOBILITY TEST

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487

Analyst: **GKH**
Date:
Start Time: 12/2/19 2:00pm
End Time: 12/5/19 1:00pm

Workgroup Number: WG487164

Feed Moisture

Sx Number	Pan Weight (g)	Wet Sx + Pan Weight (g)	Dry Sx + Pan Weight (g)	% Solid	% Feed Moisture
L56147-01	137.28	648.1	631.45	96.74053483	3.259465174
L56147-02	160.86	667.24	623.02	91.26742762	8.732572376
L56147-03	151.38	672.2	648.44	95.43796321	4.562036788
L56147-04	141.61	652.36	560.6	82.03426334	17.96573666
L56147-05	150.67	694.25	669.13	95.37878509	4.621214909
L56147-05 DUP	153.42	687.84	664.68	95.66632985	4.333670147
				#DIV/0!	#DIV/0!
				#DIV/0!	#DIV/0!

Screening-Particle Size

Sx Number	Sx Weight (g)	Sx > 5 cm (g)	Sx < 5 cm (g)	%Sx > 5cm	%Sx < 5cm
L56147-01	5169	0	5169	0	100
L56147-02	5479	0	5479	0	100
L56147-03	5240	0	5240	0	100
L56147-04	6096	0	6096	0	100
L56147-05	5243	0	5243	0	100
L56147-05 DUP	5227	0	5227	0	100
			0	#DIV/0!	#DIV/0!
			0	#DIV/0!	#DIV/0!

Residual Moisture

Sx Number	Pan Weight (g)	Wet Sx + Pan Weight (g)	Dry Sx + Pan Weight (g)	% Solid	% Res. Moisture
L56147-01	137.34	733.78	655.55	86.88384414	13.11615586
L56147-02	160.95	757.09	635.45	79.59539705	20.40460295
L56147-03	151.4	638.48	595.74	91.22526074	8.774739263
L56147-04	153.48	719.83	567.36	73.07848504	26.92151496
L56147-05	150.69	700.31	620.61	85.49907209	14.50092791
L56147-05 DUP	141.73	711.52	642.19	87.83235929	12.16764071
0				#DIV/0!	#DIV/0!
0				#DIV/0!	#DIV/0!

Time and Temperature for Residual Moisture:
Sample Description: Sand/ Aggregate
Centrifuge or pre-filter? N/A
Observation of changes: N/A
Storage Conditions of "as rec" sample: Room

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487361

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst:
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487361CSTD1	NONE	As Rec				10.04		10.05								20.5
2	WG487361CSTD2	NONE					7.01		7.01								20.6
3	WG487361CSTD3	NONE					2.04		2.05								20.5
4	WG487361ICV	PCN58503					4.01		4.01								20.7
5	WG487361PBS	NONE					5.19	23	5.93	6.06	0	5001.5	0	9:45	10:20		20.7
6	L56147-01	STSB27_0.5-3							7.70	7.78	5000	5005.7	13.12		14:15		20.8
7	L56147-02	STSB27_6-15							7.59	7.66		5001.4	20.40		14:20		20.7
8	L56147-03	STSB28_0.5-3							4.63	4.58		5002.4	8.77		12:40		20.9
9	L56147-04	STSB28_6-15							6.91	6.93		5005.8	26.92		14:35		20.8
10	L56147-05	STSB29_0.5-3							4.34	4.31		5007.5	14.50		13:30		20.2
11	L56147-05MS1	MS190905-3															
12	L56147-05MSD1	MS190905-3															
13	L56147-05MS2	II191127-2															
14	L56147-05MSD2	II191127-2															
15	WG487361CCV1	PCN58503					4.04	4 GRH 12/4/19	4.03								20.5
16	L56147-05DUP	NONE					5.19	23	4.32	4.31	5000	5001.6	12.17	9:45	13:45		20.8
17	WG487361LFB1	II191127-2							5.93	6.06	0	5001.5	0		10:20		20.7
18	WG487361LFB2	MS190905-3									0		0		10:20		
19	WG487361CCV2	PCN58503					4.02		4.01								20.5

Report Comments:

Internal Comments

AREV:
Initials, Date

SREV:
Initials, Date

12/4/2019 12:21:02 PM 121719

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487361

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst:
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time:
End Date/Time:

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MS2	ICP Spike
L56147-05MSD1	ICPMS Spike
L56147-05MSD2	ICP Spike
WG487361CCV1	pH QC
WG487361CSTD1	pH QC
WG487361CSTD2	pH QC
WG487361CSTD3	pH QC
WG487361ICV	pH QC
WG487361LFB1	ICP LFB
WG487361LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/4/2019 12:21:02 PM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487361

Date Reported: 05-Dec-19
Run ID: R1763019
Date Analyzed: 03-Dec-19
ICAL Workgroup:
Instrument ID: SOILSPREP

WG487361ICV

Tag: **Measured:** 12/3/2019 1:50:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	NEED			4.01		
SREV	POST FILTER PH	TEXT		1		units	NEED			4.01		
SREV	PRE FILTER PH	TEXT		1		units	NEED			4.01		
SREV	TEMPERATURE	PREP	20.7	1		C	NEED	0.1	0.1			

WG487361PBS

Tag: **Measured:** 12/3/2019 5:46:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	3333333139	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5001.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			6.06		
SREV	PRE FILTER PH	TEXT		1		units	++			5.93		
SREV	RETAINED MOISTURE	TEXT		1		%	++			0		
SREV	TEMPERATURE	PREP	20.7	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	0	1		g	++					

L56147-01

Tag: **Measured:** 12/3/2019 9:43:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	28.5	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5005.7	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			7.78		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			7.70		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			13.12		
SREV	TEMPERATURE	ıWMT-96	20.8	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-02

Tag: Measured: 12/3/2019 1:40:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	28.58333	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5001.4	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			7.66		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			7.59		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			20.4		
SREV	TEMPERATURE	ıWMT-96	20.7	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-03

Tag: Measured: 12/3/2019 5:36:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	26.91667	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5002.4	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			4.58		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			4.63		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			8.77		
SREV	TEMPERATURE	ıWMT-96	20.9	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-04

Tag: Measured: 12/3/2019 9:33:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	28.83333	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5005.8	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			6.93		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			6.91		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			26.92		
SREV	TEMPERATURE	ıWMT-96	20.8	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-05

Tag: Measured: 12/4/2019 1:30:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	ıWMT-96		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	ıWMT-96	23.0	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	ıWMT-96	27.75	1		hrs	++					
SREV	LEACHATE VOLUME	ıWMT-96	5007.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	ıWMT-96	0	1		%	++					
SREV	POST FILTER PH	ıWMT-96		1		units	++			4.31		
SREV	PRE FILTER PH	ıWMT-96		1		units	++			4.34		
SREV	RETAINED MOISTURE	ıWMT-96		1		%	++			14.5		
SREV	TEMPERATURE	ıWMT-96	20.2	1		C	++	0.1	0.1			
SREV	TIME IN	ıWMT-96		1			++					
SREV	TIME OUT	ıWMT-96		1			++					
SREV	WEIGHT, DRY	ıWMT-96	5000	1		g	++					

L56147-05MS1

Tag: Measured: 12/4/2019 5:26:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	27.75	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5007.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			4.31		
SREV	PRE FILTER PH	TEXT		1		units	++			4.34		
SREV	RETAINED MOISTURE	TEXT		1		%	++			14.5		
SREV	TEMPERATURE	PREP	20.2	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

L56147-05MSD1

Tag: Measured: 12/4/2019 9:23:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	27.75	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5007.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			4.31		
SREV	PRE FILTER PH	TEXT		1		units	++			4.34		
SREV	RETAINED MOISTURE	TEXT		1		%	++			14.5		
SREV	TEMPERATURE	PREP	20.2	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

L56147-05MS2

Tag: Measured: 12/4/2019 1:20:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	27.75	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5007.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			4.31		
SREV	PRE FILTER PH	TEXT		1		units	++			4.34		
SREV	RETAINED MOISTURE	TEXT		1		%	++			14.5		
SREV	TEMPERATURE	PREP	20.2	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

L56147-05MSD2

Tag: Measured: 12/4/2019 5:16:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	27.75	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5007.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			4.31		
SREV	PRE FILTER PH	TEXT		1		units	++			4.34		
SREV	RETAINED MOISTURE	TEXT		1		%	++			14.5		
SREV	TEMPERATURE	PREP	20.2	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

WG487361CCV1

Tag: Measured: 12/4/2019 9:13:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	NEED			4.04		
SREV	POST FILTER PH	TEXT		1		units	NEED			4.03		
SREV	PRE FILTER PH	TEXT		1		units	NEED			4.03		
SREV	TEMPERATURE	PREP	20.5	1		C	NEED	0.1	0.1			

L56147-05DUP

Tag: Measured: 12/5/2019 1:10:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	9999999418	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5001.6	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			4.31		
SREV	PRE FILTER PH	TEXT		1		units	++			4.32		
SREV	RETAINED MOISTURE	TEXT		1		%	++			12.17		
SREV	TEMPERATURE	PREP	20.8	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	5000	1		g	++					

WG487361LFB1

Tag:

Measured: 12/5/2019 5:06:40 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	3333333139	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5001.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			6.06		
SREV	PRE FILTER PH	TEXT		1		units	++			5.93		
SREV	RETAINED MOISTURE	TEXT		1		%	++			0		
SREV	TEMPERATURE	PREP	20.7	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	0	1		g	++					

WG487361LFB2

Tag:

Measured: 12/5/2019 9:03:20 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	++			5.19		
SREV	EXTRACTION TEMPERATURE	REG	23	1		C	++	0.1	0.1			
SREV	EXTRACTION TIME	PREP	3333333139	1		hrs	++					
SREV	LEACHATE VOLUME	PREP	5001.5	1		mL	++					
SREV	PARTICLE SIZE OVER 5 CM	PREP	0	1		%	++					
SREV	POST FILTER PH	TEXT		1		units	++			6.06		
SREV	PRE FILTER PH	TEXT		1		units	++			5.93		
SREV	RETAINED MOISTURE	TEXT		1		%	++			0		
SREV	TEMPERATURE	PREP	20.7	1		C	++	0.1	0.1			
SREV	TIME IN	DATE		1			++					
SREV	TIME OUT	DATE		1			++					
SREV	WEIGHT, DRY	PREP	0	1		g	++					

WG487361CCV2

Tag:

Measured: 12/5/2019 1:00:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	EXTRACTION PH	TEXT		1		units	NEED			4.02		
SREV	POST FILTER PH	TEXT		1		units	NEED			4.01		
SREV	PRE FILTER PH	TEXT		1		units	NEED			4.01		
SREV	TEMPERATURE	PREP	20.5	1		C	NEED	0.1	0.1			

Wood - E&I Solutions, Inc.

Project ID: L56147

Soil Preparation

WG487361 **Meteoric Water Mobility**

Sample	Date	SCN	ACTION TEMPERA	EXTRACTION PH	POST FILTER PH	PRE FILTER PH	ETAINED MOISTUR
WG487361ICV	12/03/19 01:50			X	X	X	
WG487361PBS	12/03/19 05:46		X	X	X	X	X
L56147-01	12/03/19 09:43		X	X	X	X	X
L56147-02	12/03/19 13:40		X	X	X	X	X
L56147-03	12/03/19 17:36		X	X	X	X	X
L56147-04	12/03/19 21:33		X	X	X	X	X
L56147-05	12/04/19 01:30		X	X	X	X	X
L56147-05MS1	12/04/19 05:26		X	X	X	X	X
L56147-05MSD1	12/04/19 09:23		X	X	X	X	X
L56147-05MS2	12/04/19 13:20		X	X	X	X	X
L56147-05MSD2	12/04/19 17:16		X	X	X	X	X
WG487361CCV1	12/04/19 21:13			X	X	X	
L56147-05DUP	12/05/19 01:10		X	X	X	X	X
WG487361LFB1	12/05/19 05:06		X	X	X	X	X
WG487361LFB2	12/05/19 09:03		X	X	X	X	X
WG487361CCV2	12/05/19 13:00			X	X	X	

ACZ LABORATORIES, INC. WG487795
Radium 226 by 903.1
FRMRC030.09.18.20
RA226-LUCASCELL-LIQUID

Project:

SOP# 1498

Instrument: LucasCell
Matrix Class: LIQUID
List Type: QC-RA-226-903.1
List Function: ANALYTICAL

Analyst: JLG
Dept: 55
Prep Date: 12/10/2019
Analysis Date: 12/19/2019
Start Time:
End Time:
Approved: JLG 12/19/19
Approved: TSR 12/20/19

ACZ Sample Number	Sample ID	Client ID	Sample Matrix	CPM-bkg cpm	Ba Recovery factor	E	Radium 226 Activity pCi/L	Radium 226 Error (+/-)	Radium 226 LLD pCi/L
1	WG487361PBW		SO	0.19	0.70	2.31	0.24	0.28	0.673
2	WG487361LCSW	PCN57864	SO	44.47	0.62	2.09	71.05	2.13	0.440
3	L56147-01	STSB27_0.5-3	SO	1.03	0.87	1.92	1.28	0.32	0.403
4	L56147-01DUP		SO	0.61	0.85	2.03	0.73	0.30	0.499
5	L56147-02	STSB27_6-15	SO	1.25	0.92	2.23	1.25	0.33	0.235
6	L56147-03	STSB28_0.5-3	SO	0.7	0.92	1.80	0.87	0.37	0.547
7	L56147-04	STSB28_6-15	SO	0.95	0.89	2.28	0.96	0.33	0.430
8	L56147-05	STSB29_0.5-3	SO	1.08	0.89	1.91	1.31	0.36	0.228
9	L56147-05MS	PCN57864	SO	75.37	0.94	1.97	83.59	1.90	0.286
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A

Rn222 Decay constant= 0.00755

WG487795

Bubbler ID	ACZ Sample Number	Volume ml	Rn Ingrow (mm/dd/yyyy hh:mm)	Rn Decay (mm/dd/yyyy hh:mm)	Rn Count (mm/dd/yyyy hh:mm)	Ingrow Time	Decay Time	Cell#	Counts	ICP RESULT
	WG487361PBW	300	12/11/2019 12:49	12/19/2019 8:21	12/19/2019 13:02	187.53	4.68	1	72	1.118
	WG487361LCSW	300	12/11/2019 12:49	12/19/2019 8:26	12/19/2019 13:02	187.62	4.60	2	4536	0.9881
	L56147-01	300	12/11/2019 12:49	12/19/2019 8:31	12/19/2019 13:02	187.70	4.52	3	137	1.391
	L56147-01DUP	300	12/11/2019 12:49	12/19/2019 8:36	12/19/2019 13:02	187.78	4.43	4	112	1.36
	L56147-02	300	12/11/2019 12:49	12/19/2019 8:41	12/19/2019 13:02	187.87	4.35	5	206	1.475
	L56147-03	300	12/11/2019 12:55	12/19/2019 8:46	12/19/2019 13:02	187.85	4.27	6	150	1.476
	L56147-04	300	12/11/2019 12:55	12/19/2019 8:51	12/19/2019 13:02	187.93	4.18	7	186	1.423
	L56147-05	300	12/11/2019 12:55	12/19/2019 8:56	12/19/2019 13:02	188.02	4.10	8	168	1.418
	L56147-05MS	300	12/11/2019 12:55	12/19/2019 9:01	12/19/2019 13:02	188.10	4.02	9	7596	1.503
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			

Lucas Cell calibration standards and ludlum counter standards

Lucas cells are calibrated with 1 mL of Ra226 PCN52427 at 40pCi/mL.

