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

# Analytical Report

April 14, 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: A6D0056
ACZ Project ID: L29851

Philip Nerenberg:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on April 12, 2016. This project has been assigned to ACZ's project number, L29851. 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 L29851. 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 14, 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 – L29851**
**Table of Contents**

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

# Sample Summary

ACZ Project ID: ***L29851***

| SAMPLE ID | LAB NO. | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| A6D0056-02 | L29851-01 | 4/1/2016 | 10:25 |
| A6D0056-04 | L29851-02 | 4/1/2016 | 11:05 |
| A6D0056-06 | L29851-03 | 4/1/2016 | 12:00 |
| A6D0056-08 | L29851-04 | 4/1/2016 | 16:00 |
| A6D0056-10 | L29851-05 | 4/1/2016 | 16:10 |
| 6040153-BLK1 | L29851-06 | 4/6/2016 | 15:22 |

Apex Laboratories

April 18, 2016

Project ID: A6D0056
ACZ Project ID: L29851

## Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 6 miscellaneous samples from Apex Laboratories on April 12, 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 L29851. 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.

## 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: A6D0056
Sample ID: A6D0056-02

ACZ Sample ID: ***L29851-01***
Date Sampled: *04/01/16 10:25*
Date Received: *04/12/16*
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 | 04/13/16 15:36 | sck |

**Apex Laboratories**
Project ID: A6D0056
Sample ID: A6D0056-04

ACZ Sample ID: ***L29851-02***
Date Sampled: *04/01/16 11:05*
Date Received: *04/12/16*
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 | 04/13/16 15:38 | sck |

**Apex Laboratories**
Project ID: A6D0056
Sample ID: A6D0056-06

ACZ Sample ID: ***L29851-03***
Date Sampled: *04/01/16 12:00*
Date Received: *04/12/16*
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 | 04/13/16 15:47 | sck |

**Apex Laboratories**
Project ID: A6D0056
Sample ID: A6D0056-08

ACZ Sample ID: ***L29851-04***
Date Sampled: *04/01/16 16:00*
Date Received: *04/12/16*
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 | 04/13/16 15:49 | sck |

**Apex Laboratories**
Project ID: A6D0056
Sample ID: A6D0056-10

ACZ Sample ID: ***L29851-05***
Date Sampled: *04/01/16 16:10*
Date Received: *04/12/16*
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 | 04/13/16 15:50 | sck |

**Apex Laboratories**
Project ID: A6D0056
Sample ID: 6040153-BLK1

ACZ Sample ID: ***L29851-06***
Date Sampled: *04/06/16 15:22*
Date Received: *04/12/16*
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 | 04/13/16 15:52 | sck |

## 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: ***L29851***

**Thiocyanate as SCN** SM4500-CN M

| ACZ ID | Type | Analyzed | PCN/SCN | QC | Sample | Found | Units | Rec | Lower | Upper | RPD | Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WG401370** | | | | | | | | | | | | | |
| WG401370ICV | ICV | 04/13/16 15:20 | WC151217-3 | 2 | | 1.96 | mg/L | 98 | 90 | 110 | | | |
| WG401370ICB | ICB | 04/13/16 15:21 | | | | U | mg/L | | -0.3 | 0.3 | | | |
| WG401370LFB | LFB | 04/13/16 15:23 | WC151217-7 | 2.5 | | 2.37 | mg/L | 95 | 80 | 120 | | | |
| L29851-02AS | AS | 04/13/16 15:39 | WC151217-7 | 2.5 | U | 2.5 | mg/L | 100 | 80 | 120 | | | |
| L29851-02DUP | DUP | 04/13/16 15:45 | | | U | U | mg/L | | | | 0 | 20 | RA |
| L29851-06AS | AS | 04/13/16 15:54 | WC151217-7 | 2.5 | U | 2.48 | mg/L | 99 | 80 | 120 | | | |
| L29851-06DUP | DUP | 04/13/16 15:56 | | | U | U | mg/L | | | | 0 | 20 | RA |

