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

Analytical Report

April 19, 2016

Report to:
Philip Nerenberg
Apex Laboratories
12232 S W Garden Place
Tigard, OR 97223

Bill to:
Philip Nerenberg
Apex Laboratories
12232 SW Garden Place
Tigard, OR 97223

Project ID: A6C1076
ACZ Project ID: L29915

Philip Nerenberg:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on April 14, 2016. This project has been assigned to ACZ's project number, L29915. 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 L29915. 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 May 19, 2016. If the samples are determined to be hazardous, additional charges apply for disposal (typically $11/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 raw data reports for ten years.

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

Sue Webber has reviewed and approved this report.

APEX LABORATORIES

Level IV Data Package – L29915
Table of Contents

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

Sample Summary

ACZ Project ID: ***L29915***

SAMPLE ID	LAB NO.	SAMPLE DATE	SAMPLE TIME
A6C1076-02	L29915-01	3/28/2016	10:30
A6C1076-04	L29915-02	3/28/2016	11:00
A6C1076-06	L29915-03	3/28/2016	11:30
A6C1076-08	L29915-04	3/28/2016	12:05
A6C1076-10	L29915-05	3/28/2016	12:30
A6C1076-12	L29915-06	3/28/2016	12:50
A6C1076-14	L29915-07	3/28/2016	13:15
A6C1076-16	L29915-08	3/28/2016	13:15
A6C1076-18	L29915-09	3/28/2016	13:45
A6C1076-20	L29915-10	3/28/2016	14:15
A6C1076-22	L29915-11	3/28/2016	14:45
6040281-BLK1	L29915-12	4/11/2016	14:41

Apex Laboratories

April 19, 2016

Project ID: A6C1076
ACZ Project ID: L29915

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 12 miscellaneous samples from Apex Laboratories on April 14, 2016. 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 L29915. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

The analysis was not performed within EPA recommended holding times. Samples were received after the hold time had expired.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports.

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-02

ACZ Sample ID: ***L29915-01***
Date Sampled: *03/28/16 10:30*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 15:38	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-04

ACZ Sample ID: ***L29915-02***
Date Sampled: *03/28/16 11:00*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 15:41	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-06

ACZ Sample ID: ***L29915-03***
Date Sampled: *03/28/16 11:30*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 15:44	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-08

ACZ Sample ID: ***L29915-04***
Date Sampled: *03/28/16 12:05*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 15:47	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-10

ACZ Sample ID: ***L29915-05***
Date Sampled: *03/28/16 12:30*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 15:50	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-12

ACZ Sample ID: ***L29915-06***
Date Sampled: *03/28/16 12:50*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 15:53	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-14

ACZ Sample ID: ***L29915-07***
Date Sampled: *03/28/16 13:15*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 15:56	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-16

ACZ Sample ID: ***L29915-08***
Date Sampled: *03/28/16 13:15*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 15:59	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-18

ACZ Sample ID: ***L29915-09***
Date Sampled: *03/28/16 13:45*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 16:02	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-20

ACZ Sample ID: ***L29915-10***
Date Sampled: *03/28/16 14:15*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 16:11	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: A6C1076-22

ACZ Sample ID: ***L29915-11***
Date Sampled: *03/28/16 14:45*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		UH	*	mg/L	0.1	0.5	04/18/16 16:20	sck

Arizona license number: AZ0102

Apex Laboratories
Project ID: A6C1076
Sample ID: 6040281-BLK1

ACZ Sample ID: ***L29915-12***
Date Sampled: *04/11/16 14:41*
Date Received: *04/14/16*
Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Thiocyanate as SCN	SM4500-CN M	1		U	*	mg/L	0.1	0.5	04/18/16 15:58	sck

Arizona license number: AZ0102

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: http://www.acz.com/public/extquallist.pdf

Apex Laboratories

ACZ Project ID: ***L29915***

Thiocyanate as SCN SM4500-CN M

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG401560													
WG401560ICV	ICV	04/18/16 15:30	WC151217-3	2		1.97	mg/L	99	90	110			
WG401560ICB	ICB	04/18/16 15:32				U	mg/L		-0.3	0.3			
WG401560LFB	LFB	04/18/16 15:35	WC151217-7	2.5		2.43	mg/L	97	80	120			
L29915-10AS	AS	04/18/16 16:14	WC151217-7	2.5	U	2.5	mg/L	100	80	120			
L29915-10DUP	DUP	04/18/16 16:17			U	U	mg/L				0	20	RA
L29960-08AS	AS	04/18/16 16:56	WC151217-7	2.5	U	2.57	mg/L	103	80	120			
L29960-08DUP	DUP	04/18/16 16:59			U	U	mg/L				0	20	RA
WG401561													
WG401561ICV	ICV	04/18/16 15:45	WC151217-3	2		1.98	mg/L	99	90	110			
WG401561ICB	ICB	04/18/16 15:49				U	mg/L		-0.3	0.3			
WG401561LFB	LFB	04/18/16 15:54	WC151217-7	2.5		2.42	mg/L	97	80	120			
L29959-10AS	AS	04/18/16 16:54	WC151217-7	2.5	U	2.49	mg/L	100	80	120			
L29959-10DUP	DUP	04/18/16 16:58			U	U	mg/L				0	20	RA

Apex Laboratories

ACZ Project ID: ***L29915***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L29915-01	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-02	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-03	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-04	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-05	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-06	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-07	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-08	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-09	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-10	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-11	WG401560	Thiocyanate as SCN	SM4500-CN M	H3	Sample was received and analyzed past holding time.
			SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L29915-12	WG401561	Thiocyanate as SCN	SM4500-CN M	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Wet Chemistry

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.