The performance of the Lucas cell is checked with ZnS paper and

Th230 PCN# 22288

Cell#	Net CPM	DPM Ra226	Rn Ingrowth	Rn Decay	Count time	Ingrowth time	Decay Time	E=(cpm/dpm)	STDEV	Background taken	
1	170.85	88.80	9/16/2019 8:05	9/27/2019 7:56	9/27/2019 12:33	263.85	4.62	2.31	0.11	Bkg for Cell#1	0.53
2	117.03	88.80	8/29/2019 11:27	9/4/2019 7:50	9/4/2019 12:46	140.38	4.93	2.09	0.06	Bkg for Cell#2	0.89
3	107.23	88.80	8/29/2019 11:27	9/4/2019 7:55	9/4/2019 12:46	140.47	4.85	1.92	0.07	Bkg for Cell#3	0.34
4	113.8	88.80	8/29/2019 11:27	9/4/2019 8:00	9/4/2019 12:46	140.55	4.77	2.03	0.09	Bkg for Cell#4	0.51
5	125.23	88.80	8/29/2019 11:27	9/4/2019 8:05	9/4/2019 12:46	140.63	4.68	2.23	0.05	Bkg for Cell#5	0.81
6	101.12	88.80	8/29/2019 11:35	9/4/2019 8:10	9/4/2019 12:46	140.58	4.60	1.80	0.09	Bkg for Cell#6	0.80
7	127.92	88.80	8/29/2019 11:35	9/4/2019 8:15	9/4/2019 12:46	140.67	4.52	2.28	0.09	Bkg for Cell#7	0.91
8	107.56	88.80	8/29/2019 11:35	9/4/2019 8:20	9/4/2019 12:46	140.75	4.43	1.91	0.04	Bkg for Cell#8	0.60
9	110.9	88.80	8/29/2019 11:35	9/4/2019 8:25	9/4/2019 12:46	140.83	4.35	1.97	0.06	Bkg for Cell#9	0.59
10	131.09	88.80	8/29/2019 11:35	9/4/2019 8:30	9/4/2019 12:46	140.92	4.27	2.33	0.05	Bkg for Cell#10	
11	112.8	88.80	8/29/2019 11:45	9/4/2019 8:35	9/4/2019 12:46	140.83	4.18	2.00	0.07	Bkg for Cell#11	
12	131.7	88.80	8/29/2019 11:45	9/4/2019 8:40	9/4/2019 12:46	140.92	4.10	2.34	0.06	Bkg for Cell#12	
13	124.83	88.80	8/29/2019 11:45	9/4/2019 8:45	9/4/2019 12:46	141.00	4.02	2.21	0.09	Bkg for Cell#13	
14	121.48	88.80	8/29/2019 11:45	9/4/2019 8:50	9/4/2019 14:33	141.08	5.72	2.18	0.08	Bkg for Cell#14	
15	120.68	88.80	8/29/2019 11:45	9/4/2019 8:55	9/4/2019 14:33	141.17	5.63	2.16	0.04	Bkg for Cell#15	
16	104.93	88.80	8/29/2019 11:56	9/4/2019 9:00	9/4/2019 14:33	141.07	5.55	1.88	0.05	Bkg for Cell#16	
17	115.41	88.80	8/29/2019 11:56	9/4/2019 9:05	9/4/2019 14:33	141.15	5.47	2.07	0.06	Bkg for Cell#17	
18	122.9	88.80	8/29/2019 11:56	9/4/2019 9:10	9/4/2019 14:33	141.23	5.38	2.20	0.06	Bkg for Cell#18	
19	165.44	88.80	9/16/2019 8:10	9/27/2019 8:01	9/27/2019 12:33	263.85	4.53	2.23	0.11	Bkg for Cell#19	
20	133.3	88.80	8/29/2019 11:56	9/4/2019 9:20	9/4/2019 14:33	141.40	5.22	2.38	0.03	Bkg for Cell#20	
21	108.21	88.80	8/29/2019 12:03	9/4/2019 9:25	9/4/2019 14:33	141.37	5.13	1.93	0.06	Bkg for Cell#21	
22	120.37	88.80	8/29/2019 12:03	9/4/2019 9:30	9/4/2019 14:33	141.45	5.05	2.15	0.11	Bkg for Cell#22	
23	129.48	88.80	8/29/2019 12:03	9/4/2019 9:35	9/4/2019 14:33	141.53	4.97	2.31	0.08	Bkg for Cell#23	
24	125.2	88.80	8/29/2019 12:03	9/4/2019 9:40	9/4/2019 14:33	141.62	4.88	2.23	0.05	Bkg for Cell#24	
25	126.41	88.80	8/29/2019 12:03	9/4/2019 9:45	9/4/2019 14:33	141.70	4.80	2.25	0.08	Bkg for Cell#25	
26	124.61	88.80	9/4/2019 7:45	9/10/2019 7:44	9/10/2019 12:45	143.98	5.02	2.20	0.04	Bkg for Cell#26	
27	124.47	88.80	9/4/2019 7:50	9/10/2019 7:49	9/10/2019 12:45	143.98	4.93	2.20	0.07	Bkg for Cell#27	
28	103.18	88.80	9/4/2019 7:55	9/10/2019 7:54	9/10/2019 12:45	143.98	4.85	1.82	0.06	Bkg for Cell#28	
29	106.9	88.80	9/4/2019 8:00	9/10/2019 7:59	9/10/2019 12:45	143.98	4.77	1.88	0.04	Bkg for Cell#29	
30	121.25	88.80	9/4/2019 8:05	9/10/2019 8:04	9/10/2019 12:45	143.98	4.68	2.13	0.05	Bkg for Cell#30	
31	126.45	88.80	9/4/2019 8:10	9/10/2019 8:09	9/10/2019 12:45	143.98	4.60	2.22	0.06	Bkg for Cell#31	
32	126.25	88.80	9/4/2019 8:15	9/10/2019 8:14	9/10/2019 12:45	143.98	4.52	2.22	0.07	Bkg for Cell#32	
33	124.59	88.80	9/4/2019 8:20	9/10/2019 8:19	9/10/2019 12:45	143.98	4.43	2.19	0.08	Bkg for Cell#33	
34	115.9	88.80	9/4/2019 8:25	9/10/2019 8:24	9/10/2019 12:45	143.98	4.35	2.03	0.01	Bkg for Cell#34	
35	116.04	88.80	9/4/2019 8:30	9/10/2019 8:29	9/10/2019 12:45	143.98	4.27	2.04	0.05	Bkg for Cell#35	
36	116.22	88.80	9/4/2019 8:35	9/10/2019 8:34	9/10/2019 12:45	143.98	4.18	2.04	0.05	Bkg for Cell#36	
37	126.74	88.80	9/4/2019 8:40	9/10/2019 8:39	9/10/2019 12:45	143.98	4.10	2.22	0.05	Bkg for Cell#37	
38	129.47	88.80	9/4/2019 8:45	9/10/2019 8:44	9/10/2019 12:45	143.98	4.02	2.27	0.04	Bkg for Cell#38	
39	133.03	88.80	9/4/2019 8:50	9/10/2019 8:49	9/10/2019 14:30	143.98	5.68	2.36	0.04	Bkg for Cell#39	
40	118.17	88.80	9/4/2019 8:55	9/10/2019 8:54	9/10/2019 14:30	143.98	5.60	2.09	0.05	Bkg for Cell#40	
41	121.5	88.80	9/4/2019 9:00	9/10/2019 8:59	9/10/2019 14:30	143.98	5.52	2.15	0.05	Bkg for Cell#41	
42	122.3	88.80	9/4/2019 9:05	9/10/2019 9:04	9/10/2019 14:30	143.98	5.43	2.16	0.19	Bkg for Cell#42	
43	120.75	88.80	9/4/2019 9:10	9/10/2019 9:09	9/10/2019 14:30	143.98	5.35	2.14	0.04	Bkg for Cell#43	
44	161.85	88.80	8/29/2019 12:09	9/10/2019 9:14	9/10/2019 14:30	285.08	5.27	2.15	0.05	Bkg for Cell#44	
45	127.67	88.80	9/4/2019 9:20	9/10/2019 9:19	9/10/2019 14:30	143.98	5.18	2.26	0.05	Bkg for Cell#45	
46	119.25	88.80	9/4/2019 9:25	9/10/2019 9:24	9/10/2019 14:30	143.98	5.10	2.11	0.06	Bkg for Cell#46	
47	117.47	88.80	9/4/2019 9:30	9/10/2019 9:29	9/10/2019 14:30	143.98	5.02	2.07	0.06	Bkg for Cell#47	
48	121.02	88.80	9/4/2019 9:35	9/10/2019 9:34	9/10/2019 14:30	143.98	4.93	2.13	0.14	Bkg for Cell#48	
49	117.59	88.80	9/4/2019 9:40	9/10/2019 9:39	9/10/2019 14:30	143.98	4.85	2.07	0.10	Bkg for Cell#49	
50	133.68	88.80	9/4/2019 9:45	9/10/2019 9:44	9/10/2019 14:30	143.98	4.77	2.35	0.12	Bkg for Cell#50	
51	123.22	88.80	9/10/2019 7:44	9/16/2019 8:00	9/16/2019 13:01	144.27	5.02	2.17	0.04	Bkg for Cell#51	
52	130.7	88.80	9/10/2019 7:49	9/16/2019 8:05	9/16/2019 13:01	144.27	4.93	2.30	0.04	Bkg for Cell#52	
53	131.17	88.80	9/10/2019 7:54	9/16/2019 8:10	9/16/2019 13:01	144.27	4.85	2.31	0.03	Bkg for Cell#53	
54	133.89	88.80	9/10/2019 7:59	9/16/2019 8:15	9/16/2019 13:01	144.27	4.77	2.36	0.06	Bkg for Cell#54	
55	120.38	88.80	9/10/2019 8:04	9/16/2019 8:20	9/16/2019 13:01	144.27	4.68	2.12	0.07	Bkg for Cell#55	
56	110.28	88.80	9/10/2019 8:09	9/16/2019 8:25	9/16/2019 13:01	144.27	4.60	1.94	0.05	Bkg for Cell#56	
57	127.43	88.80	9/10/2019 8:14	9/16/2019 8:30	9/16/2019 13:01	144.27	4.52	2.24	0.07	Bkg for Cell#57	
58	119.94	88.80	9/10/2019 8:19	9/16/2019 8:35	9/16/2019 13:01	144.27	4.43	2.10	0.09	Bkg for Cell#58	
59	123.07	88.80	9/16/2019 8:15	9/27/2019 8:06	9/27/2019 12:33	263.85	4.45	1.66	0.05	Bkg for Cell#59	
60	133.53	88.80	9/10/2019 8:29	9/16/2019 8:45	9/16/2019 13:01	144.27	4.27	2.34	0.06	Bkg for Cell#60	
61	123.53	88.80	9/10/2019 8:34	9/16/2019 8:50	9/16/2019 13:01	144.27	4.18	2.16	0.07	Bkg for Cell#61	
62	136.02	88.80	9/10/2019 8:39	9/16/2019 8:55	9/16/2019 13:01	144.27	4.10	2.38	0.08	Bkg for Cell#62	
63	126.61	88.80	9/10/2019 8:44	9/16/2019 9:00	9/16/2019 13:01	144.27	4.02	2.21	0.03	Bkg for Cell#63	
64	131.52	88.80	9/10/2019 8:49	9/16/2019 9:05	9/16/2019 14:48	144.27	5.72	2.33	0.05	Bkg for Cell#64	
65	138.29	88.80	9/10/2019 13:58	9/16/2019 9:10	9/16/2019 14:48	139.20	5.63	2.50	0.02	Bkg for Cell#65	
66	131.65	88.80	9/10/2019 8:59	9/16/2019 9:15	9/16/2019 14:48	144.27	5.55	2.33	0.08	Bkg for Cell#66	
67	125.15	88.80	9/10/2019 9:04	9/16/2019 9:20	9/16/2019 14:48	144.27	5.47	2.21	0.08	Bkg for Cell#67	
68	128.05	88.80	9/10/2019 9:09	9/16/2019 9:25	9/16/2019 14:48	144.27	5.38	2.26	0.13	Bkg for Cell#68	
69	117.75	88.80	9/10/2019 9:14	9/16/2019 9:30	9/16/2019 14:48	144.27	5.30	2.08	0.09	Bkg for Cell#69	
70	137.74	88.80	9/10/2019 9:19	9/16/2019 9:35	9/16/2019 14:48	144.27	5.22	2.43	0.14	Bkg for Cell#70	
71	119.94	88.80	9/10/2019 9:24	9/16/2019 9:40	9/16/2019 14:48	144.27	5.13	2.12	0.06	Bkg for Cell#71	
72	121.17	88.80	9/10/2019 9:29	9/16/2019 9:45	9/16/2019 14:48	144.27	5.05	2.14	0.08	Bkg for Cell#72	
73	131.93	88.80	9/10/2019 9:34	9/16/2019 9:50	9/16/2019 14:48	144.27	4.97	2.32	0.08	Bkg for Cell#73	
74	113.84	88.80	9/10/2019 9:39	9/16/2019 9:55	9/16/2019 14:48	144.27	4.88	2.00	0.06	Bkg for Cell#74	
75	127.39	88.80	9/10/2019 9:44	9/16/2019 10:00	9/16/2019 14:48	144.27	4.80	2.24	0.04	Bkg for Cell#75	
76	166.08	88.80	9/16/2019 8:20	9/27/2019 8:11	9/27/2019 12:33	263.85	4.37	2.24	0.03	Bkg for Cell#76	
77	148.81	88.80	9/16/2019 8:25	9/27/2019 8:16	9/27/2019 12:33	263.85	4.28	2.00	0.03	Bkg for Cell#77	
78	138.71	88.80	9/16/2019 8:30	9/27/2019 8:21	9/27/2019 12:33	263.85	4.20	1.87	0.04	Bkg for Cell#78	

ACZ Laboratories, Inc.
Radiochemistry Data Review Checklist

Data Reviewer: JLG
Date: 12/19/19

Approved: TSR
Date: 12/20/19

Work Group: 487795
Sample Type: SO
Analysis Date: 12/19/19
Analyst: JLG
Prep Date: 12/10/19

Weekly background file: 12/18/19
Daily background file: N/A

Alpha performance file: 12/19/19
Beta performance file: N/A

GAB dry date/time: N/A

	Yes	No	NA
1) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		
2) **FOR SREV**: For 903.1 WG's only, was the ICP Barium recovery raw data merged with the WG in LIMS?	✓		
3) Does the workgroup include all required QC samples?	✓		
4) Are all QC criteria listed in LIMS within specified limits? TSR 12/20/19	✓	✓	
5) Does all QC have the correct nomenclature (PBS vs PBW, etc.)?	✓		
6) For GABs: Beta LCS/MS deleted from Alpha & Alpha LCS/MS deleted from Beta?			✓
7) Are all PCNs / SCNs used for LIMS calculations entered correctly?	✓		
8) Have all transcriptions been reviewed for accuracy (e.g. volumes, BG's, sx counts, etc.)?	✓		
9) Are samples flagged for INSX, if applicable?			✓
10) Is any sample analyzed using less volume appropriately "D" qualified?			✓
11) Are all calculations based on the correct matrix?	✓		
12) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
13 Is a current standard/reagent sheet attached to the workgroup?	✓		
14) Are all associated WG benchsheets locked for editing?	✓		
15) For GAB WG's containing DW samples, did at least 72 hours elapse between end of drying and start of counting?			✓
16) Are all tracer or carrier recoveries within acceptable limits?	✓		
17) For Lead-210 WG's, are the counts off the instrument in gross counts?			✓
18) Is the correct instrument ID on the WG benchsheet, and does it correspond with the template and raw data?	✓		

QC limits *

Analyte	PBW	LCS & MS
gross alpha	2*LLD	67-144
gross beta	2*LLD	82-122
Ra-226 (903.1)	2*LLD	43-148
Alpha emitting Ra isotopes	2*LLD	66-132
Ra-228	2*LLD	47-123
Pb-210	2*LLD	55-121
Th	2*LLD	91-126
U-234	2*LLD	77-122
U-235	2*LLD	42-136
U-238	2*LLD	87-124
Po-210	2*LLD	51-128
GAMMA	2*LLD	90-110
Rn-222	2*LLD	90-110

Tracer/Carrier QC Limits

Tracer/Carrier	%Rec
Ra-228 (Ba & Y)	40-130
Alpha emitting Ra isotopes (Ba)	40-130
Ra-226 903.1 (Ba)	40-130
U-232	30-130
Po-209	25-130
Pb-210	30-130
Th-229	30-130

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
L56147-01DUP	RPD out. Duplicated SX & SX LCS RER used for assessment	BG

Comments:

LCS/MS limits are based on 1 sigma control chart data for LCSW LCSS.

ACZ LABORATORIES, INC. WG487795
Radium 226 by 903.1
FRMRC030.09.18.20
RA226-LUCASCELL-LIQUID

Project:

SOP# 1498

Instrument: LucasCell
Matrix Class: LIQUID
List Type: QC-RA-226-903.1
List Function: ANALYTICAL

Analyst: JLG
Dept: 55
Prep Date: 12/10/2019
Analysis Date:
Start Time:
End Time:
Approved:
Approved:

ACZ Sample Number	Sample ID	Client ID	Sample Matrix	CPM-bkg cpm	Ba Recovery factor	E	Radium 226 Activity pCi/L	Radium 226 Error (+/-)	Radium 226 LLD pCi/L
1	WG487795PBW		SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
2	WG487795LCSW	PCN57864	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
3	L56147-01	STSB27_0.5-3	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
4	L56147-01DUP		SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
5	L56147-02	STSB27_6-15	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
6	L56147-03	STSB28_0.5-3	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
7	L56147-04	STSB28_6-15	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
8	L56147-05	STSB29_0.5-3	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
9	L56147-05MS	PCN57864	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A

Rn222 Decay constant= 0.00755

Bubbler ID	ACZ Sample Number	Volume ml	Rn Ingrow (mm/dd/yyyy hh:mm)	Rn Decay (mm/dd/yyyy hh:mm)	Rn Count (mm/dd/yyyy hh:mm)	Ingrow Time	Decay Time	Cell#	Counts	ICP RESULT
			12/11/19	12/19/19	12/19/19					
cdho	WG487795PBW	300	1249	821	1302	0.00	0.00	1	72	
—	WG487795LCSW			826		0.00	0.00	2	4536	
A	L56147-01			831		0.00	0.00	3	137	
Sr	L56147-01DUP			836		0.00	0.00	4	112	
Cm	L56147-02			841		0.00	0.00	5	206	
bchr	L56147-03		1255	846		0.00	0.00	6	150	
Y	L56147-04			851		0.00	0.00	7	186	
Stand	L56147-05			856		0.00	0.00	8	168	
turkey	L56147-05MS			901		0.00	0.00	9	7596	
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			

Lucas Cell calibration standards and ludlum counter standards

Lucas cells are calibrated with 1 mL of Ra226 PCN52427 at 40pCi/mL.

The performance of the Lucas cell is checked with ZnS paper and

Th230 PCN# 22288

ACZ LABORATORIES, INC.
Standards/Reagents Information
Radium 226 903.1
Water

WG487795.xlsx

ANALYST:
Second analyst:
DATE TIME of prep start:

PROJECT/WG:
Method 903.1

INSTR: LUDLUM

Approved:

Radioactive Standards

LCS & MS 57864

Reagents

Barium Carrier RC191102-2

Nitric Acid, conc. 59928

EDTA RC191210-1

Sulfuric Acid, conc. 59932

Hydrochloric Acid, conc. 60353

Sulfuric Acid 0.1N 59566

Ascarite 59343

Antifoam Emulsion N/A

Magnesium perchlorate 59342

Centrifuge Tubes Lot# J4AF318118

Sodium hydroxide 10N N/A

COMMENTS:

ACZ Sample Number	Bottle ID
WG487795PBW	
WG487795LCSW	
L56147-01	
L56147-01DUP	
L56147-02	
L56147-03	
L56147-04	
L56147-05	
L56147-05MS	
0	
0	
0	
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0	
0	

Meteoric Water Mobility

WG487361

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/03/2019 1:50
End Date/Time: 12/05/2019 13:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487361CSTD1	NONE															
2	WG487361CSTD2	NONE															
3	WG487361CSTD3	NONE															
4	WG487361ICV	PCN58503	As Rec		12/03/19 1:50		4.01		4.01	4.01							20.7
5	WG487361PBS	NONE	As Rec		12/03/19 5:46	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
6	L56147-01	STSB27_0.5-3	As Rec		12/03/19 9:43	0	5.19	23	7.70	7.78	5000	5005.7	13.12	12/03/19 9:45	12/04/19 14:15	28.5	20.8
7	L56147-02	STSB27_6-15	As Rec		12/03/19 13:40	0	5.19	23	7.59	7.66	5000	5001.4	20.4	12/03/19 9:45	12/04/19 14:20	28.5833333332557	20.7
8	L56147-03	STSB28_0.5-3	As Rec		12/03/19 17:36	0	5.19	23	4.63	4.58	5000	5002.4	8.77	12/03/19 9:45	12/04/19 12:40	26.9166666667443	20.9
9	L56147-04	STSB28_6-15	As Rec		12/03/19 21:33	0	5.19	23	6.91	6.93	5000	5005.8	26.92	12/03/19 9:45	12/04/19 14:35	28.8333333333721	20.8
10	L56147-05	STSB29_0.5-3	As Rec		12/04/19 1:30	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
11	L56147-05MS1	MS191119-5	As Rec		12/04/19 5:26	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
12	L56147-05MSD1	MS191119-5	As Rec		12/04/19 9:23	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
13	L56147-05MS2	II191127-2	As Rec		12/04/19 13:20	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
14	L56147-05MSD2	II191127-2	As Rec		12/04/19 17:16	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/03/19 9:45	12/04/19 13:30	27.75	20.2
15	WG487361CCV1	PCN58503	As Rec		12/04/19 21:13		4.04		4.03	4.03							20.5
16	L56147-05DUP	NONE	As Rec		12/05/19 1:10	0	5.19	23	4.32	4.31	5000	5001.6	12.17	12/03/19 9:45	12/04/19 13:45	27.9999999999418	20.8
17	WG487361LFB1	II191127-2	As Rec		12/05/19 5:06	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
18	WG487361LFB2	MS191119-5	As Rec		12/05/19 9:03	0	5.19	23	5.93	6.06	0	5001.5	0	12/03/19 9:45	12/04/19 10:20	24.5833333333139	20.7
19	WG487361CCV2	PCN58503	As Rec		12/05/19 13:00		4.02		4.01	4.01							20.5

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/19/2019 4:13:33 PM 121719

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487361

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/03/2019 1:50
End Date/Time: 12/05/2019 13:00

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MS2	ICP Spike
L56147-05MSD1	ICPMS Spike
L56147-05MSD2	ICP Spike
WG487361CCV1	pH QC
WG487361CSTD1	pH QC
WG487361CSTD2	pH QC
WG487361CSTD3	pH QC
WG487361ICV	pH QC
WG487361LFB1	ICP LFB
WG487361LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/19/2019 4:13:33 PM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487795

Date Reported: 20-Dec-19
Run ID: R1765295
Date Analyzed: 19-Dec-19
ICAL Workgroup:
Instrument ID: LUCASCELL

WG487361PBW

Tag: Measured: 12/19/2019

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	FOUND	0.24 ✓	1		pCi/L	++	0.67 ✓	0.28			

WG487361LCSW

Tag: Measured: 12/19/2019 12:01:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	FOUND	71	1		pCi/L	++	0.44	2.1	PCN57864		
SREV	RADIUM 226	REC	107	1		%	++	0.44	2.1	PCN57864		
SREV	RADIUM 226	TRUE	6666666667	1		pCi/L	++	0.44	2.1	PCN57864		

L56147-01

Tag: Measured: 12/19/2019 12:02:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	1.3	1		pCi/L	++	0.4	0.32		RG TB	

L56147-01DUP

Tag: Measured: 12/19/2019 12:04:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	FOUND	0.73 ✓	1		pCi/L	++	0.5	0.3			
SREV	RADIUM 226	RER	1.3	1		%	++	0.4	5			
SREV	RADIUM 226	RPD	56	1		pCi/L	ALRT	0.5	0.3		RG	

batch qualified

RER = 2.6

L56147-02

Tag: Measured: 12/19/2019 12:05:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	1.3	1		pCi/L	++	0.24	0.33		RG TB	

L56147-03

Tag: Measured: 12/19/2019 12:07:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	0.87	1		pCi/L	++	0.55	0.37		RG TB	

L56147-04

Tag: Measured: 12/19/2019 12:08:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	0.96	1		pCi/L	++	0.43	0.33		RG TB	

L56147-05

Tag: Measured: 12/19/2019 12:10:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	1.3	1		pCi/L	++	0.23	0.36		RG TB	

L56147-05MS Tag: Measured: 12/19/2019 12:11:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	FOUND	84	1		pCi/L	++	0.29	1.9	PCN57864		
SREV	RADIUM 226	REC	124	1		%	++	0.29	1.9	PCN57864		
SREV	RADIUM 226	TRUE	6666666667	1		pCi/L	++	0.29	1.9	PCN57864		

12/17/19 Perf DJR

1) 1212 2) 1211 3) 1142 4) 1167 5) 1190 6) 1191 7) 1202 8) 1235 9) 1156
10) 1220 11) 1215 12) 1182 13) 1105

12/18/19 Perf JL

1) 1149 2) 1161 3) 1154 4) 1157 5) 1190 6) 1142 7) 1134 8) 1228 9) 1161
10) 1152 11) 1229 12) 1209 13) 1077

1 73	2 89	3 34	4 51	5 81	6 80	7 91	8 60	9 59	10 37	11 44	12 30	13 31
14 41	15 51	16 29	17 38	18 63	19 68	20 18	21 38	22 69	23 33	24 29	25 65	26
27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49	50	51	52
53 33	54 34	55 54	56 55	57 33	58 51	59 69	60 79	61 51	62 50	63 27	64 29	65 17
66 35	67 44	68 28	69 39	70 39	71 28	72 47	73 65	74 62	75 30	76 13	77 13	78 16

12/19/19 Perf JL

1) 1164 ✓ 2) 1099 ✓ 3) 1111 ✓ 4) 1158 ✓ 5) 1183 ✓ 6) 1200 ✓ 7) 1196 ✓ 8) 1269 ✓
9) 1151 ✓ 10) 1206 ✓ 11) 1211 ✓ 12) 1162 ✓ 13) 1143 ✓

12/22/19 Perf JL

1) 1144 2) 1108 3) 1156 4) 1119 5) 1169 6) 1212 7) 1120 8) 1195 9) 1101
10) 1257 11) 1139 12) 1162 13) 1132

1 46	2 98	3 38	4 66	5 72	6 95	7 75	8 68	9 47	10 27	11 36	12 23	13 27
14 39	15 50	16 22	17 28	18 53	19 55	20	21	22	23	24	25	26
27 33	28 40	29 30	30 37	31 63	32 32	33 79	34 15	35 50	36 18	37 47	38 48	39 30
40	41 29	42 30	43 14	44 35	45 36	46 15	47 22	48 18	49 30	50 47	51 17	52
53	54	55	56	57	58	59	60	61	62	63	64	65
66	67	68	69	70	71	72	73	74	75	76	77	78

12/26/19 Perf JL

1) 1191 2) 1167 3) 1109 4) 1135 5) 1204 6) 1190 7) 1187 8) 1144 9) 1133
10) 1146 11) 1167 12) 1220 13) 1082

12/27/19 Perf JL

1) 1210 2) 1122 3) 1190 4) 1152 5) 1142 6) 1223 7) 1139 8) 1214 9) 1201
10) 1141 11) 1176 12) 1145 13) 1151

Continued on Page

Read and Understood By

Signed Date Signed Date

ACZ Laboratories, Inc.