**Apex Laboratories**

ACZ Project ID: ***L29851***

| ACZ ID | WORKNUM | PARAMETER | METHOD | QUAL | DESCRIPTION |
|---|---|---|---|---|---|
| **L29851-01** | WG401370 | 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). |
| **L29851-02** | WG401370 | 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). |
| **L29851-03** | WG401370 | 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). |
| **L29851-04** | WG401370 | 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). |
| **L29851-05** | WG401370 | 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). |
| **L29851-06** | WG401370 | 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

# WG401370

**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: 04/13/2016 14:37
Start Date/Time: 04/13/2016 15:20
End Date/Time: 04/13/2016 16:00

| SEQ | ACZ ID | Client ID | SubSX | Pri | Analysis Date | Cyanide (mg/L) | pH (pH) | filter date | Dilution | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | WG401370ICV | WC151217-3 | black | | 04/13/16 15:20 | 1.961 | 1 | 4/13/2016 | 1 | |
| 2 | WG401370ICB | NONE | black | | 04/13/16 15:21 | 0 | 1 | 4/13/2016 | 1 | |
| 3 | WG401370LFB | WC151217-7 | black | | 04/13/16 15:23 | 2.369 | 1 | 4/13/2016 | 1 | |
| 4 | L29850-01 | A6D0013-02 | black | | 04/13/16 15:25 | 0 | 1 | 4/13/2016 | 1 | |
| 5 | L29850-02 | A6D0013-04 | black | | 04/13/16 15:27 | 0 | 1 | 4/13/2016 | 1 | |
| 6 | L29850-03 | A6D0013-06 | black | | 04/13/16 15:29 | 0 | 1 | 4/13/2016 | 1 | |
| 7 | L29850-04 | A6D0013-08 | black | | 04/13/16 15:30 | 0 | 1 | 4/13/2016 | 1 | |
| 8 | L29850-05 | A6D0013-10 | black | | 04/13/16 15:32 | 0 | 1 | 4/13/2016 | 1 | |
| 9 | L29850-06 | A6D0013-12 | black | | 04/13/16 15:34 | 0 | 1 | 4/13/2016 | 1 | |
| 10 | L29851-01 | A6D0056-02 | black | | 04/13/16 15:36 | 0 | 1 | 4/13/2016 | 1 | |
| 11 | L29851-02 | A6D0056-04 | black | | 04/13/16 15:38 | 0 | 1 | 4/13/2016 | 1 | |
| 12 | L29851-02AS | WC151217-7 | black | | 04/13/16 15:39 | 2.503 | 1 | 4/13/2016 | 1 | |
| 13 | WG401370CCV1 | WC151217-6 | black | | 04/13/16 15:41 | 4.975 | 1 | 4/13/2016 | 1 | |
| 14 | WG401370CCB1 | NONE | black | | 04/13/16 15:43 | 0 | 1 | 4/13/2016 | 1 | |
| 15 | L29851-02DUP | NONE | black | | 04/13/16 15:45 | 0 | 1 | 4/13/2016 | 1 | |
| 16 | L29851-03 | A6D0056-06 | black | | 04/13/16 15:47 | 0 | 1 | 4/13/2016 | 1 | |
| 17 | L29851-04 | A6D0056-08 | black | | 04/13/16 15:49 | 0.035 | 1 | 4/13/2016 | 1 | |
| 18 | L29851-05 | A6D0056-10 | black | | 04/13/16 15:50 | 0 | 1 | 4/13/2016 | 1 | |
| 19 | L29851-06 | 6040153-BLK1 | black | | 04/13/16 15:52 | 0 | 1 | 4/13/2016 | 1 | |
| 20 | L29851-06AS | WC151217-7 | black | | 04/13/16 15:54 | 2.479 | 1 | 4/13/2016 | 1 | |
| 21 | L29851-06DUP | NONE | black | | 04/13/16 15:56 | 0 | 1 | 4/13/2016 | 1 | |
| 22 | WG401370CCV2 | WC151217-6 | black | | 04/13/16 15:58 | 4.956 | 1 | 4/13/2016 | 1 | |
| 23 | WG401370CCB2 | NONE | black | | 04/13/16 15:59 | 0 | 1 | 4/13/2016 | 1 | |