Thiocyanate as SCN	SM4500-CN M

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

Thiocyanate as SCN	SM4500-CN M

Thiocyanate

WG401560

ACZ Laboratories, Inc

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

Instrument ID: SPEC2
Analyst: sck
ACZ Dept: 37
Create Date: 04/18/2016 13:14
Start Date/Time: 04/18/2016 15:30
End Date/Time: 04/18/2016 17:05

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Cyanide (mg/L)	pH (pH)	filter date	Dilution	Comments
1	WG401560ICV	WC151217-3	black		04/18/16 15:30	1.969	1		1	
2	WG401560ICB	NONE	black		04/18/16 15:32	0	1		1	
3	WG401560LFB	WC151217-7	black		04/18/16 15:35	2.427	1		1	
4	L29915-01	A6C1076-02	black		04/18/16 15:38	0	1		1	
5	L29915-02	A6C1076-04	black		04/18/16 15:41	0	1		1	
6	L29915-03	A6C1076-06	black		04/18/16 15:44	0	1		1	
7	L29915-04	A6C1076-08	black		04/18/16 15:47	0.016	1		1	
8	L29915-05	A6C1076-10	black		04/18/16 15:50	0	1		1	
9	L29915-06	A6C1076-12	black		04/18/16 15:53	0	1		1	
10	L29915-07	A6C1076-14	black		04/18/16 15:56	0	1		1	
11	L29915-08	A6C1076-16	black		04/18/16 15:59	0	1		1	
12	L29915-09	A6C1076-18	black		04/18/16 16:02	0	1		1	
13	WG401560CCV1	WC151217-6	black		04/18/16 16:05	4.995	1		1	
14	WG401560CCB1	NONE	black		04/18/16 16:08	0	1		1	
15	L29915-10	A6C1076-20	black		04/18/16 16:11	0	1		1	
16	L29915-10AS	WC151217-7	black		04/18/16 16:14	2.498	1		1	
17	L29915-10DUP	NONE	black		04/18/16 16:17	0	1		1	
18	L29915-11	A6C1076-22	black		04/18/16 16:20	0	1		1	
19	L29959-04	A6C1134-08	black		04/18/16 16:23	0.008	1		1	
20	L29960-01	A6C1124-02	black		04/18/16 16:26	0	1		1	
21	L29960-02	A6C1124-04	black		04/18/16 16:29	0	1		1	
22	L29960-03	A6C1124-06	black		04/18/16 16:32	0	1		1	
23	L29960-04	A6C1124-08	black		04/18/16 16:35	0.019	1		1	
24	L29960-05	A6C1124-10	black		04/18/16 16:38	0.033	1		1	

Report Comments: _____

AREV: SCK 4/19/16
Initials, Date

Internal Comments _____

SREV: ABD 4/19/16
Initials, Date

L29915-1604191555

Thiocyanate

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

WG401560

ACZ Laboratories, Inc

Instrument ID: SPEC2
Analyst: sck
ACZ Dept: 37
Create Date: 04/18/2016 13:14
Start Date/Time: 04/18/2016 15:30
End Date/Time: 04/18/2016 17:05

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Cyanide (mg/L)	pH (pH)	filter date	Dilution	Comments
25	WG401560CCV2	WC151217-6	black		04/18/16 16:41	4.998	1		1	
26	WG401560CCB2	NONE	black		04/18/16 16:44	0	1		1	
27	L29960-06	A6C1124-12	black		04/18/16 16:47	0.089	1		1	
28	L29960-07	A6C1124-14	black		04/18/16 16:50	0.014	1		1	
29	L29960-08	A6C1124-16	black		04/18/16 16:53	0.022	1		1	
30	L29960-08AS	WC151217-7	black		04/18/16 16:56	2.571	1		1	
31	L29960-08DUP	NONE	black		04/18/16 16:59	0.024	1		1	
32	WG401560CCV3	WC151217-6	black		04/18/16 17:01	5.003	1		1	
33	WG401560CCB3	NONE	black		04/18/16 17:04	0	1		1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

Thiocyanate

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

WG401560

ACZ Laboratories, Inc

Instrument ID: SPEC2
Analyst: sck
ACZ Dept: 37
Create Date: 04/18/2016 13:14
Start Date/Time: 04/18/2016 15:30
End Date/Time: 04/18/2016 17:05

Sample	Login Comments
L29915-01	BK ||
L29915-02	BK ||
L29915-03	BK ||
L29915-04	BK ||
L29915-05	BK ||
L29915-06	BK ||
L29915-07	BK ||
L29915-08	BK ||
L29915-09	BK ||
L29915-10	BK ||
L29915-11	BK ||
L29959-04	BK ||
L29960-01	BK ||
L29960-02	BK ||
L29960-03	BK ||
L29960-04	BK ||
L29960-05	BK ||
L29960-06	BK ||
L29960-07	BK ||
L29960-08	BK ||

Report Comments: _____

AREV: _____
Initials, Date

Internal Comments _____

SREV: _____
Initials, Date

L29915-1604191555

ACZ Laboratories, Inc.