Steamboat Springs, CO 80487

Detector 1	Detector 2	Detector 3
1074 - 1288	1092 - 1232	1064 - 1185
Detector 4	Detector 5	Detector 6
1086 - 1200	1140 - 1239	1141 - 1223
Detector 7	Detector 8	Detector 9
1119 - 1234	1121 - 1295	1100 - 1206
Detector 10	Detector 11	Detector 12
1138 - 1258	1105 - 1237	1112 - 1224
Detector 13		
1049 - 1180		

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Radiochemistry

WG487795 **Ra226**

Sample	Date	SCN	RADIUM 226
WG487361PBW	12/19/19 00:00		X
WG487361LCSW	12/19/19 00:01		X
L56147-01	12/19/19 00:02		X
L56147-01DUP	12/19/19 00:04		X
L56147-02	12/19/19 00:05		X
L56147-03	12/19/19 00:07		X
L56147-04	12/19/19 00:08		X
L56147-05	12/19/19 00:10		X
L56147-05MS	12/19/19 00:11		X

Element, Wavelength and Order	Date of Fit	Date of Cal.	Type of Fit	Weighting	A0	A1	A2	n (Exponent)
Ag 328.068 {103}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	-0.000548	0.036750	0.000000	1.000000
Al 396.152 { 85}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000203	0.023623	0.000000	1.000000
As 189.042 {478}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	-0.000011	0.001163	0.000000	1.000000
B 208.959 {461}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	-0.000006	0.006872	0.000000	1.000000
Ba 455.403 { 74}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.008854	2.006905	0.000000	1.000000
Be 313.042 {108}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000819	1.623002	0.000000	1.000000
Bi 223.061 {451}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000117	0.001488	0.000000	1.000000
Ca 315.887 {107}	12/11/2019 19:07:26	12/11/2019 19:07:26	Linear	None	-0.006537	0.019186	0.000000	1.000000
Cd 214.438 {457}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	-0.000065	0.047416	0.000000	1.000000
Cd 226.502 {449}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000094	0.038271	0.000000	1.000000
Co 228.616 {447}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000051	0.012162	0.000000	1.000000
Cr 205.560 {464}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000007	0.014667	0.000000	1.000000
Cr 267.716 {126}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000337	0.029017	0.000000	1.000000
Cu 324.754 {104}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000693	0.044176	0.000000	1.000000
Fe 240.488 {140}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000293	0.009866	0.000000	1.000000
Fe 259.940 {130}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000682	0.028748	0.000000	1.000000
Ga 294.364 {114}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000096	0.002281	0.000000	1.000000
K 766.490 { 44}	12/11/2019 19:07:26	12/11/2019 19:07:26	Linear	None	0.000955	0.010720	0.000000	1.000000
Li 670.784 { 50}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	-0.003263	0.349376	0.000000	1.000000
Mg 279.079 {121}	12/11/2019 19:07:26	12/11/2019 19:07:26	Linear	None	0.001064	0.003869	0.000000	1.000000
Mn 257.610 {131}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.001227	0.146730	0.000000	1.000000
Mo 202.030 {467}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000020	0.008589	0.000000	1.000000
Na 589.592 { 57}	12/11/2019 19:07:26	12/11/2019 19:07:26	Linear	None	0.007320	0.062828	0.000000	1.000000
Ni 231.604 {446}	12/11/2019 19:07:26	12/11/2019 19:07:26	Linear	None	-0.000079	0.009113	0.000000	1.000000
P 214.914 {457}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000027	0.000931	0.000000	1.000000
Pb 220.353 {453}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000047	0.002419	0.000000	1.000000
S 182.034 {485}	12/11/2019 19:07:26	12/11/2019 19:07:26	Linear	None	0.000100	0.001140	0.000000	1.000000
Sb 206.833 {463}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000011	0.001516	0.000000	1.000000
Sc 361.384 { 93}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.002781	0.635762	0.000000	1.000000
Se 196.090 {472}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	-0.000009	0.001094	0.000000	1.000000
Si 251.611 {134}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000073	0.008409	0.000000	1.000000
Si 251.611 {134}2	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000073	0.008409	0.000000	1.000000
Sn 189.989 {477}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	-0.000008	0.002155	0.000000	1.000000
Sr 421.552 { 80}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.005925	1.986808	0.000000	1.000000
Ti 334.941 {101}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000659	0.146095	0.000000	1.000000
Tl 190.856 {477}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000011	0.001302	0.000000	1.000000
V 292.402 {115}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	-0.000042	0.036900	0.000000	1.000000
Y 371.030 { 91}*	12/11/2019 19:07:26	12/11/2019 19:07:26	Linear	None	21097.246	146.13975	0.000000	1.000000
Zn 206.200 {463}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000027	0.014949	0.000000	1.000000
Zn 213.856 {457}	12/11/2019 19:04:12	12/11/2019 19:04:12	Linear	None	0.000068	0.020069	0.000000	1.000000

Element, Wavelength and Order	Correlation	Std Error of Est	Predicted MDL	Predicted MQL	Status	Reslope		QC Norm	
						Slope	Y-int	Slope factor	Offset
Ag 328.068 {103}	0.999983	0.000153	0.007582	0.025273	OK.	1.000000	0.000000	1	0
Al 396.152 { 85}	0.999959	0.001527	0.018371	0.061237	OK.	1.000000	0.000000	1	0
As 189.042 {478}	0.999986	0.000022	0.019935	0.066449	OK.	1.000000	0.000000	1	0
B 208.959 {461}	0.999998	0.000049	0.005032	0.016773	OK.	1.000000	0.000000	1	0
Ba 455.403 { 74}	0.999971	0.021510	0.000383	0.001278	OK.	1.000000	0.000000	1	0
Be 313.042 {108}	0.999988	0.011275	0.000222	0.000740	OK.	1.000000	0.000000	1	0
Bi 223.061 {451}	0.999994	0.000018	0.026231	0.087438	OK.	1.000000	0.000000	1	0
Ca 315.887 {107}	1.000000	0.001085	0.016080	0.053600	OK.	1.000000	0.000000	1	0
Cd 214.438 {457}	0.999998	0.000128	0.000762	0.002540	OK.	1.000000	0.000000	1	0
Cd 226.502 {449}	0.999999	0.000084	0.001091	0.003637	OK.	1.000000	0.000000	1	0
Co 228.616 {447}	1.000000	0.000006	0.003099	0.010329	OK.	1.000000	0.000000	1	0
Cr 205.560 {464}	1.000000	0.000030	0.002752	0.009172	OK.	1.000000	0.000000	1	0
Cr 267.716 {126}	0.999974	0.000734	0.007226	0.024088	OK.	1.000000	0.000000	1	0
Cu 324.754 {104}	0.999968	0.000500	0.007881	0.026271	OK.	1.000000	0.000000	1	0
Fe 240.488 {140}	0.999908	0.000475	0.015961	0.053205	OK.	1.000000	0.000000	1	0
Fe 259.940 {130}	0.999948	0.001035	0.004935	0.016450	OK.	1.000000	0.000000	1	0
Ga 294.364 {114}	0.999909	0.000043	0.076324	0.254413	OK.	1.000000	0.000000	1	0
K 766.490 { 44}	1.000000	0.000474	0.084693	0.282309	OK.	1.000000	0.000000	1	0
Li 670.784 { 50}	0.999962	0.004281	0.002705	0.009016	OK.	1.000000	0.000000	1	0
Mg 279.079 {121}	0.999991	0.000980	0.046545	0.155149	OK.	1.000000	0.000000	1	0
Mn 257.610 {131}	0.999863	0.003437	0.000985	0.003283	OK.	1.000000	0.000000	1	0
Mo 202.030 {467}	0.999998	0.000021	0.003488	0.011628	OK.	1.000000	0.000000	1	0
Na 589.592 { 57}	1.000000	0.000790	0.014285	0.047618	OK.	1.000000	0.000000	1	0
Ni 231.604 {446}	1.000000	0.000000	0.004507	0.015024	OK.	1.000000	0.000000	1	0
P 214.914 {457}	0.999999	0.000005	0.037843	0.126142	OK.	1.000000	0.000000	1	0
Pb 220.353 {453}	0.999961	0.000075	0.016019	0.053398	OK.	1.000000	0.000000	1	0
S 182.034 {485}	0.999998	0.000063	0.025352	0.084506	OK.	1.000000	0.000000	1	0
Sb 206.833 {463}	0.999991	0.000009	0.021279	0.070931	OK.	1.000000	0.000000	1	0
Sc 361.384 { 93}	0.999970	0.006941	0.000618	0.002059	OK.	1.000000	0.000000	1	0
Se 196.090 {472}	0.999955	0.000037	0.025259	0.084195	OK.	1.000000	0.000000	1	0
Si 251.611 {134}	0.999941	0.000326	0.017292	0.057640	OK.	1.000000	0.000000	1	0
Si 251.611 {134}2	0.999941	0.000326	0.017292	0.057640	OK.	1.000000	0.000000	1	0
Sn 189.989 {477}	0.999993	0.000028	0.010462	0.034874	OK.	1.000000	0.000000	1	0
Sr 421.552 { 80}	0.999988	0.014001	0.000296	0.000985	OK.	1.000000	0.000000	1	0
Ti 334.941 {101}	0.999989	0.000494	0.001868	0.006225	OK.	1.000000	0.000000	1	0
Tl 190.856 {477}	0.999977	0.000062	0.024599	0.081996	OK.	1.000000	0.000000	1	0
V 292.402 {115}	0.999937	0.000282	0.005598	0.018661	OK.	1.000000	0.000000	1	0
Y 371.030 { 91}*	0.435454	185.00633	0.059330	0.197766	OK.	1.000000	0.000000	1	0
Zn 206.200 {463}	0.999993	0.000077	0.001869	0.006229	OK.	1.000000	0.000000	1	0
Zn 213.856 {457}	0.999995	0.000086	0.001418	0.004728	OK.	1.000000	0.000000	1	0

CALIBRATION REAGENTS

6010/200.7 Reagent Sheet

1% Calibration Standards			10% Calibration Standards		
CLPSTD1:	**	SCN	CLPTSTD1:	**	SCN
CLPSTD2:	II191120-2	SCN	CLPTSTD2:	II191209-3	SCN
CLPSTD3:	II191209-1	SCN	CLPTSTD3:	II191127-3	SCN

Yttrium (Internal Standard) = PCN59951 EXP: 12/30/2020

**=CALSTD1 is a 2X dilution on CALSTD2 using either 1% or 10% Blank as the dilutent.

Blank Solutions:

Nitric acid:	60299	PCN	Nitric acid:	60299	PCN
Hydrochloric acid:	60374	PCN	Hydrochloric acid:	60176	PCN

VERIFIED BY: JLW 12/12/19

ICPSTD

ACZ LABORATORIES, INC. WG487796
Radium 226 by 903.1
FRMRC030.09.18.20
RA226-LUCASCELL-LIQUID

Project:

SOP# 1498

Instrument: LucasCell
Matrix Class: LIQUID
List Type: QC-RA-226-903.1
List Function: ANALYTICAL

Analyst: JLG
Dept: 55
Prep Date: 12/10/2019
Analysis Date: 12/19/2019
Start Time:
End Time:
Approved: JLG 12/20/19
Approved: JSR 12/23/19

ACZ Sample Number	Sample ID	Client ID	Sample Matrix	CPM-bkg cpm	Ba Recovery factor	E	Radium 226 Activity pCi/L	Radium 226 Error (+/-)	Radium 226 LLD pCi/L
1	WG487250PBW		SO	0.48	0.66	2.33	0.65	0.30	0.345
2	WG487250LCSW	PCN57864	SO	37.71	0.64	2.00	61.92	2.00	0.566
3	L56147-06	STSB29_6-15	SO	1.02	0.90	2.34	1.01	0.25	0.256
4	L56147-07	STSB29-FD_6-1	SO	0.96	0.92	2.21	0.99	0.25	0.432
5	L56147-08	STSB30_0.5-3	SO	1.03	0.98	2.18	1.01	0.26	0.377
6	L56147-08DUP		SO	1.28	0.94	2.16	1.32	0.31	0.200
7	L56147-09	STSB30_6-15	SO	1.16	0.93	1.88	1.38	0.31	0.270
8	L56147-09MS	PCN57864	SO	53.58	0.87	2.07	62.25	1.68	0.331
9	L56147-10	STSB31_0.5-3	SO	0.63	0.93	2.20	0.64	0.27	0.266
10	L56147-11	STSB31_6-15	SO	6.6	0.89	2.23	6.89	0.58	0.518
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A

Rn222 Decay constant= 0.00755

487796

Bubbler ID	ACZ Sample Number	Volume ml	Rn Ingrow (mm/dd/yyyy hh:mm)	Rn Decay (mm/dd/yyyy hh:mm)	Rn Count (mm/dd/yyyy hh:mm)	Ingrow Time	Decay Time	Cell#	Counts	ICP RESULT
	WG487250PBW	300	12/11/2019 13:02	12/19/2019 9:06	12/19/2019 15:47	188.07	6.68	10	85	1.056
	WG487250LCSW	300	12/11/2019 13:02	12/19/2019 9:11	12/19/2019 15:47	188.15	6.60	11	3815	1.019
	L56147-06	300	12/11/2019 13:02	12/19/2019 9:16	12/19/2019 15:47	188.23	6.52	12	132	1.444
	L56147-07	300	12/11/2019 13:02	12/19/2019 9:21	12/19/2019 15:47	188.32	6.43	13	127	1.465
	L56147-08	300	12/11/2019 13:02	12/19/2019 9:26	12/19/2019 15:47	188.40	6.35	14	144	1.569
	L56147-08DUP	300	12/11/2019 13:08	12/19/2019 9:31	12/19/2019 15:47	188.38	6.27	15	179	1.498
	L56147-09	300	12/11/2019 13:08	12/19/2019 9:36	12/19/2019 15:47	188.47	6.18	16	144	1.495
	L56147-09MS	300	12/11/2019 13:08	12/19/2019 9:41	12/19/2019 15:47	188.55	6.10	17	5396	1.389
	L56147-10	300	12/11/2019 13:08	12/19/2019 9:46	12/19/2019 15:47	188.63	6.02	18	126	1.491
	L56147-11	300	12/11/2019 13:08	12/19/2019 9:51	12/19/2019 15:47	188.72	5.93	19	728	1.428
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			

Lucas Cell calibration standards and ludlum counter standards

Lucas cells are calibrated with 1 mL of Ra226 PCN52427 at 40pCi/mL.