Report Comments: _____

Internal Comments _____

AREV: sck 4/13/16
Initials, Date

SREV: ABD 4/14/16
Initials, Date

## Thiocyanate

# WG401370

**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: 04/13/2016 14:37
Start Date/Time: 04/13/2016 15:20
End Date/Time: 04/13/2016 16:00

| Sample | Login Comments |
|---|---|
| L29850-01 | BK \|\| |
| L29850-02 | BK \|\| |
| L29850-03 | BK \|\| |
| L29850-04 | BK \|\| |
| L29850-05 | BK \|\| |
| L29850-06 | BK \|\| |
| L29851-01 | BK \|\| |
| L29851-02 | BK \|\| |
| L29851-03 | BK \|\| |
| L29851-04 | BK \|\| |
| L29851-05 | BK \|\| |
| L29851-06 | BK \|\| |

Report Comments: _____

AREV: _____
Initials, Date

Internal Comments _____

SREV: _____
Initials, Date

L29851-1604181615

ACZ Laboratories, Inc.

**WET CHEMISTRY SPEC / ISE PROBE DATA REVIEW CHECKLIST**

AREV: SCL
Date: 4/13/16

Work Group: 401370
Sample Type: SCN
Analysis Date: 4/13/16
Analyst: SCL

SREV: ABD
Date: 4/14/16

| **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: 401370

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 |
|---|---|---|
| all SX's | not filtered by analyst, | n/a |
| 1 | field filtered | 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

# WG401370

**ACZ Laboratories, Inc**

Instrument ID: SPEC2
Analyst: Sck
ACZ Dept: 37
Create Date: 04/13/2016 14:37
Start Date/Time: 4/13/16 3:20pm
End Date/Time: 4/13/16 4:00pm

| SEQ | ACZ ID | Client ID | SubSX | Pri | Analysis Date | Cyanide (mg/L) | pH (pH) | filter date | Dilution | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | WG401370ICV | WC151217-3 | | | | 1.961 | 1.0 | N/A | 1 | |
| 2 | WG401370ICB | NONE | | | SCK 4/13/16 | ~~-0.033~~ -0.033 | | | 1 | |
| 3 | WG401370LFB | WC151217-7 | | | | 2.369 | | | 1 | |
| 4 | L29850-01 ✓ | A6D0013-02 | | | | -0.073 | | | 1 | |
| 5 | L29850-02 ✓ | A6D0013-04 | | | | -0.039 | | | 1 | |
| 6 | L29850-03 ✓ | A6D0013-06 | | | | -0.086 | | | 1 | |
| 7 | L29850-04 ✓ | A6D0013-08 | | | | -0.045 | | | 1 | |
| 8 | L29850-05 ✓ | A6D0013-10 | | | | -0.035 | | | 1 | |
| 9 | L29850-06 ✓ | A6D0013-12 | | | | -0.035 | | | 1 | |
| 10 | L29851-01 ✓ | A6D0056-02 | | | | -0.057 | | | 1 | |
| 11 | L29851-02 ✓ | A6D0056-04 | | | | -0.053 | | | 1 | |
| 12 | L29851-02AS ✓ | WC151217-7 | | | SCK 4/13/16 | ~~-0.055~~ 2.503 | | | 1 | |
| 13 | WG401370CCV1 | WC151217-6 | | | | 4.975 | | | 1 | |
| 14 | WG401370CCB1 | NONE | | | | -0.067 | | | 1 | |
| 15 | L29851-02DUP ✓ | NONE | | | | -0.055 | | | 1 | |
| 16 | L29851-03 ✓ | A6D0056-06 | | | | -0.012 | | | 1 | |
| 17 | L29851-04 ✓ | A6D0056-08 | | | | 0.035 | | | 1 | |
| 18 | L29851-05 ✓ | A6D0056-10 | | | | -0.003 | | | 1 | |
| 19 | L29851-06 ✓ | 6040153-BLK1 | | | | -0.080 | | | 1 | |
| 20 | L29851-06AS ✓ | WC151217-7 | | | | 2.479 | | | 1 | |
| 21 | L29851-06DUP ✓ | NONE | | | | -0.087 | | | 1 | |
| 22 | WG401370CCV2 | WC151217-6 | | | | 4.956 | | | 1 | |
| 23 | WG401370CCB2 | NONE | | | | -0.062 | | | 1 | |