WET CHEMISTRY SPEC / ISE PROBE DATA REVIEW CHECKLIST

AREV: SCL
Date: 4/19/16

Work Group: 401560
Sample Type: SCV
Analysis Date: 4/18/16
Analyst: SCL

SREV: ABD
Date: 4/19/16

Instrument Checklist	**Yes**	**No**	**N/A**
1.) Is the calibration passing (r ≥ 0.995 for Spec or m = - 59.16 +/- 5% for Fluoride)?	✓		
2.) Are all of the QC critera listed in LIMS within specified limits?	✓		
3.) Are dilutions in the appropriate range (explain if "B" or "U" reported for sample)?			✓
4.) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal)?			✓
5.) Was each sample analyzed within method holding time? Flag data if "No."		✓	
6.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
7.) Is a current standard/reagent sheet attached to the workgroup?	✓		
8.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

"R" or "m" = 1.000

Spec Calibration Workgroup: 401560

Digestion Temp °C : —

Time In: —

Disposable Vessel Lot* —

Time Out: —

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
915-01 to -11	post hold	H3
959-04	1	1
960-01 to -08	1	1
Comments:		
*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.		

Thiocyanate

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

WG401560

ACZ Laboratories, Inc

Instrument ID: SPEC2
Analyst: SCK
ACZ Dept: 37
Create Date: 04/18/2016 13:14
Start Date/Time: 4/19/16 3:30pm
End Date/Time: 4/19/16 5:05pm

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Cyanide (mg/L)	pH (pH)	filter date	Dilution	Comments
1	WG401560ICV	WC151217-3				1.969	1.0	4/19/16	1	
2	WG401560ICB	NONE				-0.013			1	
3	WG401560LFB	WC151217-7				2.427			1	
4	L29915-01 ✓	A6C1076-02				-0.044			1	
5	L29915-02 ✓	A6C1076-04			SCK 4/19/16	~~-0.029~~ -0.029			1	
6	L29915-03 ✓	A6C1076-06				~~-0.031~~ -0.031			1	
7	L29915-04 ✓	A6C1076-08				0.066			1	
8	L29915-05 ✓	A6C1076-10				-0.019			1	
9	L29915-06 ✓	A6C1076-12				-0.031			1	
10	L29915-07 ✓	A6C1076-14				-0.047			1	
11	L29915-08 ✓	A6C1076-16				-0.054			1	
12	L29915-09 ✓	A6C1076-18				-0.025			1	
13	WG401560CCV1	WC151217-6				4.995			1	
14	WG401560CCB1	NONE				-0.030			1	
15	L29915-10 ✓	A6C1076-20				-0.063			1	
16	L29915-10AS ✓	WC151217-7				2.498			1	
17	L29915-10DUP ✓	NONE				-0.062			1	
18	L29915-11 ✓	A6C1076-22				-0.046			1	
19	L29959-04 ✓	A6C1134-08				0.008			1	
20	L29960-01 ✓	A6C1124-02				-0.025			1	
21	L29960-02 ✓	A6C1124-04				-0.051			1	
22	L29960-03 ✓	A6C1124-06				-0.048			1	
23	L29960-04 ✓	A6C1124-08				0.019			1	
24	L29960-05 ✓	A6C1124-10				0.033			1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

Thiocyanate

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

WG401560

ACZ Laboratories, Inc

Instrument ID: SPEC2
Analyst:
ACZ Dept: 37
Create Date: 04/18/2016 13:14
Start Date/Time:
End Date/Time:

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Cyanide (mg/L)	pH (pH)	filter date	Dilution	Comments
25	WG401560CCV2	WC151217-6				4.998	1.0	N/A (scc 4/18/16)	1	
26	WG401560CCB2	NONE				-0.023			1	
27	L29960-06 ✓	A6C1124-12				0.099			1	
28	L29960-07 ✓	A6C1124-14				0.014			1	
29	L29960-08 ✓	A6C1124-16			0.022	~~0.024~~ ~~0.023~~			1	
30	L29960-08AS ✓	WC151217-7				2.571			1	
31	L29960-08DUP ✓	NONE			0.024	~~0.032~~ (scc 4/18/16)			1	
32	WG401560CCV3	WC151217-6				5.003			1	
33	WG401560CCB3	NONE				-0.023			1	

Report Comments: _____

Internal Comments _____

AREV: _____
Initials, Date

SREV: _____
Initials, Date

Thiocyanate

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

WG401560

ACZ Laboratories, Inc

Instrument ID: SPEC2
Analyst:
ACZ Dept: 37
Create Date: 04/18/2016 13:14
Start Date/Time:
End Date/Time:

Sample	Login Comments
L29915-01	BK ||
L29915-02	BK ||
L29915-03	BK ||
L29915-04	BK ||
L29915-05	BK ||
L29915-06	BK ||
L29915-07	BK ||
L29915-08	BK ||
L29915-09	BK ||
L29915-10	BK ||
L29915-11	BK ||
L29959-04	BK ||
L29960-01	BK ||
L29960-02	BK ||
L29960-03	BK ||
L29960-04	BK ||
L29960-05	BK ||
L29960-06	BK ||
L29960-07	BK ||
L29960-08	BK ||