The performance of the Lucas cell is checked with ZnS paper and

Th230 PCN# 22288

Cell#	Net CPM	DPM Ra226	Rn Ingrowth	Rn Decay	Count time	Ingrowth time	Decay Time	E=(cpm/dpm)	STDEV	Background taken	
1	170.85	88.80	9/16/2019 8:05	9/27/2019 7:56	9/27/2019 12:33	263.85	4.62	2.31	0.11	Bkg for Cell#1	
2	117.03	88.80	8/29/2019 11:27	9/4/2019 7:50	9/4/2019 12:46	140.38	4.93	2.09	0.06	Bkg for Cell#2	
3	107.23	88.80	8/29/2019 11:27	9/4/2019 7:55	9/4/2019 12:46	140.47	4.85	1.92	0.07	Bkg for Cell#3	
4	113.8	88.80	8/29/2019 11:27	9/4/2019 8:00	9/4/2019 12:46	140.55	4.77	2.03	0.09	Bkg for Cell#4	
5	125.23	88.80	8/29/2019 11:27	9/4/2019 8:05	9/4/2019 12:46	140.63	4.68	2.23	0.05	Bkg for Cell#5	
6	101.12	88.80	8/29/2019 11:35	9/4/2019 8:10	9/4/2019 12:46	140.58	4.60	1.80	0.09	Bkg for Cell#6	
7	127.92	88.80	8/29/2019 11:35	9/4/2019 8:15	9/4/2019 12:46	140.67	4.52	2.28	0.09	Bkg for Cell#7	
8	107.56	88.80	8/29/2019 11:35	9/4/2019 8:20	9/4/2019 12:46	140.75	4.43	1.91	0.04	Bkg for Cell#8	
9	110.9	88.80	8/29/2019 11:35	9/4/2019 8:25	9/4/2019 12:46	140.83	4.35	1.97	0.06	Bkg for Cell#9	
10	131.09	88.80	8/29/2019 11:35	9/4/2019 8:30	9/4/2019 12:46	140.92	4.27	2.33	0.05	Bkg for Cell#10	0.37
11	112.8	88.80	8/29/2019 11:45	9/4/2019 8:35	9/4/2019 12:46	140.83	4.18	2.00	0.07	Bkg for Cell#11	0.44
12	131.7	88.80	8/29/2019 11:45	9/4/2019 8:40	9/4/2019 12:46	140.92	4.10	2.34	0.06	Bkg for Cell#12	0.30
13	124.83	88.80	8/29/2019 11:45	9/4/2019 8:45	9/4/2019 12:46	141.00	4.02	2.21	0.09	Bkg for Cell#13	0.31
14	121.48	88.80	8/29/2019 11:45	9/4/2019 8:50	9/4/2019 14:33	141.08	5.72	2.18	0.08	Bkg for Cell#14	0.41
15	120.68	88.80	8/29/2019 11:45	9/4/2019 8:55	9/4/2019 14:33	141.17	5.63	2.16	0.04	Bkg for Cell#15	0.51
16	104.93	88.80	8/29/2019 11:56	9/4/2019 9:00	9/4/2019 14:33	141.07	5.55	1.88	0.05	Bkg for Cell#16	0.28
17	115.41	88.80	8/29/2019 11:56	9/4/2019 9:05	9/4/2019 14:33	141.15	5.47	2.07	0.06	Bkg for Cell#17	0.38
18	122.9	88.80	8/29/2019 11:56	9/4/2019 9:10	9/4/2019 14:33	141.23	5.38	2.20	0.06	Bkg for Cell#18	0.63
19	165.44	88.80	9/16/2019 8:10	9/27/2019 8:01	9/27/2019 12:33	263.85	4.53	2.23	0.11	Bkg for Cell#19	0.68
20	133.3	88.80	8/29/2019 11:56	9/4/2019 9:20	9/4/2019 14:33	141.40	5.22	2.38	0.03	Bkg for Cell#20	
21	108.21	88.80	8/29/2019 12:03	9/4/2019 9:25	9/4/2019 14:33	141.37	5.13	1.93	0.06	Bkg for Cell#21	
22	120.37	88.80	8/29/2019 12:03	9/4/2019 9:30	9/4/2019 14:33	141.45	5.05	2.15	0.11	Bkg for Cell#22	
23	129.48	88.80	8/29/2019 12:03	9/4/2019 9:35	9/4/2019 14:33	141.53	4.97	2.31	0.08	Bkg for Cell#23	
24	125.2	88.80	8/29/2019 12:03	9/4/2019 9:40	9/4/2019 14:33	141.62	4.88	2.23	0.05	Bkg for Cell#24	
25	126.41	88.80	8/29/2019 12:03	9/4/2019 9:45	9/4/2019 14:33	141.70	4.80	2.25	0.08	Bkg for Cell#25	
26	124.61	88.80	9/4/2019 7:45	9/10/2019 7:44	9/10/2019 12:45	143.98	5.02	2.20	0.04	Bkg for Cell#26	
27	124.47	88.80	9/4/2019 7:50	9/10/2019 7:49	9/10/2019 12:45	143.98	4.93	2.20	0.07	Bkg for Cell#27	
28	103.18	88.80	9/4/2019 7:55	9/10/2019 7:54	9/10/2019 12:45	143.98	4.85	1.82	0.06	Bkg for Cell#28	
29	106.9	88.80	9/4/2019 8:00	9/10/2019 7:59	9/10/2019 12:45	143.98	4.77	1.88	0.04	Bkg for Cell#29	
30	121.25	88.80	9/4/2019 8:05	9/10/2019 8:04	9/10/2019 12:45	143.98	4.68	2.13	0.05	Bkg for Cell#30	
31	126.45	88.80	9/4/2019 8:10	9/10/2019 8:09	9/10/2019 12:45	143.98	4.60	2.22	0.06	Bkg for Cell#31	
32	126.25	88.80	9/4/2019 8:15	9/10/2019 8:14	9/10/2019 12:45	143.98	4.52	2.22	0.07	Bkg for Cell#32	
33	124.59	88.80	9/4/2019 8:20	9/10/2019 8:19	9/10/2019 12:45	143.98	4.43	2.19	0.08	Bkg for Cell#33	
34	115.9	88.80	9/4/2019 8:25	9/10/2019 8:24	9/10/2019 12:45	143.98	4.35	2.03	0.01	Bkg for Cell#34	
35	116.04	88.80	9/4/2019 8:30	9/10/2019 8:29	9/10/2019 12:45	143.98	4.27	2.04	0.05	Bkg for Cell#35	
36	116.22	88.80	9/4/2019 8:35	9/10/2019 8:34	9/10/2019 12:45	143.98	4.18	2.04	0.05	Bkg for Cell#36	
37	126.74	88.80	9/4/2019 8:40	9/10/2019 8:39	9/10/2019 12:45	143.98	4.10	2.22	0.05	Bkg for Cell#37	
38	129.47	88.80	9/4/2019 8:45	9/10/2019 8:44	9/10/2019 12:45	143.98	4.02	2.27	0.04	Bkg for Cell#38	
39	133.03	88.80	9/4/2019 8:50	9/10/2019 8:49	9/10/2019 14:30	143.98	5.68	2.36	0.04	Bkg for Cell#39	
40	118.17	88.80	9/4/2019 8:55	9/10/2019 8:54	9/10/2019 14:30	143.98	5.60	2.09	0.05	Bkg for Cell#40	
41	121.5	88.80	9/4/2019 9:00	9/10/2019 8:59	9/10/2019 14:30	143.98	5.52	2.15	0.05	Bkg for Cell#41	
42	122.3	88.80	9/4/2019 9:05	9/10/2019 9:04	9/10/2019 14:30	143.98	5.43	2.16	0.19	Bkg for Cell#42	
43	120.75	88.80	9/4/2019 9:10	9/10/2019 9:09	9/10/2019 14:30	143.98	5.35	2.14	0.04	Bkg for Cell#43	
44	161.85	88.80	8/29/2019 12:09	9/10/2019 9:14	9/10/2019 14:30	285.08	5.27	2.15	0.05	Bkg for Cell#44	
45	127.67	88.80	9/4/2019 9:20	9/10/2019 9:19	9/10/2019 14:30	143.98	5.18	2.26	0.05	Bkg for Cell#45	
46	119.25	88.80	9/4/2019 9:25	9/10/2019 9:24	9/10/2019 14:30	143.98	5.10	2.11	0.06	Bkg for Cell#46	
47	117.47	88.80	9/4/2019 9:30	9/10/2019 9:29	9/10/2019 14:30	143.98	5.02	2.07	0.06	Bkg for Cell#47	
48	121.02	88.80	9/4/2019 9:35	9/10/2019 9:34	9/10/2019 14:30	143.98	4.93	2.13	0.14	Bkg for Cell#48	
49	117.59	88.80	9/4/2019 9:40	9/10/2019 9:39	9/10/2019 14:30	143.98	4.85	2.07	0.10	Bkg for Cell#49	
50	133.68	88.80	9/4/2019 9:45	9/10/2019 9:44	9/10/2019 14:30	143.98	4.77	2.35	0.12	Bkg for Cell#50	
51	123.22	88.80	9/10/2019 7:44	9/16/2019 8:00	9/16/2019 13:01	144.27	5.02	2.17	0.04	Bkg for Cell#51	
52	130.7	88.80	9/10/2019 7:49	9/16/2019 8:05	9/16/2019 13:01	144.27	4.93	2.30	0.04	Bkg for Cell#52	
53	131.17	88.80	9/10/2019 7:54	9/16/2019 8:10	9/16/2019 13:01	144.27	4.85	2.31	0.03	Bkg for Cell#53	
54	133.89	88.80	9/10/2019 7:59	9/16/2019 8:15	9/16/2019 13:01	144.27	4.77	2.36	0.06	Bkg for Cell#54	
55	120.38	88.80	9/10/2019 8:04	9/16/2019 8:20	9/16/2019 13:01	144.27	4.68	2.12	0.07	Bkg for Cell#55	
56	110.28	88.80	9/10/2019 8:09	9/16/2019 8:25	9/16/2019 13:01	144.27	4.60	1.94	0.05	Bkg for Cell#56	
57	127.43	88.80	9/10/2019 8:14	9/16/2019 8:30	9/16/2019 13:01	144.27	4.52	2.24	0.07	Bkg for Cell#57	
58	119.94	88.80	9/10/2019 8:19	9/16/2019 8:35	9/16/2019 13:01	144.27	4.43	2.10	0.09	Bkg for Cell#58	
59	123.07	88.80	9/16/2019 8:15	9/27/2019 8:06	9/27/2019 12:33	263.85	4.45	1.66	0.05	Bkg for Cell#59	
60	133.53	88.80	9/10/2019 8:29	9/16/2019 8:45	9/16/2019 13:01	144.27	4.27	2.34	0.06	Bkg for Cell#60	
61	123.53	88.80	9/10/2019 8:34	9/16/2019 8:50	9/16/2019 13:01	144.27	4.18	2.16	0.07	Bkg for Cell#61	
62	136.02	88.80	9/10/2019 8:39	9/16/2019 8:55	9/16/2019 13:01	144.27	4.10	2.38	0.08	Bkg for Cell#62	
63	126.61	88.80	9/10/2019 8:44	9/16/2019 9:00	9/16/2019 13:01	144.27	4.02	2.21	0.03	Bkg for Cell#63	
64	131.52	88.80	9/10/2019 8:49	9/16/2019 9:05	9/16/2019 14:48	144.27	5.72	2.33	0.05	Bkg for Cell#64	
65	138.29	88.80	9/10/2019 13:58	9/16/2019 9:10	9/16/2019 14:48	139.20	5.63	2.50	0.02	Bkg for Cell#65	
66	131.65	88.80	9/10/2019 8:59	9/16/2019 9:15	9/16/2019 14:48	144.27	5.55	2.33	0.08	Bkg for Cell#66	
67	125.15	88.80	9/10/2019 9:04	9/16/2019 9:20	9/16/2019 14:48	144.27	5.47	2.21	0.08	Bkg for Cell#67	
68	128.05	88.80	9/10/2019 9:09	9/16/2019 9:25	9/16/2019 14:48	144.27	5.38	2.26	0.13	Bkg for Cell#68	
69	117.75	88.80	9/10/2019 9:14	9/16/2019 9:30	9/16/2019 14:48	144.27	5.30	2.08	0.09	Bkg for Cell#69	
70	137.74	88.80	9/10/2019 9:19	9/16/2019 9:35	9/16/2019 14:48	144.27	5.22	2.43	0.14	Bkg for Cell#70	
71	119.94	88.80	9/10/2019 9:24	9/16/2019 9:40	9/16/2019 14:48	144.27	5.13	2.12	0.06	Bkg for Cell#71	
72	121.17	88.80	9/10/2019 9:29	9/16/2019 9:45	9/16/2019 14:48	144.27	5.05	2.14	0.08	Bkg for Cell#72	
73	131.93	88.80	9/10/2019 9:34	9/16/2019 9:50	9/16/2019 14:48	144.27	4.97	2.32	0.08	Bkg for Cell#73	
74	113.84	88.80	9/10/2019 9:39	9/16/2019 9:55	9/16/2019 14:48	144.27	4.88	2.00	0.06	Bkg for Cell#74	
75	127.39	88.80	9/10/2019 9:44	9/16/2019 10:00	9/16/2019 14:48	144.27	4.80	2.24	0.04	Bkg for Cell#75	
76	166.08	88.80	9/16/2019 8:20	9/27/2019 8:11	9/27/2019 12:33	263.85	4.37	2.24	0.03	Bkg for Cell#76	
77	148.81	88.80	9/16/2019 8:25	9/27/2019 8:16	9/27/2019 12:33	263.85	4.28	2.00	0.03	Bkg for Cell#77	
78	138.71	88.80	9/16/2019 8:30	9/27/2019 8:21	9/27/2019 12:33	263.85	4.20	1.87	0.04	Bkg for Cell#78	

ACZ Laboratories, Inc.
Radiochemistry Data Review Checklist

Data Reviewer: JLD
Date: 12/20/19

Approved: TJR
Date: 12/23/19

Work Group: 487796
Sample Type: SO
Analysis Date: 12/19/19
Analyst: JLD
Prep Date: 12/10/19

Weekly background file: 12/18/19
Daily background file: N/A

Alpha performance file: 12/19/19
Beta performance file: N/A

GAB dry date/time: N/A

	Yes	No	NA
1) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		
2) **FOR SREV**: For 903.1 WG's only, was the ICP Barium recovery raw data merged with the WG in LIMS?	✓		
3) Does the workgroup include all required QC samples?	✓		
4) Are all QC criteria listed in LIMS within specified limits? TJR 12/23	✓	✓	
5) Does all QC have the correct nomenclature (PBS vs PBW, etc.)? TJR 12/23/19	✓		
6) For GABs: Beta LCS/MS deleted from Alpha & Alpha LCS/MS deleted from Beta?			✓
7) Are all PCNs / SCNs used for LIMS calculations entered correctly?	✓		
8) Have all transcriptions been reviewed for accuracy (e.g. volumes, BG's, sx counts, etc.)?	✓		
9) Are samples flagged for INSX, if applicable?			✓
10) Is any sample analyzed using less volume appropriately "D" qualified?			✓
11) Are all calculations based on the correct matrix?	✓		
12) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
13 Is a current standard/reagent sheet attached to the workgroup?	✓		
14) Are all associated WG benchsheets locked for editing?	✓		
15) For GAB WG's containing DW samples, did at least 72 hours elapse between end of drying and start of counting?			✓
16) Are all tracer or carrier recoveries within acceptable limits?	✓		
17) For Lead-210 WG's, are the counts off the instrument in gross counts?			✓
18) Is the correct instrument ID on the WG benchsheet, and does it correspond with the template and raw data?	✓		

QC limits *		
Analyte	PBW	LCS & MS
gross alpha	2*LLD	67-144
gross beta	2*LLD	82-122
Ra-226 (903.1)	2*LLD	43-148
Alpha emitting Ra isotopes	2*LLD	66-132
Ra-228	2*LLD	47-123
Pb-210	2*LLD	55-121
Th	2*LLD	91-126
U-234	2*LLD	77-122
U-235	2*LLD	42-136
U-238	2*LLD	87-124
Po-210	2*LLD	51-128
GAMMA	2*LLD	90-110
Rn-222	2*LLD	90-110

Tracer/Carrier QC Limits	
Tracer/Carrier	%Rec
Ra-228 (Ba & Y)	40-130
Alpha emitting Ra isotopes (Ba)	40-130
Ra-226 903.1 (Ba)	40-130
U-232	30-130
Po-209	25-130
Pb-210	30-130
Th-229	30-130

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
1561147-08Dup	RPD- Out. Duplicated SX < 5<LLD RER used for assessment	RG

Comments:

ACZ LABORATORIES, INC. WG487796
Radium 226 by 903.1
FRMRC030.09.18.20
RA226-LUCASCELL-LIQUID

Project:

SOP# 1498

Instrument: LucasCell
Matrix Class: LIQUID
List Type: QC-RA-226-903.1
List Function: ANALYTICAL

Analyst: JLG
Dept: 55
Prep Date: 12/10/2019
Analysis Date:
Start Time:
End Time:
Approved:
Approved:

ACZ Sample Number	Sample ID	Client ID	Sample Matrix	CPM-bkg cpm	Ba Recovery factor	E	Radium 226 Activity pCi/L	Radium 226 Error (+/-)	Radium 226 LLD pCi/L
1	WG487796PBW		SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
2	WG487796LCSW	PCN57864	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
3	L56147-06	STSB29_6-15	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
4	L56147-07	STSB29-FD_6-1	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
5	L56147-08	STSB30_0.5-3	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
6	L56147-08DUP		SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
7	L56147-09	STSB30_6-15	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
8	L56147-09MS	PCN57864	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
9	L56147-10	STSB31_0.5-3	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
10	L56147-11	STSB31_6-15	SO	#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A
				#N/A	0.00	#N/A	#N/A	#N/A	#N/A

Rn222 Decay constant= 0.00755

Bubbler ID	ACZ Sample Number	Volume ml	Rn Ingrow (mm/dd/yyyy hh:mm)	Rn Decay (mm/dd/yyyy hh:mm)	Rn Count (mm/dd/yyyy hh:mm)	Ingrow Time	Decay Time	Cell#	Counts	ICP RESULT
			12/11/19	12/19/19	12/19/19					
S=	WG487250PBW	300	1302	906	1547	0.00	0.00	10	85	
poop	WG487250LCSW	300		911		0.00	0.00	11	3815	
alpha	L56147-06	300		916		0.00	0.00	12	132	
dirty	L56147-07	300		921		0.00	0.00	13	127	
choppy	L56147-08	300		926		0.00	0.00	14	144	
shaved	L56147-08DUP	300	1308	931		0.00	0.00	15	179	
oak	L56147-09	300		936		0.00	0.00	16	144	
be	L56147-09MS	300		941		0.00	0.00	17	5396	
R	L56147-10	300		946		0.00	0.00	18	126	
peach	L56147-11	300		951		0.00	0.00	19	788	
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			
	0					0.00	0.00			

Lucas Cell calibration standards and ludlum counter standards

Lucas cells are calibrated with 1 mL of Ra226 PCN52427 at 40pCi/mL.

The performance of the Lucas cell is checked with ZnS paper and

Th230 PCN# 22288

ACZ LABORATORIES, INC.
Standards/Reagents Information
Radium 226 903.1
Water

WG487796.xlsx

ANALYST:
Second analyst:
DATE TIME of prep start:

PROJECT/WG:
Method 903.1

INSTR: LUDLUM

Approved:

Radioactive Standards

LCS & MS 57864

Reagents

Barium Carrier RC191102-1

EDTA RC191210-1

Hydrochloric Acid, conc. 60353

Ascarite 59433

Magnesium perchlorate 59342

Sodium hydroxide 10N N/A

Nitric Acid, conc. 59928

Sulfuric Acid, conc. 59932

Sulfuric Acid 0.1N 59566

Antifoam Emulsion N/A

Centrifuge Tubes Lot# J4AF318118

COMMENTS:

ACZ Sample Number	Bottle ID
WG487796PBW	
WG487796LCSW	
L56147-06	
L56147-07	
L56147-08	
L56147-08DUP	
L56147-09	
L56147-09MS	
L56147-10	
L56147-11	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	

L56147-2001131042

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487250

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 16:20
End Date/Time: 12/06/2019 10:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487250CSTD1	NONE															
2	WG487250CSTD2	NONE															
3	WG487250CSTD3	NONE															
4	WG487250ICV	PCN58503	As Rec		12/04/19 16:20		4.04		4.04	4.04							21.5
5	WG487250PBS	NONE	As Rec		12/04/19 19:06		5.95	23	6.39	6.40	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
6	L56147-06	STSB29_6-15	As Rec		12/04/19 21:53	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
7	L56147-06MS	WI191023-2	As Rec		12/05/19 0:40	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
8	L56147-06MSD	II191127-2	As Rec		12/05/19 3:26	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
9	L56147-07	STSB29-FD_6-15	As Rec		12/05/19 6:13	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
10	L56147-07MS	Multiple	As Rec		12/05/19 9:00	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
11	L56147-07MSD	Multiple	As Rec		12/05/19 11:46	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
12	L56147-08	STSB30_0.5-3	As Rec		12/05/19 14:33	0	5.95	23	4.09	4.35	5000	5014.1	8.24	12/04/19 10:45	12/05/19 14:25	27.6666666667443	20.8
13	L56147-09	STSB30_6-15	As Rec		12/05/19 17:20	0	5.95	23	5.85	5.87	5000	5006.3	21.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.6
14	L56147-10	STSB31_0.5-3	As Rec		12/05/19 20:06	0	5.95	23	4.1	4.04	5000	5004.3	11.31	12/04/19 10:45	12/05/19 14:20	27.5833333333139	20.5
15	L56147-11	STSB31_6-15	As Rec		12/05/19 22:53	0	5.95	23	5.66	5.71	5000	5000.7	28.21	12/04/19 10:45	12/05/19 16:05	29.3333333334303	20.6
16	WG487250CCV1	PCN58503	As Rec		12/06/19 1:40		4.05		4.05	4.05							21.5
17	WG487250LFB1	II191127-2	As Rec		12/06/19 4:26	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
18	WG487250LFB2	Multiple	As Rec		12/06/19 7:13	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
19	WG487250CCV2	PCN58503	As Rec		12/06/19 10:00		4.05		4.04	4.04							21.4

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/19/2019 4:15:23 PM 121719

L56147-2001131042

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487250

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 16:20
End Date/Time: 12/06/2019 10:00

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-06MSD	ICP Spike
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250CCV1	pH QC
WG487250CSTD1	pH QC
WG487250CSTD2	pH QC
WG487250CSTD3	pH QC
WG487250ICV	pH QC
WG487250LFB1	ICP LFB
WG487250LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/19/2019 4:15:23 PM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG487796

Date Reported: 23-Dec-19
Run ID: R1765357
Date Analyzed: 19-Dec-19
ICAL Workgroup:
Instrument ID: LUCASCELL

WG487250PBW

Tag: | Measured: 12/19/2019

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	FOUND	0.65	1		pCi/L	++	0.34	0.3			

WG487250LCSW

Tag: | Measured: 12/19/2019 12:01:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	FOUND	62 ✓	1		pCi/L	++	0.57	2	PCN57864		
SREV	RADIUM 226	REC	93	1		%	++	0.57	2	PCN57864		
SREV	RADIUM 226	TRUE	6666666667	1		pCi/L	++	0.57	2	PCN57864		

L56147-06

Tag: | Measured: 12/19/2019 12:02:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	1	1		pCi/L	++	0.26	0.25		RG TB	

L56147-07

Tag: | Measured: 12/19/2019 12:04:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	0.99	1		pCi/L	++	0.43	0.25		RG TB	

L56147-08

Tag: | Measured: 12/19/2019 12:05:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	1	1		pCi/L	++	0.38	0.26		RG TB	

L56147-08DUP

Tag: | Measured: 12/19/2019 12:07:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	FOUND	1.3	1		pCi/L	++	0.2	0.31			
SREV	RADIUM 226	RER	0.74	1		%	++	0.4	5	RER = 1.48 ✓		
SREV	RADIUM 226	RPD	26	1		pCi/L	ALRT	0.2	0.31		RG	

L56147-09

Tag: | Measured: 12/19/2019 12:08:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	1.4	1		pCi/L	++	0.27	0.31		RG TB	

L56147-09MS

Tag: | Measured: 12/19/2019 12:10:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	FOUND	62 ✓	1		pCi/L	++	0.33	1.7	PCN57864		
SREV	RADIUM 226	REC	91	1		%	++	0.33	1.7	PCN57864		
SREV	RADIUM 226	TRUE	6666666667	1		pCi/L	++	0.33	1.7	PCN57864		

L56147-10 Tag: Measured: 12/19/2019 12:11:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	0.64	1		pCi/L	++	0.27	0.27		RG TB	

L56147-11 Tag: Measured: 12/19/2019 12:12:00 AM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 226	.1-MWMT	6.9	1		pCi/L	++	0.52	0.58		RG TB	

12/17/19 Perf DJR

1) 1212 2) 1211 3) 1142 4) 1167 5) 1190 6) 1191 7) 1202 8) 1235 9) 1156
10) 1220 11) 1215 12) 1182 13) 1105

12/18/19 Perf JL

1) 1149 2) 1161 3) 1154 4) 1157 5) 1190 6) 1142 7) 1134 8) 1228 9) 1161
10) 1152 11) 1229 12) 1209 13) 1077

1 73	2 89	3 34	4 51	5 81	6 80	7 91	8 60	9 59	10 37	11 44	12 30	13 31
14 41	15 51	16 29	17 38	18 63	19 68	20 18	21 38	22 69	23 33	24 29	25 65	26
27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49	50	51	52
53 33	54 34	55 54	56 55	57 33	58 51	59 69	60 79	61 51	62 50	63 27	64 29	65 17
66 35	67 44	68 28	69 39	70 39	71 28	72 47	73 65	74 62	75 30	76 13	77 13	78 16

12/19/19 Perf JL

1) 1164 ✓ 2) 1099 ✓ 3) 1111 ✓ 4) 1158 ✓ 5) 1183 ✓ 6) 1200 ✓ 7) 1196 ✓ 8) 1269 ✓
9) 1151 ✓ 10) 1206 ✓ 11) 1211 ✓ 12) 1162 ✓ 13) 1143 ✓

12/22/19 Perf JL

1) 1144 2) 1108 3) 1156 4) 1119 5) 1169 6) 1212 7) 1120 8) 1195 9) 1101
10) 1257 11) 1139 12) 1162 13) 1132

1 46	2 98	3 38	4 66	5 72	6 95	7 75	8 68	9 47	10 27	11 36	12 23	13 27
14 39	15 50	16 22	17 28	18 53	19 55	20	21	22	23	24	25	26
27 33	28 40	29 30	30 37	31 63	32 32	33 79	34 15	35 50	36 18	37 47	38 48	39 30
40	41 29	42 30	43 14	44 35	45 36	46 15	47 22	48 18	49 30	50 47	51 17	52
53	54	55	56	57	58	59	60	61	62	63	64	65
66	67	68	69	70	71	72	73	74	75	76	77	78

12/26/19 Perf JL

1) 1191 2) 1167 3) 1109 4) 1135 5) 1204 6) 1190 7) 1187 8) 1144 9) 1133
10) 1146 11) 1167 12) 1220 13) 1082

12/27/19 Perf JL

1) 1210 2) 1122 3) 1190 4) 1152 5) 1142 6) 1223 7) 1139 8) 1214 9) 1201
10) 1141 11) 1176 12) 1145 13) 1151

Continued on Page

Read and Understood By

Signed Date Signed Date

ACZ Laboratories, Inc.