Report Comments: _____

AREV: _____
Initials, Date

Internal Comments _____

SREV: _____
Initials, Date

L29851-1604181615

## 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

# WG401370

**ACZ Laboratories, Inc**

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

| Sample | Login Comments |
|---|---|
| L29850-01 | BK \|\| |
| L29850-02 | BK \|\| |
| L29850-03 | BK \|\| |
| L29850-04 | BK \|\| |
| L29850-05 | BK \|\| |
| L29850-06 | BK \|\| |
| L29851-01 | BK \|\| |
| L29851-02 | BK \|\| |
| L29851-03 | BK \|\| |
| L29851-04 | BK \|\| |
| L29851-05 | BK \|\| |
| L29851-06 | BK \|\| |

Report Comments: _____

AREV: _____
Initials, Date

Internal Comments _____

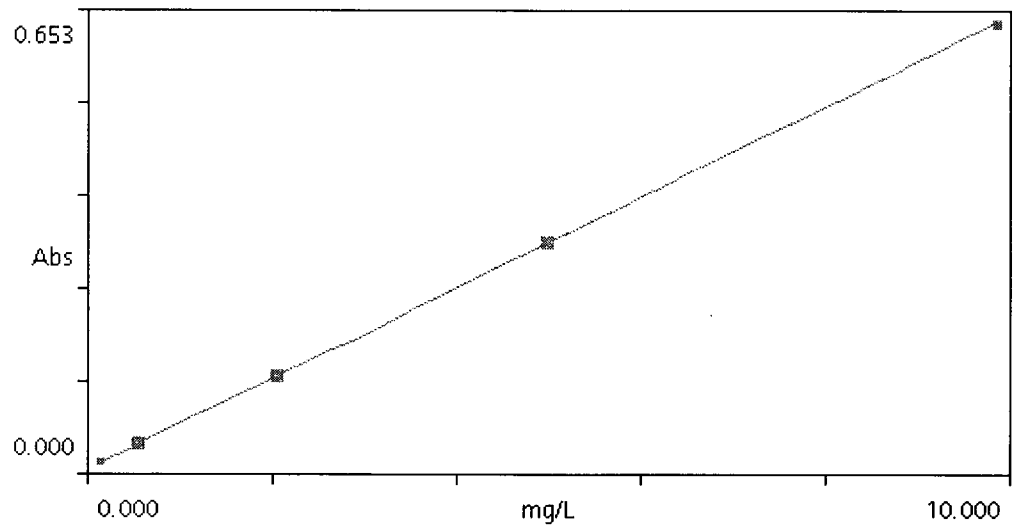
SREV: _____
Initials, Date

L29851-1604181615

Parameter: Thiocyanate Instr: SPEC

| | REAGENT | PCN/SCN | EXPIRATION DATE |
|---|---|---|---|
| Reagents: | Ferric Nitrate Color Reagent | WC160129-1 | 1/29/2017 |
| | Nitric Acid | ~~PCN~~ 49434 SCK 4/13/16 PCN | 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: -0.033 b: 15.337 |
| Curve Fit $r^2$= | 1.0000 |




| mg/L | Abs |
|---|---|
| 0.0000 | 0.000 |
| 0.5000 | 0.035 |
| 2.0000 | 0.133 |
| 5.0000 | 0.330 |
| 10.000 | 0.653 |

| | |
|---|---|
| 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: | 04-13-2016 15:37 |

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

Workgroup Review and Approval

# WG401370

Date Reported: 14-Apr-16
Run ID: R1390748
Date Analyzed: 13-Apr-16
ICAL Workgroup:
Instrument ID: SPEC2

## WG401370ICV

Tag: Measured: 4/13/2016 3:20:00 PM

| Status | Parm_Stored | Type | Value | Dil | Qual | Units | Appv | MDL | PQL | Text Value | Ext Qual | Signal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SREV | CYANIDE | FOUND | 1.96 | 1 | | mg/L | ++ | 0.1 | 0.5 | | | |
| SREV | CYANIDE | REC | 98 | 1 | | % | ++ | 0.1 | 0.5 | | | |

## WG401370ICB

Tag: Measured: 4/13/2016 3:21:49 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 | | | |