Report Comments: _____

Internal Comments _____

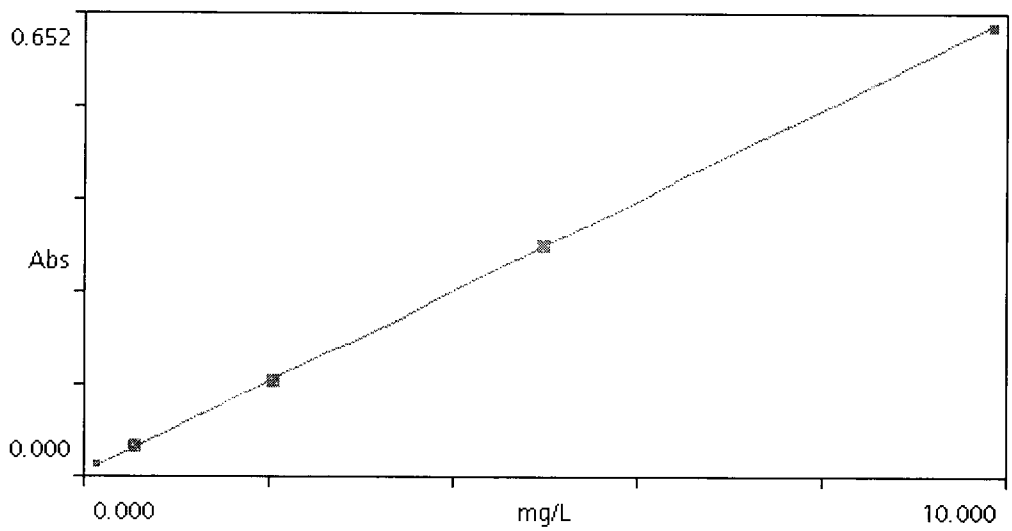
AREV: _____
Initials, Date

SREV: _____
Initials, Date

Parameter: Thiocyanate Instr: SPEC

	REAGENT	PCN/SCN	EXPIRATION DATE
Reagents:	Ferric Nitrate Color Reagent	WC160129-1	1/29/2017
	Nitric Acid	PCN A9434	3/18/17

Program:	9004
Name:	Thiocyanate
Units:	mg/L
Wavelength:	460 nm
Resolution:	0.001
Chemical Form 1:	SCN
Calibration:	C = a + bA
	a: -0.021 b: 15.353
Curve Fit r^2=	1.0000



mg/L	Abs
0.0000	0.000
0.5000	0.035
2.0000	0.130
5.0000	0.330
10.000	0.652

Upper Limit:	13.000
Lower Limit:	-0.100
Timer 1:	Off
Timer 2:	Off
Timer 3:	Off
Timer 4:	Off
Chemical Form 2:	Off
Chemical Form 3:	Off
Chemical Form 4:	Off
Created:	04-18-2016 16:33

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

Workgroup Review and Approval

WG401560

Date Reported: 19-Apr-16
Run ID: R1391883
Date Analyzed: 18-Apr-16
ICAL Workgroup:
Instrument ID: SPEC2

WG401560ICV

Tag: Measured: 4/18/2016 3:30:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	1.97	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	99	1		%	++	0.1	0.5			

WG401560ICB

Tag: Measured: 4/18/2016 3:32:58 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			

WG401560LFB

Tag: Measured: 4/18/2016 3:35:56 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	2.43	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	97	1		%	++	0.1	0.5			

L29915-01

Tag: Measured: 4/18/2016 3:38:54 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-02

Tag: Measured: 4/18/2016 3:41:52 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-03

Tag: Measured: 4/18/2016 3:44:50 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-04

Tag: Measured: 4/18/2016 3:47:48 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-05

Tag: Measured: 4/18/2016 3:50:46 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-06

Tag: Measured: 4/18/2016 3:53:44 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-07

Tag: Measured: 4/18/2016 3:56:42 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-08

Tag: Measured: 4/18/2016 3:59:40 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-09

Tag: Measured: 4/18/2016 4:02:38 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

WG401560CCV1

Tag: Measured: 4/18/2016 4:05:36 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	5	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	100	1		%	++	0.1	0.5			

WG401560CCB1

Tag: Measured: 4/18/2016 4:08:34 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			

L29915-10

Tag: Measured: 4/18/2016 4:11:32 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29915-10AS

Tag: Measured: 4/18/2016 4:14:30 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	2.5	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	100	1		%	++	0.1	0.5			

L29915-10DUP

Tag: Measured: 4/18/2016 4:17:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	CYANIDE	RPD	0	1		%	++	0.1	0.5		RA	

L29915-11

Tag: Measured: 4/18/2016 4:20:26 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TA TB	
NEED	PH	PREP	1	1		pH	++				H3 TA TB	

L29959-04

Tag: Measured: 4/18/2016 4:23:24 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29960-01

Tag: Measured: 4/18/2016 4:26:22 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29960-02

Tag: Measured: 4/18/2016 4:29:20 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29960-03

Tag: Measured: 4/18/2016 4:32:18 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29960-04

Tag: Measured: 4/18/2016 4:35:16 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29960-05

Tag: Measured: 4/18/2016 4:38:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

WG401560CCV2

Tag: Measured: 4/18/2016 4:41:12 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	5	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	100	1		%	++	0.1	0.5			

WG401560CCB2

Tag: Measured: 4/18/2016 4:44:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			

L29960-06

Tag: Measured: 4/18/2016 4:47:08 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29960-07

Tag: Measured: 4/18/2016 4:50:06 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29960-08

Tag: Measured: 4/18/2016 4:53:04 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29960-08AS

Tag: Measured: 4/18/2016 4:56:02 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	2.57	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	103	1		%	++	0.1	0.5			

L29960-08DUP

Tag: Measured: 4/18/2016 4:59:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	CYANIDE	RPD	0	1		%	++	0.1	0.5		RA	