Steamboat Springs, CO 80487

Detector 1	Detector 2	Detector 3
1074 - 1288	1092 - 1232	1064 - 1185
Detector 4	Detector 5	Detector 6
1086 - 1200	1140 - 1239	1141 - 1223
Detector 7	Detector 8	Detector 9
1119 - 1234	1121 - 1295	1100 - 1206
Detector 10	Detector 11	Detector 12
1138 - 1258	1105 - 1237	1112 - 1224
Detector 13		
1049 - 1180		

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Radiochemistry

WG487796 **Ra226**

Sample	Date	SCN	RADIUM 226
WG487250PBW	12/19/19 00:00		X
WG487250LCSW	12/19/19 00:01		X
L56147-06	12/19/19 00:02		X
L56147-07	12/19/19 00:04		X
L56147-08	12/19/19 00:05		X
L56147-08DUP	12/19/19 00:07		X
L56147-09	12/19/19 00:08		X
L56147-09MS	12/19/19 00:10		X
L56147-10	12/19/19 00:11		X
L56147-11	12/19/19 00:12		X

Element, Wavelength and Order	Date of Fit	Date of Cal.	Type of Fit	Weighting	A0	A1	A2	n (Exponent)
Ag 328.068 {103}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	-0.000570	0.036219	0.000000	1.000000
Al 396.152 { 85}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	-0.000229	0.023534	0.000000	1.000000
As 189.042 {478}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	-0.000005	0.001152	0.000000	1.000000
B 208.959 {461}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000008	0.006805	0.000000	1.000000
Ba 455.403 { 74}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.006641	1.993255	0.000000	1.000000
Be 313.042 {108}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	-0.002180	1.617535	0.000000	1.000000
Bi 223.061 {451}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000113	0.001468	0.000000	1.000000
Ca 315.887 {107}	12/11/2019 20:02:37	12/11/2019 20:02:37	Linear	None	-0.006387	0.019086	0.000000	1.000000
Cd 214.438 {457}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000037	0.046838	0.000000	1.000000
Cd 226.502 {449}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000236	0.037779	0.000000	1.000000
Co 228.616 {447}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000069	0.012051	0.000000	1.000000
Cr 205.560 {464}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000065	0.014514	0.000000	1.000000
Cr 267.716 {126}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000247	0.028844	0.000000	1.000000
Cu 324.754 {104}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000417	0.044196	0.000000	1.000000
Fe 240.488 {140}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000238	0.009822	0.000000	1.000000
Fe 259.940 {130}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000642	0.028514	0.000000	1.000000
Ga 294.364 {114}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000029	0.002279	0.000000	1.000000
K 766.490 { 44}	12/11/2019 20:02:37	12/11/2019 20:02:37	Linear	None	0.001005	0.010613	0.000000	1.000000
Li 670.784 { 50}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	-0.003098	0.346607	0.000000	1.000000
Mg 279.079 {121}	12/11/2019 20:02:37	12/11/2019 20:02:37	Linear	None	0.000917	0.003855	0.000000	1.000000
Mn 257.610 {131}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.001036	0.145405	0.000000	1.000000
Mo 202.030 {467}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000017	0.008490	0.000000	1.000000
Na 589.592 { 57}	12/11/2019 20:02:37	12/11/2019 20:02:37	Linear	None	0.006954	0.062477	0.000000	1.000000
Ni 231.604 {446}	12/11/2019 20:02:37	12/11/2019 20:02:37	Linear	None	-0.000062	0.008940	0.000000	1.000000
P 214.914 {457}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000018	0.000921	0.000000	1.000000
Pb 220.353 {453}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000090	0.002398	0.000000	1.000000
S 182.034 {485}	12/11/2019 20:02:37	12/11/2019 20:02:37	Linear	None	0.000118	0.001118	0.000000	1.000000
Sb 206.833 {463}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000006	0.001511	0.000000	1.000000
Sc 361.384 { 93}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.002002	0.631755	0.000000	1.000000
Se 196.090 {472}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000010	0.001071	0.000000	1.000000
Si 251.611 {134}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	-0.000042	0.008346	0.000000	1.000000
Si 251.611 {134}2	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	-0.000042	0.008346	0.000000	1.000000
Sn 189.989 {477}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000004	0.002129	0.000000	1.000000
Sr 421.552 { 80}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.002292	1.979526	0.000000	1.000000
Ti 334.941 {101}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000637	0.144861	0.000000	1.000000
Tl 190.856 {477}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000006	0.001292	0.000000	1.000000
V 292.402 {115}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	-0.000208	0.036968	0.000000	1.000000
Y 371.030 { 91}*	12/11/2019 20:02:37	12/11/2019 20:02:37	Linear	None	21805.022	-263.74852	0.000000	1.000000
Zn 206.200 {463}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000042	0.014778	0.000000	1.000000
Zn 213.856 {457}	12/11/2019 19:59:23	12/11/2019 19:59:23	Linear	None	0.000088	0.019794	0.000000	1.000000

Element, Wavelength and Order	Correlation	Std Error of Est	Predicted MDL	Predicted MQL	Status	Reslope		QC Norm	
						Slope	Y-int	Slope factor	Offset
Ag 328.068 {103}	0.999983	0.000148	0.007440	0.024801	OK.	1.000000	0.000000	1	0
Al 396.152 { 85}	0.999981	0.001037	0.017862	0.059539	OK.	1.000000	0.000000	1	0
As 189.042 {478}	1.000000	0.000000	0.019446	0.064820	OK.	1.000000	0.000000	1	0
B 208.959 {461}	0.999996	0.000065	0.004951	0.016505	OK.	1.000000	0.000000	1	0
Ba 455.403 { 74}	0.999984	0.016010	0.000374	0.001247	OK.	1.000000	0.000000	1	0
Be 313.042 {108}	0.999999	0.003168	0.000215	0.000717	OK.	1.000000	0.000000	1	0
Bi 223.061 {451}	0.999989	0.000024	0.025868	0.086227	OK.	1.000000	0.000000	1	0
Ca 315.887 {107}	1.000000	0.000919	0.015644	0.052146	OK.	1.000000	0.000000	1	0
Cd 214.438 {457}	0.999987	0.000337	0.000747	0.002491	OK.	1.000000	0.000000	1	0
Cd 226.502 {449}	0.999982	0.000317	0.001063	0.003544	OK.	1.000000	0.000000	1	0
Co 228.616 {447}	0.999981	0.000105	0.003042	0.010141	OK.	1.000000	0.000000	1	0
Cr 205.560 {464}	0.999995	0.000167	0.002698	0.008993	OK.	1.000000	0.000000	1	0
Cr 267.716 {126}	0.999989	0.000471	0.007045	0.023482	OK.	1.000000	0.000000	1	0
Cu 324.754 {104}	0.999990	0.000284	0.007649	0.025498	OK.	1.000000	0.000000	1	0
Fe 240.488 {140}	0.999900	0.000492	0.015648	0.052161	OK.	1.000000	0.000000	1	0
Fe 259.940 {130}	0.999960	0.000897	0.004828	0.016092	OK.	1.000000	0.000000	1	0
Ga 294.364 {114}	0.999636	0.000086	0.074278	0.247594	OK.	1.000000	0.000000	1	0
K 766.490 { 44}	1.000000	0.000388	0.082699	0.275663	OK.	1.000000	0.000000	1	0
Li 670.784 { 50}	0.999961	0.004305	0.002639	0.008797	OK.	1.000000	0.000000	1	0
Mg 279.079 {121}	0.999995	0.000746	0.045020	0.150067	OK.	1.000000	0.000000	1	0
Mn 257.610 {131}	0.999896	0.002962	0.000963	0.003210	OK.	1.000000	0.000000	1	0
Mo 202.030 {467}	0.999996	0.000033	0.003431	0.011437	OK.	1.000000	0.000000	1	0
Na 589.592 { 57}	1.000000	0.000726	0.013891	0.046304	OK.	1.000000	0.000000	1	0
Ni 231.604 {446}	1.000000	0.000000	0.004452	0.014842	OK.	1.000000	0.000000	1	0
P 214.914 {457}	0.999982	0.000019	0.037105	0.123685	OK.	1.000000	0.000000	1	0
Pb 220.353 {453}	0.999971	0.000064	0.015538	0.051794	OK.	1.000000	0.000000	1	0
S 182.034 {485}	0.999998	0.000064	0.024765	0.082550	OK.	1.000000	0.000000	1	0
Sb 206.833 {463}	0.999549	0.000065	0.020867	0.069557	OK.	1.000000	0.000000	1	0
Sc 361.384 { 93}	0.999982	0.005363	0.000604	0.002013	OK.	1.000000	0.000000	1	0
Se 196.090 {472}	0.999999	0.000005	0.025199	0.083997	OK.	1.000000	0.000000	1	0
Si 251.611 {134}	0.999987	0.000152	0.016931	0.056436	OK.	1.000000	0.000000	1	0
Si 251.611 {134}2	0.999987	0.000152	0.016931	0.056436	OK.	1.000000	0.000000	1	0
Sn 189.989 {477}	0.999990	0.000034	0.010226	0.034087	OK.	1.000000	0.000000	1	0
Sr 421.552 { 80}	0.999998	0.004892	0.000287	0.000956	OK.	1.000000	0.000000	1	0
Ti 334.941 {101}	0.999983	0.000607	0.001823	0.006078	OK.	1.000000	0.000000	1	0
Tl 190.856 {477}	0.999987	0.000047	0.023878	0.079593	OK.	1.000000	0.000000	1	0
V 292.402 {115}	1.000000	0.000014	0.005436	0.018118	OK.	1.000000	0.000000	1	0
Y 371.030 { 91}*	0.599718	215.50776	-1.000000	-1.000000	Warnin	1.000000	0.000000	1	0
Zn 206.200 {463}	0.999982	0.000126	0.001838	0.006126	OK.	1.000000	0.000000	1	0
Zn 213.856 {457}	0.999993	0.000106	0.001400	0.004666	OK.	1.000000	0.000000	1	0

CALIBRATION REAGENTS

6010/200.7 Reagent Sheet

1% Calibration Standards			10% Calibration Standards		
CLPSTD1:	**	SCN	CLPTSTD1:	**	SCN
CLPSTD2:	II191120-2	SCN	CLPTSTD2:	II191209-3	SCN
CLPSTD3:	II191209-1	SCN	CLPTSTD3:	II191127-3	SCN

Yttrium (Internal Standard) = PCN59951 EXP: 12/30/2020

**=CALSTD1 is a 2X dilution on CALSTD2 using either 1% or 10% Blank as the dilutent.

Blank Solutions:

Nitric acid:	60299	PCN	Nitric acid:	60299	PCN
Hydrochloric acid:	60374	PCN	Hydrochloric acid:	60176	PCN

VERIFIED BY: JLW 12/12/19

ICPSTD

488103

ACZ Laboratories, Inc. **WG488103**
Radium 228 in Water
EPA 904.0/9320

ISN 12/17/2019 12:42 PM

Project:
SOP # 1495

Instrument: G542
Matrix Class: LIQUID
List Type: QC-RA-228
List Function: ANALYTICAL

Analyst: ISN
Dept: 55
Prep Date: 12/11/2019
Analysis Date: 12/13/2019
Start Time:
End Time:
Approved: ISN 12/17/19
Approved: TJR 12/26/19

Seq #	ACZ Sample No.	Client Sample ID	Sample Volume mL	Sample Matrix	Y Planchett Weight g	Y Gross Weight g	Sample Weight g	Residue Density mg/cm²	Ba Planchett Weight g	Ba Gross Weight g	Radium 228 pCi/L	Error (+ -)	LLD pCi/L
1	WG487361LCSW	PCN57186	300	AQ	9.2307	9.253	0.0223	1.1150	9.1326	9.1914	27.12	3.55	6.03
2	WG487361PBW		300	AQ	9.2134	9.235	0.0216	1.0800	9.1711	9.2314	-0.14	2.67	6.49
3	L56147-01	STSB27_0.5-3	300	SO	9.2113	9.2335	0.0222	1.1100	9.1902	9.2415	3.79	2.66	7.11
4	L56147-01MS	PCN57186	300	SO	9.1954	9.2176	0.0222	1.1100	9.2171	9.2697	31.37	3.99	6.83
5	L56147-02	STSB27_6-15	300	SO	9.1813	9.2053	0.0240	1.2000	9.21	9.2668	0.99	2.35	5.55
6	L56147-03	STSB28_0.5-3	300	SO	9.2222	9.2444	0.0222	1.1100	9.2546	9.3069	-0.64	2.47	6.11
7	L56147-04	STSB28_6-15	300	SO	9.22	9.2427	0.0227	1.1350	9.1743	9.232	2.12	2.67	5.97
8	L56147-05	STSB29_0.5-3	300	SO	9.1729	9.1955	0.0226	1.1300	9.1855	9.241	2.75	2.50	5.98
9	L56147-05DUP		300	SO	9.1664	9.1894	0.0230	1.1500	9.1671	9.2226	1.64	2.49	5.81
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Comments:

Decay Equation for Ra228:	
Standard Preparation Date	8/20/2018
Initial True Value (pCi/mL)	33.33
Decayed Value (pCi/mL)	28.44

Sr89 Calibration performed with PCN 54078

Daily performance check with SR-Y PCN 22287

DOP

Enter values in only one of these two columns*

ACZ Sample No.	Det.	Gross CPM	BG β	NET CPM Beta	Ingrow Time (mm/dd/yyyy hh:mm)	Decay Time (mm/dd/yyyy hh:mm)	Analysis Time (mm/dd/yyyy hh:mm)	Ingrow Time min.	Decay Time min.	Y Yield (dec %)	Ba Rec Weight (g)	Ba Yield (dec %)	Ba Rec ICPMS (ug/L)	Total Yield (dec %)	Efficiency Beta	Radium 228 Calculations (See notes) A	B	C	D	Det.	Det. BG β
WG487361LCSW	1A	6.9670	2.1890	4.7780	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.73	0.06	1.07		0.73	0.4883	14.69105	1.08717	1.00492	1.23260	1A	2.189
WG487361PBW	1B	2.2330	2.2560	-0.0230	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.71	0.06	1.10		0.71	0.4687	-0.07368	1.08717	1.00492	1.23260	1B	2.256
L56147-01	1C	2.1330	1.5670	0.5660	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.73	0.05	0.93		0.68	0.4463	1.90412	1.08717	1.00492	1.23260	1C	1.567
L56147-01MS	1D	6.9440	2.0670	4.8770	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.73	0.05	0.96		0.69	0.4526	16.17853	1.08717	1.00492	1.23260	1D	2.067
L56147-02	2A	2.4560	2.2670	0.1890	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.79	0.06	1.03		0.79	0.4931	0.57556	1.08717	1.00492	1.23260	2A	2.267
L56147-03	2B	2.1000	2.2110	-0.1110	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.73	0.05	0.99		0.72	0.4905	-0.33980	1.08717	1.00492	1.23260	2B	2.211
L56147-04	2C	2.8330	2.4560	0.3770	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.74	0.06	1.05		0.74	0.4850	1.16706	1.08717	1.00492	1.23260	2C	2.456
L56147-05	3A	2.5560	2.0670	0.4890	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.74	0.06	1.01		0.74	0.4862	1.51018	1.08717	1.00492	1.23260	2D	
L56147-05DUP	3B	2.5780	2.2780	0.3000	12/11/2019 15:35	12/13/2019 14:38	12/13/2019 16:29	2823.00	111	0.75	0.06	1.01		0.75	0.4919	0.91580	1.08717	1.00492	1.23260	3A	2.067
												0.00		0.00			1.08717			3B	2.278
												0.00		0.00			1.08717			3C	
												0.00		0.00			1.08717			3D	
												0.00		0.00			1.08717			4A	
												0.00		0.00			1.08717			4B	
												0.00		0.00			1.08717			4C	
												0.00		0.00			1.08717			4D	
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				

Radium 228 Calculations

A	(Net CPM Beta * 1000) / (2.22 * Eff. Beta * Samp. Vol.)
B	(0.001884 * 90) / (1 - 2.7183 ^ (-0.001884 * 90))
C	1 / (1 - 2.7183 ^ (-0.001884 * Ingrow Time))
D	1 / (2.7183 ^ (-0.001884 * Decay Time))

*see <P:\QAQC\QA - Editable\Scanned DOC, MDL, etc\RadChem\2015\EPA904.0\"Ra228 Ba Yield Test"> for derivation of Ba true values

Beta efficiency equation factors for each of 16 G542 detectors

Efficiency Equation:
(Y = MX + B)
where
(X=Residue Density)

Detector	M	B
1A	-0.0049	0.4938
1B	-0.0012	0.4700
1C	-0.0089	0.4562
1D	-0.0034	0.4564
2A	-0.0032	0.4969
2B	-0.0019	0.4926
2C	0.0025	0.4822
2D	0.0004	0.4812
3A	0.0007	0.4854
3B	0.0000	0.4919
3C	-0.0028	0.4862
3D	-0.0056	0.5009
4A	-0.0022	0.4975
4B	0.0022	0.4586
4C	-0.0021	0.4821
4D	-0.0029	0.4916

ACZ Laboratories, Inc.
Radiochemistry Data Review Checklist

Data Reviewer: ISN
Date: 12/19/19

Approved: DR
Date: 12/26/19

Work Group: 498903
Sample Type: SO
Analysis Date: 12/13/19
Analyst: ISN
Prep Date: 12/11/19

Weekly background file: N/A
Daily background file: 12/13/19 @ 1040

Alpha performance file: N/A
Beta performance file: 12/13/19 @ 1359

GAB dry date/time: N/A

	Yes	No	NA
1) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		
2) **FOR SREV:** For 903.1 WG's only, was the ICP Barium recovery raw data merged with the WG in LIMS?			✓
3) Does the workgroup include all required QC samples?	✓		
4) Are all QC criteria listed in LIMS within specified limits?		✓	
5) Does all QC have the correct nomenclature (PBS vs PBW, etc.)?	✓		
6) For GABs: Beta LCS/MS deleted from Alpha & Alpha LCS/MS deleted from Beta?			✓
7) Are all PCNs / SCNs used for LIMS calculations entered correctly?	✓		
8) Have all transcriptions been reviewed for accuracy (e.g. volumes, BG's, sx counts, etc.)?	✓		
9) Are samples flagged for INSX, if applicable?			✓
10) Is any sample analyzed using less volume appropriately "D" qualified?			✓
11) Are all calculations based on the correct matrix?	✓		
12) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
13 Is a current standard/reagent sheet attached to the workgroup?	✓		
14) Are all associated WG benchsheets locked for editing?	✓		
15) For GAB WG's containing DW samples, did at least 72 hours elapse between end of drying and start of counting?			✓
16) Are all tracer or carrier recoveries within acceptable limits?	✓		
17) For Lead-210 WG's, are the counts off the instrument in gross counts?			✓
18) Is the correct instrument ID on the WG benchsheet, and does it correspond with the template and raw data?	✓		

QC limits

Analyte	PBW	LCS & MS
gross alpha	2*LLD	67-144
gross beta	2*LLD	82-122
Ra-226 (903.1)	2*LLD	43-148
Alpha emitting Ra isotopes	2*LLD	66-132
Ra-228	2*LLD	47-123
Pb-210	2*LLD	55-121
Th	2*LLD	91-126
U-234	2*LLD	77-122
U-235	2*LLD	42-136
U-238	2*LLD	87-124
Po-210	2*LLD	51-128
GAMMA	2*LLD	90-110
Rn-222	2*LLD	90-110

Tracer/Carrier QC Limits

Tracer/Carrier	%Rec
Ra-228 (Ba & Y)	40-130
Alpha emitting Ra isotopes (Ba)	40-130
Ra-226 903.1 (Ba)	40-130
U-232	30-130
Po-209	25-130
Pb-210	30-130
Th-229	30-130

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
L56147-05 DUP	RPD out. Duplicated Sx < Sx LLD. RER used for assessment.	RG

Comments:

LCS MS limits developed from combined control chart data for LCSW LCSS.

FRMRC010.08.17.32

ACZ Laboratories, Inc. **WG488103**
Radium 228 in Water
EPA 904.0/9320

ISX 12/17/2019 12:38 PM

Project:

SOP # 1495

Instrument: G542
Matrix Class: LIQUID
List Type: QC-RA-228
List Function: PREP

Analyst: ISN
Dept: 55
Prep Date: 12/11/2019
Analysis Date:
Start Time:
End Time:
Approved:
Approved:

Seq #	ACZ Sample No.	Client Sample ID	Sample Volume mL	Sample Matrix	Y Planchett Weight g	Y Gross Weight g	Sample Weight g	Residue Density mg/cm^	Ba Planchett Weight g	Ba Gross Weight g	Radium 228 pCi/L	Error (+ -)	LLD pCi/L
1	WG487361LCSW	PCN57186	300	AQ									#DIV/0!
2	WG487361PBW		1	AQ									#DIV/0!
3	L56147-01	STSB27_0.5-3		SO									#DIV/0!
4	L56147-01MS	PCN57186		SO									#DIV/0!
5	L56147-02	STSB27_6-15		SO									#DIV/0!
6	L56147-03	STSB28_0.5-3		SO									#DIV/0!
7	L56147-04	STSB28_6-15		SO									#DIV/0!
8	L56147-05	STSB29_0.5-3		SO									#DIV/0!
9	L56147-05DUP			SO									#DIV/0!
													#DIV/0!
													#DIV/0!
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Comments:

Decay Equation for Ra228:	
Standard Preparation Date	8/20/2018
Initial True Value (pCi/mL)	#DIV/0!
Decayed Value (pCi/mL)	#DIV/0!