## WG401370LFB

Tag: Measured: 4/13/2016 3:23:38 PM

| Status | Parm_Stored | Type | Value | Dil | Qual | Units | Appv | MDL | PQL | Text Value | Ext Qual | Signal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SREV | CYANIDE | FOUND | 2.37 | 1 | | mg/L | ++ | 0.1 | 0.5 | | | |
| SREV | CYANIDE | REC | 95 | 1 | | % | ++ | 0.1 | 0.5 | | | |

## L29850-01

Tag: Measured: 4/13/2016 3:25:27 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29850-02

Tag: Measured: 4/13/2016 3:27:16 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29850-03

Tag: Measured: 4/13/2016 3:29:05 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29850-04

Tag: Measured: 4/13/2016 3:30:54 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29850-05

Tag: Measured: 4/13/2016 3:32:43 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29850-06

Tag: Measured: 4/13/2016 3:34:32 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29851-01

Tag: Measured: 4/13/2016 3:36:21 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29851-02

Tag: Measured: 4/13/2016 3:38:10 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29851-02AS

Tag: Measured: 4/13/2016 3:39:59 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 | | | |

## WG401370CCV1

Tag: Measured: 4/13/2016 3:41:48 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 | | | |

## WG401370CCB1

Tag: Measured: 4/13/2016 3:43:37 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 | | | |

## L29851-02DUP

Tag: Measured: 4/13/2016 3:45:26 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 | |

## L29851-03

Tag: Measured: 4/13/2016 3:47:15 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29851-04

Tag: Measured: 4/13/2016 3:49:04 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29851-05

Tag: Measured: 4/13/2016 3:50:53 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29851-06

Tag: Measured: 4/13/2016 3:52:42 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 | FILTER DATE | REPDATE | | 1 | | | NEED | | | | TA TB | |
| NEED | PH | PREP | 1 | 1 | | pH | ++ | | | | TA TB | |

## L29851-06AS

Tag: Measured: 4/13/2016 3:54:31 PM

| Status | Parm_Stored | Type | Value | Dil | Qual | Units | Appv | MDL | PQL | Text Value | Ext Qual | Signal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SREV | CYANIDE | FOUND | 2.48 | 1 | | mg/L | ++ | 0.1 | 0.5 | | | |
| SREV | CYANIDE | REC | 99 | 1 | | % | ++ | 0.1 | 0.5 | | | |

## L29851-06DUP

Tag: Measured: 4/13/2016 3:56:20 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 | |

## WG401370CCV2

Tag: Measured: 4/13/2016 3:58:09 PM

| Status | Parm_Stored | Type | Value | Dil | Qual | Units | Appv | MDL | PQL | Text Value | Ext Qual | Signal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SREV | CYANIDE | FOUND | 4.96 | 1 | | mg/L | ++ | 0.1 | 0.5 | | | |
| SREV | CYANIDE | REC | 99 | 1 | | % | ++ | 0.1 | 0.5 | | | |

## WG401370CCB2

Tag: Measured: 4/13/2016 3:59:58 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 | | | |

**Apex Laboratories**

Project ID: L29851

## Wet Chemistry

**WG401370** **Thiocyanate**

| Sample | Date | SCN | CYANIDE | FILTER DATE |
|---|---|---|---|---|
| WG401370ICV | 04/13/16 15:20 | WC151217-3 | X | |
| WG401370ICB | 04/13/16 15:21 | | X | |
| WG401370LFB | 04/13/16 15:23 | WC151217-7 | X | |
| L29850-01 | 04/13/16 15:25 | | X | |
| L29850-02 | 04/13/16 15:27 | | X | |
| L29850-03 | 04/13/16 15:29 | | X | |
| L29850-04 | 04/13/16 15:30 | | X | |
| L29850-05 | 04/13/16 15:32 | | X | |
| L29850-06 | 04/13/16 15:34 | | X | |
| L29851-01 | 04/13/16 15:36 | | X | |
| L29851-02 | 04/13/16 15:38 | | X | |
| L29851-02AS | 04/13/16 15:39 | WC151217-7 | X | |
| WG401370CCV1 | 04/13/16 15:41 | WC151217-6 | X | |
| WG401370CCB1 | 04/13/16 15:43 | | X | |
| L29851-02DUP | 04/13/16 15:45 | | X | |
| L29851-03 | 04/13/16 15:47 | | X | |
| L29851-04 | 04/13/16 15:49 | | X | |
| L29851-05 | 04/13/16 15:50 | | X | |
| L29851-06 | 04/13/16 15:52 | | X | |
| L29851-06AS | 04/13/16 15:54 | WC151217-7 | X | |
| L29851-06DUP | 04/13/16 15:56 | | X | |
| WG401370CCV2 | 04/13/16 15:58 | WC151217-6 | X | |
| WG401370CCB2 | 04/13/16 15:59 | | X | |