WG401560CCV3

Tag: Measured: 4/18/2016 5:01:58 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	5	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	100	1		%	++	0.1	0.5			

WG401560CCB3

Tag: Measured: 4/18/2016 5:04:56 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			

Thiocyanate

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

WG401561

ACZ Laboratories, Inc

Instrument ID: SPEC2
Analyst: sck
ACZ Dept: 37
Create Date: 04/18/2016 13:15
Start Date/Time: 04/18/2016 15:45
End Date/Time: 04/18/2016 17:08

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Cyanide (mg/L)	pH (pH)	filter date	Dilution	Comments
1	WG401561ICV	WC151217-3	black		04/18/16 15:45	1.975	1		1	
2	WG401561ICB	NONE	black		04/18/16 15:49	0	1		1	
3	WG401561LFB	WC151217-7	black		04/18/16 15:54	2.423	1		1	
4	L29915-12	6040281-BLK1	black		04/18/16 15:58	0	1		1	
5	L29959-01	A6C1134-02	black		04/18/16 16:03	0	1		1	
6	L29959-02	A6C1134-04	black		04/18/16 16:08	0	1		1	
7	L29959-03	A6C1134-06	black		04/18/16 16:12	0	1		1	
8	L29959-05	A6C1134-10	black		04/18/16 16:17	0	1		1	
9	L29959-06	A6C1134-12	black		04/18/16 16:21	0	1		1	
10	L29959-07	A6C1134-14	black		04/18/16 16:26	0.165	1		1	
11	L29959-08	A6C1134-16	black		04/18/16 16:31	0.081	1		1	
12	L29959-09	A6C1134-18	black		04/18/16 16:35	0	1		1	
13	WG401561CCV1	WC151217-6	black		04/18/16 16:40	4.987	1		1	
14	WG401561CCB1	NONE	black		04/18/16 16:45	0	1		1	
15	L29959-10	A6C1134-20	black		04/18/16 16:49	0	1		1	
16	L29959-10AS	WC151217-7	black		04/18/16 16:54	2.488	1		1	
17	L29959-10DUP	NONE	black		04/18/16 16:58	0	1		1	
18	WG401561CCV2	WC151217-6	black		04/18/16 17:03	4.982	1		1	
19	WG401561CCB2	NONE	black		04/18/16 17:08	0	1		1	

Report Comments: _____

AREV: Sck 4/19/16
Initials, Date

Internal Comments _____

SREV: ABD 4/19/16
Initials, Date

L29915-1604191555

4/19/2016 8:50:18 AM 42216

Thiocyanate

WG401561

ACZ Laboratories, Inc

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

Instrument ID: SPEC2
Analyst: sck
ACZ Dept: 37
Create Date: 04/18/2016 13:15
Start Date/Time: 04/18/2016 15:45
End Date/Time: 04/18/2016 17:08

Sample	Login Comments
L29915-12	BK ||
L29959-01	BK ||
L29959-02	BK ||
L29959-03	BK ||
L29959-05	BK ||
L29959-06	BK ||
L29959-07	BK ||
L29959-08	BK ||
L29959-09	BK ||
L29959-10	BK ||

Report Comments: _____

AREV: _____
Initials, Date

Internal Comments _____

SREV: _____
Initials, Date

L29915-1604191555

ACZ Laboratories, Inc.

WET CHEMISTRY SPEC / ISE PROBE DATA REVIEW CHECKLIST

AREV: SCK
Date: 4/19/16

Work Group: 401561
Sample Type: SCV
Analysis Date: 4/19/16
Analyst: SCK

SREV: ABD
Date: 4/19/16

Instrument Checklist

	Yes	No	N/A
1.) Is the calibration passing (r ≥ 0.995 for Spec or m = - 59.16 +/- 5% for Fluoride)?	✓		
2.) Are all of the QC critera listed in LIMS within specified limits?	✓		
3.) Are dilutions in the appropriate range (explain if "B" or "U" reported for sample)?			✓
4.) Is any sample analyzed on dilution appropriately "D" qualified (not required for o-cal)?			✓
5.) Was each sample analyzed within method holding time? Flag data if "No."		✓	
6.) Are all errors properly corrected (i.e. single-line crossout, dated & initialed)?	✓		
7.) Is a current standard/reagent sheet attached to the workgroup?	✓		
8.) **FOR SREV**: QA/QC approval for initial training or 2 sets of initials for WG & LIMS?	✓		

"R" or "m" = 1.000

Spec Calibration Workgroup: 401560

Digestion Temp °C : —

Time In: —

Disposable Vessel Lot*: —

Time Out: —

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
959-01 to 10	SCK 4/19/16 pinhole	H3

Comments:

*Workgroup documentation must include the lot number(s) of all disposable vessels used for volumetric measurements.