Sr89 Calibration performed with PCN 54078

Daily performance check with SR-Y PCN 22287

ACZ LABORATORIES, INC.
Standards/Reagents Information

ANALYST: _____
WG488103.xlsx12/17/2019 12:39 PM
Second analyst: _____

Water

DATE TIME of prep start: _____

PROJECT/WG: _____
Method Ra-228 904/9320 INSTR: G542

Radioactive Standards

LCS & MS 57186

Reagents

Ammonium Sulfate:	3291121-1	Ytrium carrer	RC191031-1	Ammonium Hydroxide.	59976
Barium Carrier:	RC191102-2	Strontium carrer	RC191014-1	Ammonium oxalate.	RC191018-2/ RC191126-3
Lead Carrier:	RC191073/RC191206-1	Sr-Y mix	RC191102-1	Ammonium sulfide.	RC191209-1
Citric Acid	RC191025-1	Sulfuric Acid:	60172	EDTA	RC191210-1
Nitric Acid	60363	Acetic Acid:	59993/60369	Methyl Orange	60079
Nitric Acid 6N	59928	Nitric Acid 1.0N	59927	Sodium hydroxide 18 N	RC191125-1
		Sodium hydroxide 10 N	RC191120-2		

COMMENTS:

Ingrow: 12/11/19 @ 1535

Decay: 12/13/19 @ 1438

ACZ Sample Number	Bottle ID
WG487361LCSW	
WG487361PBW	
L56147-01	
L56147-01MS	
L56147-02	
L56147-03	
L56147-04	
L56147-05	
L56147-05DUP	
0	
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ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa
USER ID: radchem

Source Name:
System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Count Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A	lcsw	Ra228_4a		90Min. 0 Sec.	22	0.2444	627	6.967
Status: Unknown		Acq Date: 2019/12/13 16:28:40.00						
1 B	pbw	Ra228_4a		90Min. 0 Sec.	5	0.0556	201	2.233
Status: Unknown		Acq Date: 2019/12/13 16:28:40.00						
1 D	47-1ms	Ra228_4a		90Min. 0 Sec.	14	0.1208	625	6.944
Status: Unknown		Acq Date: 2019/12/13 16:28:40.00						
1 C	47-1	Ra228_4a		90Min. 0 Sec.	6	0.0667	192	2.133
Status: Unknown		Acq Date: 2019/12/13 16:28:40.00						
2 A	47-2	Ra228_4a		90Min. 0 Sec.	7	0.0111	221	2.456
Status: Unknown		Acq Date: 2019/12/13 16:28:44.00						
2 D		Ra228_4a		90Min. 0 Sec.	9	0.10	208	2.311
Status: Unknown		Acq Date: 2019/12/13 16:28:44.00						
2 B	47-3	Ra228_4a		90Min. 0 Sec.	7	0.0	189	2.1
Status: Unknown		Acq Date: 2019/12/13 16:28:44.00						
2 C	47-4	Ra228_4a		90Min. 0 Sec.	8	0.0222	255	2.833
Status: Unknown		Acq Date: 2019/12/13 16:28:44.00						
3 A	47-5	Ra228_4a		90Min. 0 Sec.	5	0.00556	230	2.556
Status: Unknown		Acq Date: 2019/12/13 16:28:49.00						
3 C		Ra228_4a		90Min. 0 Sec.	7	0.0611	249	2.767
Status: Unknown		Acq Date: 2019/12/13 16:28:49.00						
3 D		Ra228_4a		90Min. 0 Sec.	8	0.0542	311	3.456
Status: Unknown		Acq Date: 2019/12/13 16:28:49.00						
3 B	47-5dup	Ra228_4a		90Min. 0 Sec.	4	0.00278	232	2.578
Status: Unknown		Acq Date: 2019/12/13 16:28:49.00						
4 A		Ra228_4a		90Min. 0 Sec.	13	0.0444	250	2.778
Status: Unknown		Acq Date: 2019/12/13 16:28:54.00						
4 C		Ra228_4a		90Min. 0 Sec.	6	0.00833	228	2.533
Status: Unknown		Acq Date: 2019/12/13 16:28:54.00						
4 B		Ra228_4a		90Min. 0 Sec.	5	0.0	241	2.678
Status: Unknown		Acq Date: 2019/12/13 16:28:54.00						
4 D		Ra228_4a		90Min. 0 Sec.	5	0.0306	211	2.344
Status: Unknown		Acq Date: 2019/12/13 16:28:54.00						

Health Physics Specialist: _____ **Date:** _____

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa
USER ID: radchem
Source Name:
System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Count Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A		Daily BG		90Min. 0 Sec.	8	0.0889	197	2.189
Status: Bkg		Acq Date: 2019/12/13 10:40:28.00						
Alpha Background QC CPM: 0.00 to 0.10 At 1.960 Std. **Yes** Beta Background QC CPM: 1.91 to 2.42 At 1.960 Std. **Yes**								
1 B		Daily BG		90Min. 0 Sec.	4	0.0444	203	2.256
Status: Bkg		Acq Date: 2019/12/13 10:40:28.00						
Alpha Background QC CPM: 0.00 to 0.08 At 1.960 Std. **Yes** Beta Background QC CPM: 1.91 to 2.40 At 1.960 Std. **Yes**								
1 D		Daily BG		90Min. 0 Sec.	9	0.10	186	2.067
Status: Bkg		Acq Date: 2019/12/13 10:40:28.00						
Alpha Background QC CPM: 0.02 to 0.11 At 1.960 Std. **Yes** Beta Background QC CPM: 1.72 to 2.57 At 1.960 Std. **Yes**								
1 C		Daily BG		90Min. 0 Sec.	3	0.0333	141	1.567
Status: Bkg		Acq Date: 2019/12/13 10:40:28.00						
Alpha Background QC CPM: 0.02 to 0.08 At 1.960 Std. **Yes** Beta Background QC CPM: 1.50 to 2.36 At 1.960 Std. **Yes**								
2 A		Daily BG		90Min. 0 Sec.	4	0.0444	204	2.267
Status: Bkg		Acq Date: 2019/12/13 10:40:33.00						
Alpha Background QC CPM: -0.01 to 0.15 At 1.960 Std. **Yes** Beta Background QC CPM: 1.72 to 3.40 At 1.960 Std. **Yes**								
2 D		Daily BG		90Min. 0 Sec.	4	0.0444	152	1.689
Status: Bkg		Acq Date: 2019/12/13 10:40:33.00						
Alpha Background QC CPM: 0.02 to 0.06 At 1.960 Std. **Yes** Beta Background QC CPM: 1.77 to 2.66 At 1.960 Std. **No**								
2 B		Daily BG		90Min. 0 Sec.	5	0.0556	199	2.211
Status: Bkg		Acq Date: 2019/12/13 10:40:33.00						
Alpha Background QC CPM: -0.05 to 0.12 At 1.960 Std. **Yes** Beta Background QC CPM: 1.72 to 3.40 At 1.960 Std. **Yes**								
2 C		Daily BG		90Min. 0 Sec.	4	0.0444	221	2.456
Status: Bkg		Acq Date: 2019/12/13 10:40:33.00						
Alpha Background QC CPM: 0.03 to 0.12 At 1.960 Std. **Yes** Beta Background QC CPM: 1.85 to 2.86 At 1.960 Std. **Yes**								
3 A		Daily BG		90Min. 0 Sec.	8	0.0889	186	2.067
Status: Bkg		Acq Date: 2019/12/13 10:40:38.00						
Alpha Background QC CPM: 0.01 to 0.09 At 1.960 Std. **Yes** Beta Background QC CPM: 1.70 to 2.64 At 1.960 Std. **Yes**								
3 C		Daily BG		90Min. 0 Sec.	3	0.0333	220	2.444
Status: Bkg		Acq Date: 2019/12/13 10:40:38.00						
Alpha Background QC CPM: 0.01 to 0.07 At 1.960 Std. **Yes** Beta Background QC CPM: 1.90 to 2.95 At 1.960 Std. **Yes**								
3 D		Daily BG		90Min. 0 Sec.	7	0.0778	232	2.578
Status: Bkg		Acq Date: 2019/12/13 10:40:38.00						
Alpha Background QC CPM: 0.00 to 0.08 At 1.960 Std. **No** Beta Background QC CPM: 2.34 to 3.51 At 1.960 Std. **Yes**								
3 B		Daily BG		90Min. 0 Sec.	4	0.0444	205	2.278
Status: Bkg		Acq Date: 2019/12/13 10:40:38.00						
Alpha Background QC CPM: 0.01 to 0.09 At 1.960 Std. **Yes** Beta Background QC CPM: 1.81 to 2.98 At 1.960 Std. **Yes**								
4 A		Daily BG		90Min. 0 Sec.	9	0.10	173	1.922
Status: Bkg		Acq Date: 2019/12/13 10:40:42.00						
Alpha Background QC CPM: 0.04 to 0.17 At 1.960 Std. **Yes** Beta Background QC CPM: 1.82 to 2.44 At 1.960 Std. **Yes**								
4 C		Daily BG		90Min. 0 Sec.	5	0.0556	196	2.178
Status: Bkg		Acq Date: 2019/12/13 10:40:42.00						
Alpha Background QC CPM: 0.01 to 0.09 At 1.960 Std. **Yes** Beta Background QC CPM: 1.98 to 2.55 At 1.960 Std. **Yes**								
4 B		Daily BG		90Min. 0 Sec.	4	0.0444	198	2.2
Status: Bkg		Acq Date: 2019/12/13 10:40:42.00						
Alpha Background QC CPM: 0.00 to 0.08 At 1.960 Std. **Yes** Beta Background QC CPM: 1.76 to 2.51 At 1.960 Std. **Yes**								

Health Physics Specialist: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa
USER ID: radchem

Source Name:
System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Count Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
4	D	Daily BG		90Min. 0 Sec.	4	0.0444	181	2.011
	Status: Bkg	Acq Date: 2019/12/13 10:40:42.00						

Alpha Background QC CPM: -0.01 to 0.12 At 1.960 Std. **Yes** Beta Background QC CPM: 1.81 to 2.74 At 1.960 Std. [**Yes**

Health Physics Specialist: _____ **Date:** _____

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name: 90SR3103846
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1291	2582.0
Status: Source		Acq Date: 2019/12/13 13:59:58.00						
Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 2,500.22 to 2,810.98 At 1.9 Yes								
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta								
1 B	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/13 13:59:58.00						
1 C	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/13 13:59:58.00						
1 D	Beta	Beta Perf	1	0Min.30 Sec.	1	2.0	1	2.0
Status: Unknown		Acq Date: 2019/12/13 13:59:58.00						

Health Physics Specialist: _____ Date: _____

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ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Time	Alpha Count	Alpha Counts cpm	Net	Beta Counts cpm	Net
1 A	Beta	Beta Perf		0Min.30 Sec.	0	0.0		1	2.0
Status: Unknown		Acq Date: 2019/12/13 14:01:04.00							
1 B	Beta	Beta Perf		0Min.30 Sec.	1	2.0		1289	2578.0
Status: Source		Acq Date: 2019/12/13 14:01:04.00							

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,536.99 to 2,719.41 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

1 C	Beta	Beta Perf		0Min.30 Sec.	0	0.0		0	0.0
Status: Unknown		Acq Date: 2019/12/13 14:01:04.00							
1 D	Beta	Beta Perf		0Min.30 Sec.	0	0.0		2	4.0
Status: Unknown		Acq Date: 2019/12/13 14:01:04.00							

Health Physics Specialist: _____ Date: _____

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ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/13 14:03:09.00						
1 B	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	3	6.0
Status: Unknown		Acq Date: 2019/12/13 14:03:09.00						
1 C	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1087	2174.0
Status: Source		Acq Date: 2019/12/13 14:03:09.00						

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 2,021.69 to 2,662.71 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

1 D	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	7	14.0
Status: Unknown		Acq Date: 2019/12/13 14:03:09.00						

Health Physics Specialist: _____ Date: _____

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ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Time	Alpha Count	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A	Beta	Beta Perf		0Min.30 Sec.	0	0.0		2	4.0
Status: Unknown		Acq Date: 2019/12/13 14:04:13.00							
1 B	Beta	Beta Perf		0Min.30 Sec.	0	0.0		0	0.0
Status: Unknown		Acq Date: 2019/12/13 14:04:13.00							
1 C	Beta	Beta Perf		0Min.30 Sec.	0	0.0		1	2.0
Status: Unknown		Acq Date: 2019/12/13 14:04:13.00							
1 D	Beta	Beta Perf		0Min.30 Sec.	0	0.0		1014	2028.0
Status: Source		Acq Date: 2019/12/13 14:04:13.00							

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 1,870.05 to 2,710.35 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

Health Physics Specialist: _____ Date: _____

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ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name: 90SR3103846
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
2 A	Beta	Beta Perf		0Min.30 Sec.	3	6.0	1354	2708.0
Status: Source		Acq Date: 2019/12/13 14:05:31.00						
Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,492.64 to 2,830.56 At 1.9 Yes								
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta								
2 B	Beta	Beta Perf		0Min.30 Sec.	0	0.0	2	4.0
Status: Unknown		Acq Date: 2019/12/13 14:05:31.00						
2 C	Beta	Beta Perf		0Min.30 Sec.	1	2.0	2	4.0
Status: Unknown		Acq Date: 2019/12/13 14:05:31.00						
2 D	Beta	Beta Perf		0Min.30 Sec.	0	0.0	2	4.0
Status: Unknown		Acq Date: 2019/12/13 14:05:31.00						

Health Physics Specialist: _____ Date: _____

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ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
2 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/13 14:06:20.00						
2 B	Beta	Beta Perf	3	0Min.30 Sec.	3	6.0	1240	2480.0
Status: Source		Acq Date: 2019/12/13 14:06:20.00						

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,460.97 to 2,747.03 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

2 C	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	3	6.0
Status: Unknown		Acq Date: 2019/12/13 14:06:20.00						
2 D	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	2	4.0
Status: Unknown		Acq Date: 2019/12/13 14:06:20.00						

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
2 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	0	0.0
Status: Unknown		Acq Date: 2019/12/13 14:07:11.00						
2 B	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	0	0.0
Status: Unknown		Acq Date: 2019/12/13 14:07:11.00						
2 C	Beta	Beta Perf	1	0Min.30 Sec.	2.0	1297	2594.0	
Status: Source		Acq Date: 2019/12/13 14:07:11.00						

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,491.79 to 2,804.61 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

2 D	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/13 14:07:11.00						

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name: 90SR3103846
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
3 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1325	2650.0

Status: Source Acq Date: 2019/12/13 14:08:53.00
Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 2,482.40 to 2,722.80 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

3 B	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0

Status: Unknown Acq Date: 2019/12/13 14:08:53.00

3 C	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0

Status: Unknown Acq Date: 2019/12/13 14:08:53.00

3 D	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	4	8.0

Status: Unknown Acq Date: 2019/12/13 14:08:53.00

Health Physics Specialist: _____ Date: _____

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ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
3 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/13 14:09:41.00						
3 B	Beta	Beta Perf	1	0Min.30 Sec.	1	2.0	1284	2568.0
Status: Source		Acq Date: 2019/12/13 14:09:41.00						

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,454.74 to 2,782.06 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

3 C	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	2	4.0
Status: Unknown		Acq Date: 2019/12/13 14:09:41.00						
3 D	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	4	8.0
Status: Unknown		Acq Date: 2019/12/13 14:09:41.00						

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A	lcsw	Ra228_4a	90Min. 0 Sec.	22	0.2444	627	6.967	
Status: Unknown		Acq Date: 2019/12/13 16:28:40.00						
1 B	pbw	Ra228_4a	90Min. 0 Sec.	5	0.0556	201	2.233	
Status: Unknown		Acq Date: 2019/12/13 16:28:40.00						
1 D	47-1ms	Ra228_4a	90Min. 0 Sec.	14	0.1208	625	6.944	
Status: Unknown		Acq Date: 2019/12/13 16:28:40.00						
1 C	47-1	Ra228_4a	90Min. 0 Sec.	6	0.0667	192	2.133	
Status: Unknown		Acq Date: 2019/12/13 16:28:40.00						
2 A	47-2	Ra228_4a	90Min. 0 Sec.	7	0.0111	221	2.456	
Status: Unknown		Acq Date: 2019/12/13 16:28:44.00						
2 D		Ra228_4a	90Min. 0 Sec.	9	0.10	208	2.311	
Status: Unknown		Acq Date: 2019/12/13 16:28:44.00						
2 B	47-3	Ra228_4a	90Min. 0 Sec.	7	0.0	189	2.1	
Status: Unknown		Acq Date: 2019/12/13 16:28:44.00						
2 C	47-4	Ra228_4a	90Min. 0 Sec.	8	0.0222	255	2.833	
Status: Unknown		Acq Date: 2019/12/13 16:28:44.00						
3 A	47-5	Ra228_4a	90Min. 0 Sec.	5	0.00556	230	2.556	
Status: Unknown		Acq Date: 2019/12/13 16:28:49.00						
3 C		Ra228_4a	90Min. 0 Sec.	7	0.0611	249	2.767	
Status: Unknown		Acq Date: 2019/12/13 16:28:49.00						
3 D		Ra228_4a	90Min. 0 Sec.	8	0.0542	311	3.456	
Status: Unknown		Acq Date: 2019/12/13 16:28:49.00						
3 B	47-5dup	Ra228_4a	90Min. 0 Sec.	4	0.00278	232	2.578	
Status: Unknown		Acq Date: 2019/12/13 16:28:49.00						
4 A		Ra228_4a	90Min. 0 Sec.	13	0.0444	250	2.778	
Status: Unknown		Acq Date: 2019/12/13 16:28:54.00						
4 C		Ra228_4a	90Min. 0 Sec.	6	0.00833	228	2.533	
Status: Unknown		Acq Date: 2019/12/13 16:28:54.00						
4 B		Ra228_4a	90Min. 0 Sec.	5	0.0	241	2.678	
Status: Unknown		Acq Date: 2019/12/13 16:28:54.00						
4 D		Ra228_4a	90Min. 0 Sec.	5	0.0306	211	2.344	
Status: Unknown		Acq Date: 2019/12/13 16:28:54.00						

Health Physics Specialist: _____ Date: _____

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487361

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/02/2019 14:00
End Date/Time: 12/05/2019 13:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487361CSTD1	NONE	As Rec		12/02/19 14:00		10.04		10.05	10.05							20.5
2	WG487361CSTD2	NONE	As Rec		12/02/19 17:56		7.01		7.01	7.01							20.6
3	WG487361CSTD3	NONE	As Rec		12/02/19 21:53		2.04		2.05	2.05							20.5
4	WG487361ICV	PCN58503	As Rec		12/03/19 1:50		4.01		4.01	4.01							20.7
5	WG487361PBS	NONE	As Rec		12/03/19 5:46	0	5.19	23	5.93	6.06	0	5001.5	0	12/3/2019 9:45:00 AM	12/4/2019 10:20:00 AM	24.58333333331	20.7
6	L56147-01	STSB27_0.5-3	As Rec		12/03/19 9:43	0	5.19	23	7.70	7.78	5000	5005.7	13.12	12/3/2019 9:45:00 AM	12/4/2019 2:15:00 PM	26.5	20.8
7	L56147-02	STSB27_6-15	As Rec		12/03/19 13:40	0	5.19	23	7.59	7.66	5000	5001.4	20.4	12/3/2019 9:45:00 AM	12/4/2019 2:20:00 PM	28.58333333326	20.7
8	L56147-03	STSB28_0.5-3	As Rec		12/03/19 17:36	0	5.19	23	4.63	4.58	5000	5002.4	8.77	12/3/2019 9:45:00 AM	12/4/2019 12:40:00 PM	26.91666666674	20.9
9	L56147-04	STSB28_6-15	As Rec		12/03/19 21:33	0	5.19	23	6.91	6.93	5000	5005.8	26.92	12/3/2019 9:45:00 AM	12/4/2019 2:35:00 PM	28.83333333337	20.8
10	L56147-05	STSB29_0.5-3	As Rec		12/04/19 1:30	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
11	L56147-05MS1	MS190905-3	As Rec		12/04/19 5:26	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
12	L56147-05MSD1	MS190905-3	As Rec		12/04/19 9:23	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
13	L56147-05MS2	II191127-2	As Rec		12/04/19 13:20	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
14	L56147-05MSD2	II191127-2	As Rec		12/04/19 17:16	0	5.19	23	4.34	4.31	5000	5007.5	14.5	12/3/2019 9:45:00 AM	12/4/2019 1:30:00 PM	27.75	20.2
15	WG487361CCV1	PCN58503	As Rec		12/04/19 21:13		4.04		4.03	4.03							20.5
16	L56147-05DUP	NONE	As Rec		12/05/19 1:10	0	5.19	23	4.32	4.31	5000	5001.6	12.17	12/3/2019 9:45:00 AM	12/4/2019 1:45:00 PM	27.99999999994	20.8
17	WG487361LFB1	II191127-2	As Rec		12/05/19 5:06	0	5.19	23	5.93	6.06	0	5001.5	0	12/3/2019 9:45:00 AM	12/4/2019 10:20:00 AM	24.58333333331	20.7
18	WG487361LFB2	MS190905-3	As Rec		12/05/19 9:03	0	5.19	23	5.93	6.06	0	5001.5	0	12/3/2019 9:45:00 AM	12/4/2019 10:20:00 AM	24.58333333331	20.7
19	WG487361CCV2	PCN58503	As Rec		12/05/19 13:00		4.02		4.01	4.01							20.5