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

# Sample Receipt

**Apex Laboratories**
A6D0056

ACZ Project ID: L29851
Date Received: 04/12/2016 09:19
Received By: ddp
Date Printed: 4/12/2016

## 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 | | |

## Chain of Custody Related Remarks

## Client Contact Remarks

## Shipping Containers

| Cooler Id | Temp(°C) | Temp Criteria(°C) | Rad(µR/Hr) | Custody Seal Intact? |
|---|---|---|---|---|
| NA23692 | 2.7 | <=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**
A6D0056

| | |
|---|---|
| ACZ Project ID: | L29851 |
| Date Received: | 04/12/2016 09:19 |
| Received By: | ddp |
| Date Printed: | 4/12/2016 |

[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).

MF 4/4/16

L29851

# SUBCONTRACT ORDER

**Apex Laboratories**

**A6D0056**

**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

**Soil Embankment (0-3.5)**

**Sample Name: 5237-160401-DC-EMB038** **Soil** **Sampled: 04/01/16 10:25** (A6D0056-02)

| Analysis | Due | Expires | Comments |
|---|---|---|---|
| **Thiocyanate by SM 4500** | 04/14/16 17:00 | 04/15/16 10:25 | Level IV DP needed Sample will be leached in house prior to sending to ACZ |
| *Containers Supplied:* (C)4 oz Glass Jar | | | |

**Soil Embankment (0-3.5)**

**Sample Name: 5237-160401-DC-EMB039** **Soil** **Sampled: 04/01/16 11:05** (A6D0056-04)

| Analysis | Due | Expires | Comments |
|---|---|---|---|
| **Thiocyanate by SM 4500** | 04/14/16 17:00 | 04/15/16 11:05 | Level IV DP needed Sample will be leached in house prior to sending to ACZ |
| *Containers Supplied:* (C)4 oz Glass Jar | | | |

**Soil Embankment (0-3)**

**Sample Name: 5237-160401-DC-EMB046** **Soil** **Sampled: 04/01/16 12:00** (A6D0056-06)

| Analysis | Due | Expires | Comments |
|---|---|---|---|
| **Thiocyanate by SM 4500** | 04/14/16 17:00 | 04/15/16 12:00 | Level IV DP needed Sample will be leached in house prior to sending to ACZ |
| *Containers Supplied:* (C)4 oz Glass Jar | | | |

**NDP Soil Embankment (0-3.5) Label Reads 523**

**Sample Name: 5237-160401-NDP-EMB002** **Soil** **Sampled: 04/01/16 16:00** (A6D0056-08)

| Analysis | Due | Expires | Comments |
|---|---|---|---|
| **Thiocyanate by SM 4500** | 04/14/16 17:00 | 04/15/16 16:00 | Level IV DP needed Sample will be leached in house prior to sending to ACZ |
| *Containers Supplied:* | | | |

L29851 Chain of Custody

Standard TAT

UPS (Shipper)

Released By 4/11/16 Date | Received By Date

UPS (Shipper)

Released By Date | Received By 4/12/16 9:19 Date

**SUBCONTRACT ORDER**

**Apex Laboratories**

**A6D0056**

L29851

**NDP Soil Embankment (0-3.0) Label Reads 523**

**Sample Name: 5237-160401-NDP-EMB003** **Soil** **Sampled: 04/01/16 16:10** (A6D0056-10)

| Analysis | Due | Expires | Comments |
|---|---|---|---|
| **Thiocyanate by SM 4500** | 04/14/16 17:00 | 04/15/16 16:10 | Level IV DP needed Sample will be leached in house prior to sending to ACZ |

*Containers Supplied:*
(C)4 oz Glass Jar

4/11/16

Released By Date UPS (Shipper) Received By Date

UPS (Shipper)

Released By Date Received By 4.12.16 9:19 Date