Thiocyanate

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

WG401561

ACZ Laboratories, Inc

Instrument ID: SPEC2
Analyst: SCK
ACZ Dept: 37
Create Date: 04/18/2016 13:15
Start Date/Time: 4/18/16 3:45PM
End Date/Time: 4/19/16 5:08PM

SEQ	ACZ ID	Client ID	SubSX	Pri	Analysis Date	Cyanide (mg/L)	pH (pH)	filter date	Dilution	Comments
1	WG401561ICV	WC151217-3				1.975	1.0	4/18	1	
2	WG401561ICB	NONE				-0.022			1	
3	WG401561LFB	WC151217-7				2.423			1	
4	L29915-12 ✓	6040281-BLK1				-0.055			1	
5	L29959-01 ✓	A6C1134-02				-0.014			1	
6	L29959-02 ✓	A6C1134-04				-0.051			1	
7	L29959-03 ✓	A6C1134-06				-0.027			1	
8	L29959-05 ✓	A6C1134-10				-0.011			1	
9	L29959-06 ✓	A6C1134-12				-0.003			1	
10	L29959-07 ✓	A6C1134-14				0.605			1	
11	L29959-08 ✓	A6C1134-16				0.091			1	
12	L29959-09 ✓	A6C1134-18				-0.043			1	
13	WG401561CCV1	WC151217-6				4.987			1	
14	WG401561CCB1	NONE				-0.026			1	
15	L29959-10 ✓	A6C1134-20				-0.035			1	
16	L29959-10AS ✓	WC151217-7				2.483			1	
17	L29959-10DUP ✓	NONE				-0.029			1	
18	WG401561CCV2	WC151217-6				4.982			1	
19	WG401561CCB2	NONE				-0.023			1	

Report Comments: Cal WG# 401560 @ SCK 4/18/16

AREV: _____ Initials, Date

Internal Comments _____

SREV: _____ Initials, Date

L29915-1604191555

4/18/2016 1:16:11 PM 42216

Thiocyanate

QC List Type: QC-SPEC-CN-THIO
QCListMatClass: LIQUID
Bench Sheet List: I-SPEC-CN-THIO
QC Ref: icv/b-ccv/b-dup-as
Group ID: WC-G-SPC-CN-THIO
Method Ref: SM4500 CN M
SOP Ref: SOPWC022

WG401561

ACZ Laboratories, Inc

Instrument ID: SPEC2
Analyst:
ACZ Dept: 37
Create Date: 04/18/2016 13:15
Start Date/Time:
End Date/Time:

Sample	Login Comments
L29915-12	BK ||
L29959-01	BK ||
L29959-02	BK ||
L29959-03	BK ||
L29959-05	BK ||
L29959-06	BK ||
L29959-07	BK ||
L29959-08	BK ||
L29959-09	BK ||
L29959-10	BK ||

Report Comments: _____

AREV: _____
Initials, Date

Internal Comments _____

SREV: _____
Initials, Date

ACZ LABORATORIES, INC
2773 Downhill Drive
Steamboat Springs, CO 80487

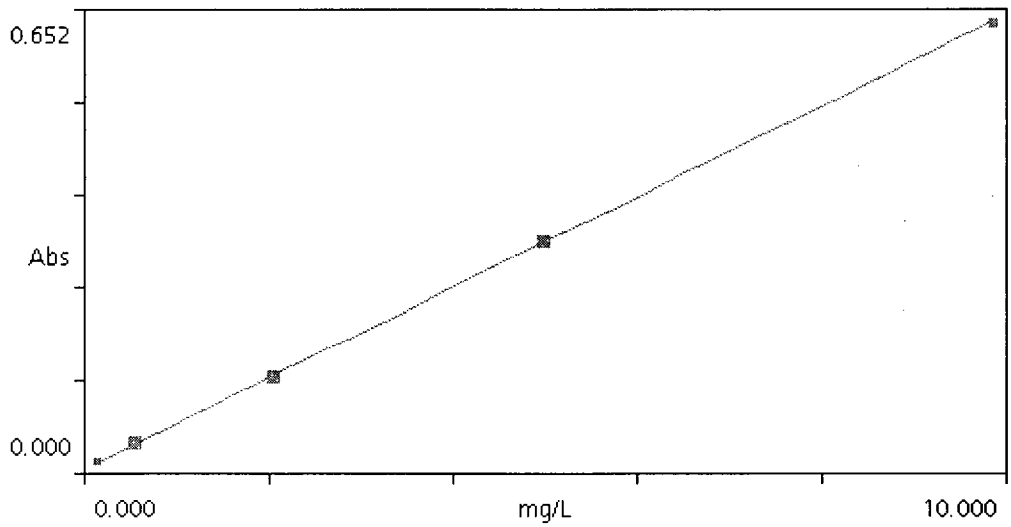
Wet Chemistry
Standards/Reagents Information

4/18/2016

Parameter: Thiocyanate Instr: SPEC

	REAGENT	PCN/SCN	EXPIRATION DATE
Reagents:	Ferric Nitrate Color Reagent	WC160129-1	1/29/2017
	Nitric Acid	PCN49434	3/18/17

Program:	9004
Name:	Thiocyanate
Units:	mg/L
Wavelength:	460 nm
Resolution:	0.001
Chemical Form 1:	SCN
Calibration:	C = a + bA
	a: -0.021 b: 15.353
Curve Fit r^2=	1.0000



mg/L	Abs
0.0000	0.000
0.5000	0.035
2.0000	0.130
5.0000	0.330
10.000	0.652

Upper Limit:	13.000
Lower Limit:	-0.100
Timer 1:	Off
Timer 2:	Off
Timer 3:	Off
Timer 4:	Off
Chemical Form 2:	Off
Chemical Form 3:	Off
Chemical Form 4:	Off
Created:	04-18-2016 16:33

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

Workgroup Review and Approval

WG401561

Date Reported: 19-Apr-16
Run ID: R1391903
Date Analyzed: 18-Apr-16
ICAL Workgroup: WG401560
Instrument ID: SPEC2

WG401561ICV

Tag: Measured: 4/18/2016 3:45:00 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	1.98	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	99	1		%	++	0.1	0.5			