Report Comments:

Internal Comments

AREV: GKH 12/5/19
Initials, Date

SREV: EWA 12-5-19
Initials, Date

12/5/2019 1:50:58 PM 121719

Meteoric Water Mobility

WG487361

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/04/2019 12:17
Start Date/Time: 12/03/2019 1:50
End Date/Time: 12/05/2019 13:00

Sample	Login Comments
L56147-01	BUCKET || Stored in soil's hallway.
L56147-02	BUCKET || Stored in soil's hallway.
L56147-03	BUCKET || Stored in soil's hallway.
L56147-04	BUCKET || Stored in soil's hallway.
L56147-05	BUCKET(2) || Stored in soil's hallway.
L56147-05MS1	ICPMS Spike
L56147-05MS2	ICP Spike
L56147-05MSD1	ICPMS Spike
L56147-05MSD2	ICP Spike
WG487361CCV1	pH QC
WG487361CSTD1	pH QC
WG487361CSTD2	pH QC
WG487361CSTD3	pH QC
WG487361ICV	pH QC
WG487361LFB1	ICP LFB
WG487361LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/6/2019 11:39:59 AM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488103

Date Reported: 26-Dec-19
Run ID: R1764799
Date Analyzed: 13-Dec-19
ICAL Workgroup:
Instrument ID: G542

L56147-01

Tag: **Measured:** 12/13/2019 4:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	3.8	1		pCi/L	++	7.1	2.7		RG TB	

L56147-01MS

Tag: **Measured:** 12/13/2019 4:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	FOUND	31 ✓	1		pCi/L	++	6.8	4	PCN57186		
SREV	RADIUM 228	REC	96	1		%	++	6.8	4	PCN57186		
SREV	RADIUM 228	TRUE	31766666667	1		pCi/L	++	6.8	4	PCN57186		

L56147-02

Tag: **Measured:** 12/13/2019 4:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	0.99	1		pCi/L	++	5.6	2.4		RG TB	

L56147-03

Tag: **Measured:** 12/13/2019 4:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	-0.64	1		pCi/L	++	6.1	2.5		RG TB	

L56147-04

Tag: **Measured:** 12/13/2019 4:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	2.1	1		pCi/L	++	6	2.7		RG TB	

L56147-05

Tag: **Measured:** 12/13/2019 4:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	2.8	1		pCi/L	++	6	2.5		RG TB	

L56147-05DUP

Tag: **Measured:** 12/13/2019 4:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	FOUND	1.6	1		pCi/L	++	5.8	2.5			
SREV	RADIUM 228	RER	0.34	1		%	++	1.5	3	RER = 0.68		
SREV	RADIUM 228	RPD	55	1		pCi/L	ALRT	5.8	2.5		RG	

WG487361LCSW

Tag: **Measured:** 12/13/2019 4:29:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	FOUND	27 ✓	1		pCi/L	++	6	3.6	PCN57186		
SREV	RADIUM 228	REC	95	1		%	++	6	3.6	PCN57186		
SREV	RADIUM 228	TRUE	31766666667	1		pCi/L	++	6	3.6	PCN57186		

WG487361PBW **Tag:** **Measured:** **12/13/2019 4:29:00 PM**

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	FOUND	-0.14	1		pCi/L	++	6.5	2.7			

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Radiochemistry

WG488103 **Ra228**

Sample	Date	SCN	RADIUM 228
L56147-02	12/13/19 16:29		X
L56147-03	12/13/19 16:29		X
L56147-01	12/13/19 16:29		X
WG487361LCSW	12/13/19 16:29		X
L56147-01MS	12/13/19 16:29		X
L56147-05	12/13/19 16:29		X
L56147-05DUP	12/13/19 16:29		X
L56147-04	12/13/19 16:29		X
WG487361PBW	12/13/19 16:29		X

488110

ACZ Laboratories, Inc. **WG488110**
Radium 228 in Water
EPA 904.0/9320

12/19/2019 2:30 PM

Project:

SOP # 1495

Instrument: G542
Matrix Class: LIQUID
List Type: QC-RA-228
List Function: ANALYTICAL

Analyst: AMK
Dept: 55
Prep Date: 12/13/2019
Analysis Date: 12/18/2019
Start Time:
End Time:
Approved: AMK 12/19/19
Approved: TSB 12/26/19

Seq #	ACZ Sample No.	Client Sample ID	Sample Volume mL	Sample Matrix	Y Planchett Weight g	Y Gross Weight g	Sample Weight g	Residue Density mg/cm³	Ba Planchett Weight g	Ba Gross Weight g	Radium 228 pCi/L	Error (+ -)	LLD pCi/L
1	WG487250PBW		410	SO	9.2582	9.2761	0.0179	0.8950	9.212	9.2709	0.80	2.27	5.45
2	WG487250LCSW	PCN57186	400	SO	9.17	9.1958	0.0258	1.2900	9.2057	9.263	20.43	2.44	4.05
3	L56147-06	STSB29_6-15	400	SO	9.2062	9.2257	0.0195	0.9750	9.1898	9.2124	5.91	3.12	7.25
4	L56147-07	STSB29-FD_6-15	415	SO	9.1944	9.2196	0.0252	1.2600	9.1844	9.2414	4.16	1.86	4.14
5	L56147-08	STSB30_0.5-3	390	SO	9.1968	9.2219	0.0251	1.2550	9.1651	9.2188	0.91	1.72	4.16
6	L56147-08MS	PCN57186	390	SO	9.2105	9.2355	0.0250	1.2500	9.2283	9.2834	20.87	2.52	4.10
7	L56147-09	STSB30_6-15	420	SO	9.2329	9.257	0.0241	1.2050	9.224	9.2781	3.39	1.76	4.05
8	L56147-09DUP		410	SO	9.2286	9.2518	0.0232	1.1600	9.1932	9.2499	4.43	1.89	4.28
9	L56147-10	STSB31_0.5-3	385	SO	9.1989	9.2228	0.0239	1.1950	9.1752	9.2292	3.40	1.95	4.46
10	L56147-11	STSB31_6-15	380	SO	9.2427	9.2644	0.0217	1.0850	9.1756	9.2295	1.96	2.23	4.93
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Comments:

Decay Equation for Ra228:	
Standard Preparation Date	8/20/2018
Initial True Value (pCi/mL)	25.00
Decayed Value (pCi/mL)	21.30

Sr89 Calibration performed with PCN 54078

Daily performance check with SR-Y PCN 22287

ACZ Sample No.	Det.	Gross CPM	BG β	NET CPM Beta	Ingrow Time (mm/dd/yyyy hh:mm)	Decay Time (mm/dd/yyyy hh:mm)	Analysis Time (mm/dd/yyyy hh:mm)	Ingrow Time min.	Decay Time min.	Y Yield (dec %)	Enter values in only one of these two columns* Ba Rec Weight (g)	Ba Yield (dec %)	Ba Rec ICPMS (ug/L)	Total Yield (dec %)	Efficiency Beta	Radium 228 Calculations (See notes) A	B	C	D	Det.	Det BG β
WG487250PBW	1A	2.3670	2.2110	0.1560	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.59	0.06	1.07		0.59	0.4894	0.35020	1.08717	1.00849	1.22104	1A	2.211
WG487250LCSW	1B	7.4560	2.1000	5.3560	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.84	0.06	1.04		0.84	0.4685	12.87545	1.08717	1.00849	1.22104	1B	2.1
L56147-06	1C	2.8780	2.0110	0.8670	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.64	0.04	0.77		0.49	0.4475	2.18168	1.08717	1.00849	1.22104	1C	2.011
L56147-07	1D	3.1890	2.1220	1.0670	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.82	0.06	1.04		0.82	0.4521	2.56161	1.08717	1.00849	1.22104	1D	2.122
L56147-08	2A	2.3890	2.1560	0.2330	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.82	0.05	0.98		0.80	0.4929	0.54600	1.08717	1.00849	1.22104	2A	2.156
L56147-08MS	2B	7.6890	2.2780	5.4110	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.82	0.06	1.00		0.82	0.4902	12.74866	1.08717	1.00849	1.22104	2B	2.278
L56147-09	2C	2.9330	2.0440	0.8890	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.79	0.05	0.98		0.78	0.4852	1.96502	1.08717	1.00849	1.22104	2C	2.044
L56147-09DUP	2D	3.1220	2.0220	1.1000	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.76	0.06	1.03		0.76	0.4817	2.50906	1.08717	1.00849	1.22104	2D	2.022
L56147-10	3A	2.9440	2.1330	0.8110	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.78	0.05	0.98		0.77	0.4862	1.95146	1.08717	1.00849	1.22104	3A	2.133
L56147-11	3B	2.9110	2.4890	0.4220	12/16/2019 17:55	12/18/2019 12:11	12/18/2019 13:57	2536.00	106	0.71	0.05	0.98		0.70	0.4919	1.01702	1.08717	1.00849	1.22104	3B	2.489
												0.00		0.00			1.08717			3C	2.144
												0.00		0.00			1.08717			3D	2.422
												0.00		0.00			1.08717			4A	1.876
												0.00		0.00			1.08717			4B	1.911
												0.00		0.00			1.08717			4C	2.211
												0.00		0.00			1.08717			4D	2.311
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				
												0.00		0.00			1.08717				
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												0.00		0.00			1.08717				
												0.00		0.00			1.08717				

Radium 228 Calculations

A	(Net CPM Beta * 1000) / (2.22 * Eff. Beta * Samp. Vol.)
B	(0.001884 * 90) / (1 - 2.7183 ^ (-0.001884 * 90))
C	1 / (1 - 2.7183 ^ (-0.001884 * Ingrow Time))
D	1 / (2.7183 ^ (-0.001884 * Decay Time))

*see <P:\QAQC\QA - Editable\Scanned DOC, MDL, etc\RadChem\2015\EPA904.0\"Ra228 Ba Yield Test"> for derivation of Ba true values

Beta efficiency equation factors for each of 16 G542 detectors

Efficiency Equation:
(Y = MX + B)
where
(X=Residue Density)

Detector	M	B
1A	-0.0049	0.4938
1B	-0.0012	0.4700
1C	-0.0089	0.4562
1D	-0.0034	0.4564
2A	-0.0032	0.4969
2B	-0.0019	0.4926
2C	0.0025	0.4822
2D	0.0004	0.4812
3A	0.0007	0.4854
3B	0.0000	0.4919
3C	-0.0028	0.4862
3D	-0.0056	0.5009
4A	-0.0022	0.4975
4B	0.0022	0.4586
4C	-0.0021	0.4821
4D	-0.0029	0.4916

ACZ Laboratories, Inc.
Radiochemistry Data Review Checklist

AMK 12/19/19

Work Group:	488110
Sample Type:	~~A~~ SO
Analysis Date:	12/18/19
Analyst:	AMK
Prep Date:	12/13/19

Data Reviewer:	AMK
Date:	12/19/19
Approved:	TJR
Date:	12/26/19

Weekly background file: —
Daily background file: 12/18/19 942

Alpha performance file: —
Beta performance file: 12/18/19 1142

GAB dry date/time: —

	Yes	No	NA
1) **FOR SREV:** QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		
2) **FOR SREV:** For 903.1 WG's only, was the ICP Barium recovery raw data merged with the WG in LIMS?			✓
3) Does the workgroup include all required QC samples?	✓		
4) Are all QC criteria listed in LIMS within specified limits?		✓	
5) Does all QC have the correct nomenclature (PBS vs PBW, etc.)?	✓		
6) For GABs: Beta LCS/MS deleted from Alpha & Alpha LCS/MS deleted from Beta?			✓
7) Are all PCNs / SCNs used for LIMS calculations entered correctly?	✓		
8) Have all transcriptions been reviewed for accuracy (e.g. volumes, BG's, sx counts, etc.)?	✓		
9) Are samples flagged for INSX, if applicable?			✓
10) Is any sample analyzed using less volume appropriately "D" qualified?			✓
11) Are all calculations based on the correct matrix?	✓		
12) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
13 Is a current standard/reagent sheet attached to the workgroup?	✓		
14) Are all associated WG benchsheets locked for editing?	✓		
15) For GAB WG's containing DW samples, did at least 72 hours elapse between end of drying and start of counting?			✓
16) Are all tracer or carrier recoveries within acceptable limits?	✓		
17) For Lead-210 WG's, are the counts off the instrument in gross counts?			✓
18) Is the correct instrument ID on the WG benchsheet, and does it correspond with the template and raw data?	✓		

QC limits *

Analyte	PBW	LCS & MS
gross alpha	2*LLD	67-144
gross beta	2*LLD	82-122
Ra-226 (903.1)	2*LLD	43-148
Alpha emitting Ra isotopes	2*LLD	66-132
Ra-228	2*LLD	47-123
Pb-210	2*LLD	55-121
Th	2*LLD	91-126
U-234	2*LLD	77-122
U-235	2*LLD	42-136
U-238	2*LLD	87-124
Po-210	2*LLD	51-128
GAMMA	2*LLD	90-110
Rn-222	2*LLD	90-110

Tracer/Carrier QC Limits

Tracer/Carrier	%Rec
Ra-228 (Ba & Y)	40-130
Alpha emitting Ra isotopes (Ba)	40-130
Ra-226 903.1 (Ba)	40-130
U-232	30-130
Po-209	25-130
Pb-210	30-130
Th-229	30-130

For any of the items listed above that are checked "No" state the corrective action/explanation below.

QC/Sample ID	Analytical Problem	Corrective action
L56147-09 DUP	RPD out. Sx value <5x LLD RER used for assessment.	RG

Comments:

LCS MS limits developed from combined control chart data for LCSW LCSS.

ACZ Laboratories, Inc. **WG488110**
Radium 228 in Water
EPA 904.0/9320

xlsx 12/19/2019 2:08 PM

Project:

SOP # 1495

Instrument: G542
Matrix Class: LIQUID
List Type: QC-RA-228
List Function: ANALYTICAL

Analyst: AMK
Dept: 55
Prep Date: 12/13/2019
Analysis Date:
Start Time:
End Time:
Approved:
Approved:

Seq. #	ACZ Sample No.	Client Sample ID	Sample Volume mL	Sample Matrix	Y Planchett Weight g	Y Gross Weight g	Sample Weight g	Residue Density mg/cm²	Ba Planchett Weight g	Ba Gross Weight g	Radium 228 pCi/L	Error (+-)	LLD pCi/L
1	WG487250PBW		410	SO								#DIV/0!	#DIV/0!
2	WG487250LCSW	PCN57186	400	SO								#DIV/0!	#DIV/0!
3	L56147-06	STSB29_6-15	400	SO								#DIV/0!	#DIV/0!
4	L56147-07	STSB29-FD_6-15	415	SO								#DIV/0!	#DIV/0!
5	L56147-08	STSB30_0.5-3	390	SO								#DIV/0!	#DIV/0!
6	L56147-08MS	PCN57186	390	SO								#DIV/0!	#DIV/0!
7	L56147-09	STSB30_6-15	420	SO								#DIV/0!	#DIV/0!
8	L56147-09DUP		410	SO								#DIV/0!	#DIV/0!
9	L56147-10	STSB31_0.5-3	385	SO								#DIV/0!	#DIV/0!
10	L56147-11	STSB31_6-15	380	SO								#DIV/0!	#DIV/0!
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Comments: Maximum vol. used for all sx + QC

ingrow 12/16/19 @ 1755
decay 12/18/19 @ 1211

Decay Equation for Ra228:	
Standard Preparation Date	8/20/2018
Initial True Value (pCi/mL)	25.00
Decayed Value (pCi/mL)	21.30

Sr89 Calibration performed with PCN 54078

Daily performance check with SR-Y PCN 22287

L56147-2001131042

ACZ LABORATORIES, INC.
Standards/Reagents Information

ANALYST: _____
WG488110.xlsx 12/13/2019 3:56 PM
Second analyst: _____

Water

DATE TIME of prep start: _____

PROJECT/WG: _____
Method Ra-228 904/9320

INSTR: G542

Radioactive Standards

LCS & MS 57186

Reagents

Ammonium Sulfate:	RC191121-1	Ytrium carrer	RC191211-2	Ammonium Hydroxide.	59976
Barium Carrier:	RC191102-2	Strontium carrer	RC191211-1	Ammonium oxalate.	RC191126-3
Lead Carrier:	RC191206-1	Sr-Y mix	RC191102-1	Ammonium sulfide.	RC191209-1
Citric Acid	RC191025-1	Sulfuric Acid:	60173	EDTA	RC191212-1
Nitric Acid	60462	Acetic Acid:	60369	Methyl Orange	56772
Nitric Acid 6N	59928	Nitric Acid 1.0N	59927	Sodium hydroxide 18 N	RC191125-1
		Sodium hydroxide 10 N	RC191120-2		

AMW 12/19/19

COMMENTS:

ACZ Sample Number	Bottle ID
WG487250~~PBS~~ PBW	
WG487250~~LCSS~~ LCSW	
L56147-06	
L56147-07	
L56147-08	
L56147-08MS	
L56147-09	
L56147-09DUP	
L56147-10	
L56147-11	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
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0	
0	
0	

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa
USER ID: radchem

Source Name:
System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Count Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A	pbs	Ra228_4a		90Min. 0 Sec.	13	0.1444	213	2.367
Status: Unknown		Acq Date: 2019/12/18 13:56:46.00						
1 B	lcss	Ra228_4a		90Min. 0 Sec.	18	0.20	671	7.456
Status: Unknown		Acq Date: 2019/12/18 13:56:46.00						
1 D	47-7	Ra228_4a		90Min. 0 Sec.	22	0.2097	287	3.189
Status: Unknown		Acq Date: 2019/12/18 13:56:46.00						
1 C	47-6	Ra228_4a		90Min. 0 Sec.	15	0.1667	259	2.878
Status: Unknown		Acq Date: 2019/12/18 13:56:46.00						
2 A	47-8	Ra228_4a		90Min. 0 Sec.	14	0.0889	215	2.389
Status: Unknown		Acq Date: 2019/12/18 13:56:51.00						
2 D	47-9dup	Ra228_4a		90Min. 0 Sec.	22	0.2444	281	3.122
Status: Unknown		Acq Date: 2019/12/18 13:56:51.00						
2 B	47-8ms	Ra228_4a		90Min. 0 Sec.	20	0.1306	692	7.689
Status: Unknown		Acq Date: 2019/12/18 13:56:51.00						
2 C	47-9	Ra228_4a		90Min. 0 Sec.	15	0.10	264	2.933
Status: Unknown		Acq Date: 2019/12/18 13:56:51.00						
3 A	47-10	Ra228_4a		90Min. 0 Sec.	12	0.0833	265	2.944
Status: Unknown		Acq Date: 2019/12/18 13:56:56.00						
3 C		Ra228_4a		90Min. 0 Sec.	8	0.0722	207	2.3
Status: Unknown		Acq Date: 2019/12/18 13:56:56.00						
3 D		Ra228_4a		90Min. 0 Sec.	11	0.0875	259	2.878
Status: Unknown		Acq Date: 2019/12/18 13:56:56.00						
3 B	47-1l	Ra228_4a		90Min. 0 Sec.	16	0.1361	262	2.911
Status: Unknown		Acq Date: 2019/12/18 13:56:56.00						
4 A		Ra228_4a		90Min. 0 Sec.	8	0.0	224	2.489
Status: Unknown		Acq Date: 2019/12/18 13:57:00.00						
4 C		Ra228_4a		90Min. 0 Sec.	10	0.0528	260	2.889
Status: Unknown		Acq Date: 2019/12/18 13:57:00.00						
4 B		Ra228_4a		90Min. 0 Sec.	9	0.0417	233	2.589
Status: Unknown		Acq Date: 2019/12/18 13:57:00.00						
4 D		Ra228_4a		90Min. 0 Sec.	11	0.0972	241	2.678
Status: Unknown		Acq Date: 2019/12/18 13:57:00.00						