WG401561ICB

Tag: Measured: 4/18/2016 3:49:37 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			

WG401561LFB

Tag: Measured: 4/18/2016 3:54:14 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	2.42	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	97	1		%	++	0.1	0.5			

L29915-12

Tag: Measured: 4/18/2016 3:58:51 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	U	mg/L	++	0.1	0.5		RA TA TB	
NEED	PH	PREP	1	1		pH	++				TA TB	

L29959-01

Tag: Measured: 4/18/2016 4:03:28 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29959-02

Tag: Measured: 4/18/2016 4:08:05 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29959-03

Tag: Measured: 4/18/2016 4:12:42 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29959-05

Tag: Measured: 4/18/2016 4:17:19 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29959-06

Tag: Measured: 4/18/2016 4:21:56 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29959-07

Tag: Measured: 4/18/2016 4:26:33 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO	0.2	1	BH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29959-08

Tag: Measured: 4/18/2016 4:31:10 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29959-09

Tag: Measured: 4/18/2016 4:35:47 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

WG401561CCV1

Tag: Measured: 4/18/2016 4:40:24 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	4.99	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	100	1		%	++	0.1	0.5			

WG401561CCB1

Tag: Measured: 4/18/2016 4:45:01 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			

L29959-10

Tag: Measured: 4/18/2016 4:49:38 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	CN-THIO		1	UH	mg/L	++	0.1	0.5		H3 RA TB	
NEED	PH	PREP	1	1		pH	++				H3 TB	

L29959-10AS

Tag: Measured: 4/18/2016 4:54:15 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	2.49	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	100	1		%	++	0.1	0.5			

L29959-10DUP

Tag: Measured: 4/18/2016 4:58:52 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			
SREV	CYANIDE	RPD	0	1		%	++	0.1	0.5		RA	

WG401561CCV2

Tag: Measured: 4/18/2016 5:03:29 PM

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND	4.98	1		mg/L	++	0.1	0.5			
SREV	CYANIDE	REC	100	1		%	++	0.1	0.5			

WG401561CCB2 **Tag:** **Measured: 4/18/2016 5:08:06 PM**

Status	Parm_Stored	Type	Value	Dil	Qual	Units	Appv	MDL	PQL	Text Value	Ext Qual	Signal
SREV	CYANIDE	FOUND		1	U	mg/L	++	0.1	0.5			

Apex Laboratories

Project ID: L29915

Wet Chemistry

WG401560 **Thiocyanate**

Sample	Date	SCN	CYANIDE
WG401560ICV	04/18/16 15:30	WC151217-3	X
WG401560ICB	04/18/16 15:32		X
WG401560LFB	04/18/16 15:35	WC151217-7	X
L29915-01	04/18/16 15:38		X
L29915-02	04/18/16 15:41		X
L29915-03	04/18/16 15:44		X
L29915-04	04/18/16 15:47		X
L29915-05	04/18/16 15:50		X
L29915-06	04/18/16 15:53		X
L29915-07	04/18/16 15:56		X
L29915-08	04/18/16 15:59		X
L29915-09	04/18/16 16:02		X
WG401560CCV1	04/18/16 16:05	WC151217-6	X
WG401560CCB1	04/18/16 16:08		X
L29915-10	04/18/16 16:11		X
L29915-10AS	04/18/16 16:14	WC151217-7	X
L29915-10DUP	04/18/16 16:17		X
L29915-11	04/18/16 16:20		X
L29959-04	04/18/16 16:23		X
L29960-01	04/18/16 16:26		X
L29960-02	04/18/16 16:29		X
L29960-03	04/18/16 16:32		X
L29960-04	04/18/16 16:35		X
L29960-05	04/18/16 16:38		X
WG401560CCV2	04/18/16 16:41	WC151217-6	X
WG401560CCB2	04/18/16 16:44		X

Apex Laboratories

Project ID: L29915

Wet Chemistry

WG401560 **Thiocyanate**

Sample	Date	SCN	CYANIDE
L29960-06	04/18/16 16:47		X
L29960-07	04/18/16 16:50		X
L29960-08	04/18/16 16:53		X
L29960-08AS	04/18/16 16:56	WC151217-7	X
L29960-08DUP	04/18/16 16:59		X
WG401560CCV3	04/18/16 17:01	WC151217-6	X
WG401560CCB3	04/18/16 17:04		X

Apex Laboratories

Project ID: L29915

Wet Chemistry

WG401561 **Thiocyanate**

Sample	Date	SCN	CYANIDE
WG401561ICV	04/18/16 15:45	WC151217-3	X
WG401561ICB	04/18/16 15:49		X
WG401561LFB	04/18/16 15:54	WC151217-7	X
L29915-12	04/18/16 15:58		X
L29959-01	04/18/16 16:03		X
L29959-02	04/18/16 16:08		X
L29959-03	04/18/16 16:12		X
L29959-05	04/18/16 16:17		X
L29959-06	04/18/16 16:21		X
L29959-07	04/18/16 16:26		X
L29959-08	04/18/16 16:31		X
L29959-09	04/18/16 16:35		X
WG401561CCV1	04/18/16 16:40	WC151217-6	X
WG401561CCB1	04/18/16 16:45		X
L29959-10	04/18/16 16:49		X
L29959-10AS	04/18/16 16:54	WC151217-7	X
L29959-10DUP	04/18/16 16:58		X
WG401561CCV2	04/18/16 17:03	WC151217-6	X
WG401561CCB2	04/18/16 17:08		X

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

Sample Receipt

Apex Laboratories
A6C1076

ACZ Project ID: L29915
Date Received: 04/14/2016 09:39
Received By: ddp
Date Printed: 4/14/2016

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	

Some parameters were received past hold time.

Chain of Custody Related Remarks

Sample #12 was added to the COC based on the information present on the sample container.

Client Contact Remarks

Shipping Containers

Cooler Id	Temp(°C)	Temp Criteria(°C)	Rad(µR/Hr)	Custody Seal Intact?
NA23710	1.5	<=6.0	16	N/A

Was ice present in the shipment container(s)?

Yes - Wet ice was present in the shipment container(s).

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

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

Sample Receipt

Apex Laboratories
A6C1076

ACZ Project ID:	L29915
Date Received:	04/14/2016 09:39
Received By:	ddp
Date Printed:	4/14/2016

[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).

L29915

SUBCONTRACT ORDER

Apex Laboratories

A6C1076

SENDING LABORATORY:

Apex Laboratories
12232 S.W. Garden Place
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 718-0333
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

ACZ Laboratories
2773 Downhill Drive
Steamboat Springs, CO 80487
Phone :(800) 334-5493
Fax: (815) 301-3857

Sediment 0 to 6 bgs

Sample Name: 5237-160328-DC-SED063 **Sedimen** **Sampled: 03/28/16 10:30** (A6C1076-02)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 10:30	Level IV DP needed Sample will be leached in house prior to sending to ACZ

Containers Supplied:
(E)4 oz Glass Jar

Sediment 0 to 6 bgs

Sample Name: 5237-160328-DC-SED065 **Sedimen** **Sampled: 03/28/16 11:00** (A6C1076-04)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 11:00	Level IV DP needed Sample will be leached in house prior to sending to ACZ

Containers Supplied:
(E)4 oz Glass Jar

Sediment 0 to 6 bgs

Sample Name: 5237-160328-DC-SED068 **Sedimen** **Sampled: 03/28/16 11:30** (A6C1076-06)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 11:30	Level IV DP needed Sample will be leached in house prior to sending to ACZ

Containers Supplied:
(C)4 oz Glass Jar

Sediment 0 to 6 bgs

ole Name: 5237-160328-DC-SED070 **Sedimen** **Sampled: 03/28/16 12:05** (A6C1076-08)

alysis	Due	Expires	Comments
ocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 12:05	Level IV DP needed Sample will be leached in house prior to sending to ACZ

Containers Supplied:
(C)4 oz Glass Jar

L29915 Chain of Custody

Standard TAT

Level IV DP

Released By	Date	Received By	Date
[signature]	4/13/16	UPS	
UPS		[signature]	4/14/16 9:30

SUBCONTRACT ORDER

Apex Laboratories

A6C1076

Sediment 0 to 6 bgs

Sample Name: 5237-160328-DC-SED072 **Sedimen** **Sampled: 03/28/16 12:30** (A6C1076-10)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 12:30	Level IV DP needed Sample will be leached in house prior to sending to ACZ
Containers Supplied: (C)4 oz Glass Jar			

Sediment 0 to 6 bgs

Sample Name: 5237-160328-DC-SED075 **Sedimen** **Sampled: 03/28/16 12:50** (A6C1076-12)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 12:50	Level IV DP needed Sample will be leached in house prior to sending to ACZ
Containers Supplied: (C)4 oz Glass Jar			

Sediment 0 to 6 bgs

Sample Name: 5237-160328-DC-SED077 **Sedimen** **Sampled: 03/28/16 13:15** (A6C1076-14)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 13:15	Level IV DP needed Sample will be leached in house prior to sending to ACZ
Containers Supplied: (C)4 oz Glass Jar			

Sediment 0 to 6 bgs

Sample Name: 5237-160328-DC-SED077D **Sedimen** **Sampled: 03/28/16 13:15** (A6C1076-16)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 13:15	Level IV DP needed Sample will be leached in house prior to sending to ACZ
Containers Supplied: (C)4 oz Glass Jar			

Sediment 0 to 6 bgs

Sample Name: 5237-160328-DC-SED082 **Sedimen** **Sampled: 03/28/16 13:45** (A6C1076-18)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 13:45	Level IV DP needed Sample will be leached in house prior to sending to ACZ
Containers Supplied: (C)4 oz Glass Jar			

Released By	Date	Received By	Date
	4/13/16		
Released By	Date	Received By	Date
			4.14.16 9:30

SUBCONTRACT ORDER

Apex Laboratories

A6C1076

Sample Name: 5237-160328-DC-SED085 **Sedimen** **Sediment 0 to 6 bgs** **Sampled: 03/28/16 14:15** (A6C1076-20)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 14:15	Level IV DP needed Sample will be leached in house prior to sending to ACZ
Containers Supplied: (C)4 oz Glass Jar			

Sample Name: 5237-160328-DC-SED087 **Sedimen** **Sediment 0 to 6 bgs** **Sampled: 03/28/16 14:45** (A6C1076-22)

Analysis	Due	Expires	Comments
Thiocyanate by SPLP/SM 4500 (SUB)	04/11/16 17:00	04/11/16 14:45	Level IV DP needed Sample will be leached in house prior to sending to ACZ
Containers Supplied: (E)4 oz Glass Jar			

6040281-BLK1 BCE 4/14/16
4/11/16 14:41

Released By	Date	Received By	Date
[signature]	4/13/16	UPS	
[signature]		[signature]	4-14-16 9:30