Health Physics Specialist: _____ **Date:** _____

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa **Source Name:**
USER ID: radchem **System Serial #:** 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Count Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A		Daily BG		90Min. 0 Sec.	13	0.1444	199	2.211
Status: Bkg		Acq Date: 2019/12/18 09:42:16.00						
Alpha Background QC CPM: 0.00 to 0.10 At 1.960 Std. **No** Beta Background QC CPM: 1.91 to 2.42 At 1.960 Std. **Yes**								
1 B		Daily BG		90Min. 0 Sec.	9	0.10	189	2.1
Status: Bkg		Acq Date: 2019/12/18 09:42:16.00						
Alpha Background QC CPM: 0.00 to 0.08 At 1.960 Std. **No** Beta Background QC CPM: 1.91 to 2.40 At 1.960 Std. **Yes**								
1 D		Daily BG		90Min. 0 Sec.	7	0.0778	191	2.122
Status: Bkg		Acq Date: 2019/12/18 09:42:16.00						
Alpha Background QC CPM: 0.02 to 0.11 At 1.960 Std. **Yes** Beta Background QC CPM: 1.72 to 2.57 At 1.960 Std. **Yes**								
1 C		Daily BG		90Min. 0 Sec.	7	0.0778	181	2.011
Status: Bkg		Acq Date: 2019/12/18 09:42:16.00						
Alpha Background QC CPM: 0.02 to 0.08 At 1.960 Std. **Yes** Beta Background QC CPM: 1.50 to 2.36 At 1.960 Std. **Yes**								
2 A		Daily BG		90Min. 0 Sec.	6	0.0667	194	2.156
Status: Bkg		Acq Date: 2019/12/18 09:42:21.00						
Alpha Background QC CPM: -0.01 to 0.15 At 1.960 Std. **Yes** Beta Background QC CPM: 1.72 to 3.40 At 1.960 Std. **Yes**								
2 D		Daily BG		90Min. 0 Sec.	8	0.0889	182	2.022
Status: Bkg		Acq Date: 2019/12/18 09:42:21.00						
Alpha Background QC CPM: 0.02 to 0.06 At 1.960 Std. **No** Beta Background QC CPM: 1.77 to 2.66 At 1.960 Std. **Yes**								
2 B		Daily BG		90Min. 0 Sec.	6	0.0667	205	2.278
Status: Bkg		Acq Date: 2019/12/18 09:42:21.00						
Alpha Background QC CPM: -0.05 to 0.12 At 1.960 Std. **Yes** Beta Background QC CPM: 1.72 to 3.40 At 1.960 Std. **Yes**								
2 C		Daily BG		90Min. 0 Sec.	5	0.0556	184	2.044
Status: Bkg		Acq Date: 2019/12/18 09:42:21.00						
Alpha Background QC CPM: 0.03 to 0.12 At 1.960 Std. **Yes** Beta Background QC CPM: 1.85 to 2.86 At 1.960 Std. **Yes**								
3 A		Daily BG		90Min. 0 Sec.	10	0.1111	192	2.133
Status: Bkg		Acq Date: 2019/12/18 09:42:26.00						
Alpha Background QC CPM: 0.01 to 0.09 At 1.960 Std. **No** Beta Background QC CPM: 1.70 to 2.64 At 1.960 Std. **Yes**								
3 C		Daily BG		90Min. 0 Sec.	7	0.0778	193	2.144
Status: Bkg		Acq Date: 2019/12/18 09:42:26.00						
Alpha Background QC CPM: 0.01 to 0.07 At 1.960 Std. **No** Beta Background QC CPM: 1.90 to 2.95 At 1.960 Std. **Yes**								
3 D		Daily BG		90Min. 0 Sec.	12	0.1333	218	2.422
Status: Bkg		Acq Date: 2019/12/18 09:42:26.00						
Alpha Background QC CPM: 0.00 to 0.08 At 1.960 Std. **No** Beta Background QC CPM: 2.34 to 3.51 At 1.960 Std. **Yes**								
3 B		Daily BG		90Min. 0 Sec.	9	0.10	224	2.489
Status: Bkg		Acq Date: 2019/12/18 09:42:26.00						
Alpha Background QC CPM: 0.01 to 0.09 At 1.960 Std. **No** Beta Background QC CPM: 1.81 to 2.98 At 1.960 Std. **Yes**								
4 A		Daily BG		90Min. 0 Sec.	9	0.10	169	1.878
Status: Bkg		Acq Date: 2019/12/18 09:42:31.00						
Alpha Background QC CPM: 0.04 to 0.17 At 1.960 Std. **Yes** Beta Background QC CPM: 1.82 to 2.44 At 1.960 Std. **Yes**								
4 C		Daily BG		90Min. 0 Sec.	8	0.0889	199	2.211
Status: Bkg		Acq Date: 2019/12/18 09:42:31.00						
Alpha Background QC CPM: 0.01 to 0.09 At 1.960 Std. **No** Beta Background QC CPM: 1.98 to 2.55 At 1.960 Std. **Yes**								
4 B		Daily BG		90Min. 0 Sec.	3	0.0333	172	1.911
Status: Bkg		Acq Date: 2019/12/18 09:42:31.00						
Alpha Background QC CPM: 0.00 to 0.08 At 1.960 Std. **Yes** Beta Background QC CPM: 1.76 to 2.51 At 1.960 Std. **Yes**								

Health Physics Specialist: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa
USER ID: radchem

Source Name:
System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Count Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
4 D		Daily BG		90Min. 0 Sec.	6	0.0667	208	2.311
Status: Bkg		Acq Date: 2019/12/18 09:42:31.00						

Alpha Background QC CPM: -0.01 to 0.12 At 1.960 Std. **Yes** Beta Background QC CPM: 1.81 to 2.74 At 1.960 Std. [**Yes**

Health Physics Specialist: _____ **Date:** _____

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name: 90SR3103846
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A	Beta	Beta Perf	0	Min.30 Sec.	2	4.0	1351	2702.0
Status: Source		Acq Date: 2019/12/18 11:42:13.00						
Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,500.22 to 2,810.98 At 1.9 Yes								
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta								
1 B	Beta	Beta Perf	0	Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/18 11:42:13.00						
1 C	Beta	Beta Perf	0	Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/18 11:42:13.00						
1 D	Beta	Beta Perf	0	Min.30 Sec.	0	0.0	0	0.0
Status: Unknown		Acq Date: 2019/12/18 11:42:13.00						

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
1 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	2	4.0
Status: Unknown		Acq Date: 2019/12/18 12:03:09.00						
1 B	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1284	2568.0
Status: Source		Acq Date: 2019/12/18 12:03:09.00						

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 2,536.99 to 2,719.41 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

1 C	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/18 12:03:09.00						
1 D	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/18 12:03:09.00						

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Time	Alpha Count	Alpha Counts cpm	Net	Beta Counts cpm	Net
1 A	Beta	Beta Perf		0Min.30 Sec.	0	0.0		2	4.0
Status: Unknown		Acq Date: 2019/12/18 11:44:19.00							
1 B	Beta	Beta Perf		0Min.30 Sec.	0	0.0		1	2.0
Status: Unknown		Acq Date: 2019/12/18 11:44:19.00							
1 C	Beta	Beta Perf		0Min.30 Sec.	1	2.0		1193	2386.0
Status: Source		Acq Date: 2019/12/18 11:44:19.00							

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,021.69 to 2,662.71 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

1 D	Beta	Beta Perf		0Min.30 Sec.	0	0.0		2	4.0
Status: Unknown		Acq Date: 2019/12/18 11:44:19.00							

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Time	Alpha Count	Alpha Counts	Net cpm	Beta Counts	Beta Net cpm
1 A	Beta	Beta Perf		0Min.30 Sec.	0	0.0	1	2.0	
Status: Unknown		Acq Date: 2019/12/18 11:45:11.00							
1 B	Beta	Beta Perf		0Min.30 Sec.	0	0.0	3	6.0	
Status: Unknown		Acq Date: 2019/12/18 11:45:11.00							
1 C	Beta	Beta Perf		0Min.30 Sec.	0	0.0	0	0.0	
Status: Unknown		Acq Date: 2019/12/18 11:45:11.00							
1 D	Beta	Beta Perf		0Min.30 Sec.	0	0.0	1219	2438.0	
Status: Source		Acq Date: 2019/12/18 11:45:11.00							

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 1,870.05 to 2,710.35 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name: 90SR3103846
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
2 A	Beta	Beta Perf	0	Min.30 Sec.	1	2.0	1364	2728.0

Status: Source Acq Date: 2019/12/18 11:46:12.00
Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,492.64 to 2,830.56 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

2 B	Beta	Beta Perf	0	Min.30 Sec.	0	0.0	2	4.0

Status: Unknown Acq Date: 2019/12/18 11:46:12.00

2 C	Beta	Beta Perf	0	Min.30 Sec.	0	0.0	0	0.0

Status: Unknown Acq Date: 2019/12/18 11:46:12.00

2 D	Beta	Beta Perf	0	Min.30 Sec.	0	0.0	1	2.0

Status: Unknown Acq Date: 2019/12/18 11:46:12.00

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
2 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	3	6.0
Status: Unknown		Acq Date: 2019/12/18 11:47:38.00						
2 B	Beta	Beta Perf	2	0Min.30 Sec.	4.0	1270	2540.0	
Status: Source		Acq Date: 2019/12/18 11:47:38.00						

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,460.97 to 2,747.03 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

2 C	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/18 11:47:38.00						
2 D	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	2	4.0
Status: Unknown		Acq Date: 2019/12/18 11:47:38.00						

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Time	Alpha Count	Alpha Counts	Net cpm	Beta Counts	Beta Net cpm
2 A	Beta	Beta Perf		0Min.30 Sec.	0	0.0		2	4.0
Status: Unknown		Acq Date: 2019/12/18 11:48:38.00							
2 B	Beta	Beta Perf		0Min.30 Sec.	0	0.0		1	2.0
Status: Unknown		Acq Date: 2019/12/18 11:48:38.00							
2 C	Beta	Beta Perf		0Min.30 Sec.	1	2.0		1288	2576.0
Status: Source		Acq Date: 2019/12/18 11:48:38.00							

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std No Beta Source QC CPM: 2,491.79 to 2,804.61 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

2 D	Beta	Beta Perf		0Min.30 Sec.	0	0.0		0	0.0
Status: Unknown		Acq Date: 2019/12/18 11:48:38.00							

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
2 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	2	4.0
Status: Unknown		Acq Date: 2019/12/18 11:50:08.00						
2 B	Beta	Beta Perf	1	0Min.30 Sec.	1	2.0	2	4.0
Status: Unknown		Acq Date: 2019/12/18 11:50:08.00						
2 C	Beta	Beta Perf	1	0Min.30 Sec.	1	2.0	2	4.0
Status: Unknown		Acq Date: 2019/12/18 11:50:08.00						
2 D	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1286	2572.0
Status: Source		Acq Date: 2019/12/18 11:50:08.00						

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 2,455.43 to 2,748.57 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name: 90SR3103846
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
3 A	Beta	Beta Perf		0Min.30 Sec.	0	0.0	1273	2546.0
Status: Source		Acq Date: 2019/12/18 11:51:34.00						
Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 2,482.40 to 2,722.80 At 1.9 Yes								
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta								
3 B	Beta	Beta Perf		0Min.30 Sec.	1	2.0	3	6.0
Status: Unknown		Acq Date: 2019/12/18 11:51:34.00						
3 C	Beta	Beta Perf		0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/18 11:51:34.00						
3 D	Beta	Beta Perf		0Min.30 Sec.	1	2.0	1	2.0
Status: Unknown		Acq Date: 2019/12/18 11:51:34.00						

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch Count	Elapsed Time	Alpha Counts	Alpha Net cpm	Beta Counts	Beta Net cpm
3 A	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	0	0.0
Status: Unknown		Acq Date: 2019/12/18 11:52:51.00						
3 B	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1313	2626.0
Status: Source		Acq Date: 2019/12/18 11:52:51.00						

Alpha Source QC CPM: 0.00 to 0.00 At 1.960 Std Yes Beta Source QC CPM: 2,454.74 to 2,782.06 At 1.9 Yes
Source Name : 90SR3103846 Isotope Name: Sr-90 Half Life: 28.79 Years Emission Type: Beta

3 C	Beta	Beta Perf	0	0Min.30 Sec.	0	0.0	1	2.0
Status: Unknown		Acq Date: 2019/12/18 11:52:51.00						
3 D	Beta	Beta Perf	0	0Min.30 Sec.	1	2.0	3	6.0
Status: Unknown		Acq Date: 2019/12/18 11:52:51.00						

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

ACZ LABS
G-542W QC and Analysis Report

Machine Name: Medusa Source Name:
USER ID: radchem System Serial #: 061701

Sample Position/De	Sample Ident	Sample Type	Batch	Elapsed Time	Alpha Count	Alpha Counts cpm	Alpha Net	Beta Counts cpm	Beta Net
1 A	pbs	Ra228_4a		90Min. 0 Sec.	13	0.1444		213	2.367
Status: Unknown		Acq Date: 2019/12/18 13:56:46.00							
1 B	lcss	Ra228_4a		90Min. 0 Sec.	18	0.20		671	7.456
Status: Unknown		Acq Date: 2019/12/18 13:56:46.00							
1 D	47-7	Ra228_4a		90Min. 0 Sec.	22	0.2097		287	3.189
Status: Unknown		Acq Date: 2019/12/18 13:56:46.00							
1 C	47-6	Ra228_4a		90Min. 0 Sec.	15	0.1667		259	2.878
Status: Unknown		Acq Date: 2019/12/18 13:56:46.00							
2 A	47-8	Ra228_4a		90Min. 0 Sec.	14	0.0889		215	2.389
Status: Unknown		Acq Date: 2019/12/18 13:56:51.00							
2 D	47-9dup	Ra228_4a		90Min. 0 Sec.	22	0.2444		281	3.122
Status: Unknown		Acq Date: 2019/12/18 13:56:51.00							
2 B	47-8ms	Ra228_4a		90Min. 0 Sec.	20	0.1306		692	7.689
Status: Unknown		Acq Date: 2019/12/18 13:56:51.00							
2 C	47-9	Ra228_4a		90Min. 0 Sec.	15	0.10		264	2.933
Status: Unknown		Acq Date: 2019/12/18 13:56:51.00							
3 A	47-10	Ra228_4a		90Min. 0 Sec.	12	0.0833		265	2.944
Status: Unknown		Acq Date: 2019/12/18 13:56:56.00							
3 C		Ra228_4a		90Min. 0 Sec.	8	0.0722		207	2.3
Status: Unknown		Acq Date: 2019/12/18 13:56:56.00							
3 D		Ra228_4a		90Min. 0 Sec.	11	0.0875		259	2.878
Status: Unknown		Acq Date: 2019/12/18 13:56:56.00							
3 B	47-1	Ra228_4a		90Min. 0 Sec.	16	0.1361		262	2.911
Status: Unknown		Acq Date: 2019/12/18 13:56:56.00							
4 A		Ra228_4a		90Min. 0 Sec.	8	0.0		224	2.489
Status: Unknown		Acq Date: 2019/12/18 13:57:00.00							
4 C		Ra228_4a		90Min. 0 Sec.	10	0.0528		260	2.889
Status: Unknown		Acq Date: 2019/12/18 13:57:00.00							
4 B		Ra228_4a		90Min. 0 Sec.	9	0.0417		233	2.589
Status: Unknown		Acq Date: 2019/12/18 13:57:00.00							
4 D		Ra228_4a		90Min. 0 Sec.	11	0.0972		241	2.678
Status: Unknown		Acq Date: 2019/12/18 13:57:00.00							

Health Physics Specialist: _____ Date: _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

L56147-2001131042

Meteoric Water Mobility

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

WG487250

ACZ Laboratories, Inc

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 16:20
End Date/Time: 12/06/2019 10:00

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Particle Size over 5 cm (%)	Extraction pH (units)	Extraction Temperature (C)	Pre Filter pH (units)	Post Filter pH (units)	Dry Weight (g)	Leachate Volume (mL)	Retained Moisture (%)	Time In	Time Out	Extraction Time (hrs)	Temperature (C)
1	WG487250CSTD1	NONE															
2	WG487250CSTD2	NONE															
3	WG487250CSTD3	NONE															
4	WG487250ICV	PCN58503	As Rec		12/04/19 16:20		4.04		4.04	4.04							21.5
5	WG487250PBS	NONE	As Rec		12/04/19 19:06		5.95	23	6.39	6.40	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
6	L56147-06	STSB29_6-15	As Rec		12/04/19 21:53	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
7	L56147-06MS	WI191023-2	As Rec		12/05/19 0:40	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
8	L56147-06MSD	II191127-2	As Rec		12/05/19 3:26	0	5.95	23	7.15	7.23	5000	5011.5	19.2	12/04/19 10:45	12/05/19 16:25	29.6666666668025	20.9
9	L56147-07	STSB29-FD_6-15	As Rec		12/05/19 6:13	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
10	L56147-07MS	MS190905-3	As Rec		12/05/19 9:00	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
11	L56147-07MSD	MS190905-3	As Rec		12/05/19 11:46	0	5.95	23	7.26	7.44	5000	5008.4	18.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.9
12	L56147-08	STSB30_0.5-3	As Rec		12/05/19 14:33	0	5.95	23	4.09	4.35	5000	5014.1	8.24	12/04/19 10:45	12/05/19 14:25	27.6666666667443	20.8
13	L56147-09	STSB30_6-15	As Rec		12/05/19 17:20	0	5.95	23	5.85	5.87	5000	5006.3	21.66	12/04/19 10:45	12/05/19 16:15	29.5000000001164	20.6
14	L56147-10	STSB31_0.5-3	As Rec		12/05/19 20:06	0	5.95	23	4.1	4.04	5000	5004.3	11.31	12/04/19 10:45	12/05/19 14:20	27.5833333333139	20.5
15	L56147-11	STSB31_6-15	As Rec		12/05/19 22:53	0	5.95	23	5.66	5.71	5000	5000.7	28.21	12/04/19 10:45	12/05/19 16:05	29.3333333334303	20.6
16	WG487250CCV1	PCN58503	As Rec		12/06/19 1:40		4.05		4.05	4.05							21.5
17	WG487250LFB1	II191127-2	As Rec		12/06/19 4:26	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
18	WG487250LFB2	MS190905-3	As Rec		12/06/19 7:13	0	5.95	23	6.39	6.4	0	5000.2	0	12/04/19 14:20	12/05/19 14:30	24.1666666666861	21.1
19	WG487250CCV2	PCN58503	As Rec		12/06/19 10:00		4.05		4.04	4.04							21.4

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/13/2019 1:30:40 PM 121719

Meteoric Water Mobility

WG487250

ACZ Laboratories, Inc

QC List Type: I-X-MWME
QCListMatClass: SOLID
Bench Sheet List: I-RFA-CN-FREE
QC Ref: CSTD3X-PBS-LFB-MSX2
Group ID: SP-G-MWMT
Method Ref: ASTM E2242-13
SOP Ref: SOPSO036

Instrument ID: SOILSPREP
Analyst: GKH
ACZ Dept: 20
Create Date: 12/03/2019 11:48
Start Date/Time: 12/04/2019 16:20
End Date/Time: 12/06/2019 10:00

Sample	Login Comments
L56147-06	BUCKET || Stored in soil's hallway.
L56147-06MSD	ICP Spike
L56147-07	BUCKET || Stored in soil's hallway.
L56147-07MS	ICPMS Spike
L56147-07MSD	ICPMS Spike
L56147-08	BUCKET || Stored in soil's hallway.
L56147-09	BUCKET || Stored in soil's hallway.
L56147-10	BUCKET || Stored in soil's hallway.
L56147-11	BUCKET || Stored in soil's hallway.
WG487250CCV1	pH QC
WG487250CSTD1	pH QC
WG487250CSTD2	pH QC
WG487250CSTD3	pH QC
WG487250ICV	pH QC
WG487250LFB1	ICP LFB
WG487250LFB2	ICPMS LFB

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

12/13/2019 1:30:40 PM 121719

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Workgroup Review and Approval

WG488110

Date Reported: 26-Dec-19
Run ID: R1765246
Date Analyzed: 18-Dec-19
ICAL Workgroup:
Instrument ID: G542

L56147-06

Tag: **Measured:** 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	5.9	1		pCi/L	++	7.3	3.1		RG TB	

L56147-07

Tag: **Measured:** 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	4.2	1		pCi/L	++	4.1	1.9		RG TB	

L56147-08

Tag: **Measured:** 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	0.91	1		pCi/L	++	4.2	1.7		RG TB	

L56147-08MS

Tag: **Measured:** 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	FOUND	21	1		pCi/L	++	4.1	2.5	PCN57186		
SREV	RADIUM 228	REC	92	1		%	++	4.1	2.5	PCN57186		
SREV	RADIUM 228	TRUE	10512820513	1		pCi/L	++	4.1	2.5	PCN57186		

L56147-09

Tag: **Measured:** 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	3.4	1		pCi/L	++	4.1	1.8		RG TB	

L56147-09DUP

Tag: **Measured:** 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	FOUND	4.4 ✓	1		pCi/L	++	4.3	1.9			
SREV	RADIUM 228	RER	0.38	1		%	++	1.5	3	RER= 0.774 ✓		
SREV	RADIUM 228	RPD	26	1		pCi/L	ALRT	4.3	1.9		RG	

L56147-10

Tag: **Measured:** 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	3.4	1		pCi/L	++	4.5	2		RG TB	

L56147-11

Tag: **Measured:** 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	20-MWMT	2	1		pCi/L	++	4.9	2.2		RG TB	

WG487250LCSW

Tag:

Measured: 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	FOUND	20	1		pCi/L	++	4.1	2.4	PCN57186		
SREV	RADIUM 228	REC	94	1		%	++	4.1	2.4	PCN57186		
SREV	RADIUM 228	TRUE	21.29795	1		pCi/L	++	4.1	2.4	PCN57186		

WG487250PBW

Tag:

Measured: 12/18/2019 1:57:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	RADIUM 228	FOUND	0.8 ✓	1		pCi/L	++	5.5	2.3			

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Run Log by Workgroup

Wood - E&I Solutions, Inc.

Project ID: L56147

Radiochemistry

WG488110 **Ra228**

Sample	Date	SCN	RADIUM 228
L56147-10	12/18/19 13:57		X
L56147-08MS	12/18/19 13:57		X
WG487250LCSW	12/18/19 13:57		X
L56147-07	12/18/19 13:57		X
WG487250PBW	12/18/19 13:57		X
L56147-09DUP	12/18/19 13:57		X
L56147-06	12/18/19 13:57		X
L56147-08	12/18/19 13:57		X
L56147-11	12/18/19 13:57		X
L56147-09	12/18/19 13:57		X