ANALYTICAL REPORT

Job Number: 180-28205-1

Job Description: Willow/Hawthorne

For:
Natural Resource Technology, Inc.
300 S. Wacker Drive
Suite 2050
Chicago, IL 60606

Attention: Ms. Sarah L Meyer

Approved for release.
Craig Addison
Project Management Assistant I
12/24/2013 7:43 AM

Craig Addison, Project Management Assistant I
301 Alpha Drive, Pittsburgh, PA, 15238
(412)963-7058
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12/24/2013

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Table of Contents

Cover Title Page 1

Data Summaries 4

- Report Narrative 4
- Sample Summary 5
- Executive Summary 6
- Method Summary 7
- Method / Analyst Summary 8
- Sample Datasheets 9
- QC Data Summary 13
- Data Qualifiers 14
- QC Association Summary 15
- Lab Chronicle 16
- Reagent Traceability 18
  - COAs 19
- Certification Summary 22

Inorganic Sample Data 23

- General Chemistry Data 23
  - Gen Chem Cover Page 24
  - Gen Chem Sample Data 25
  - Gen Chem QC Data 29
    - Gen Chem ICV/CCV 29
    - Gen Chem Blanks 30
    - Gen Chem LCS/LCSD 31
  - Gen Chem MDL 33
  - Gen Chem Analysis Run Log 35
  - Gen Chem Raw Data 36

Table of Contents

Gen Chem Prep Data 43

Shipping and Receiving Documents 44

Client Chain of Custody 45

Sample Receipt Checklist 46

CASE NARRATIVE

Client: Natural Resource Technology, Inc.

Project: Willow/Hawthorne

Report Number: 180-28205-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 12/18/2013; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.0 C.

AVAILABLE CYANIDE

No difficulties were encountered during the Available Cyanide analysis.

SAMPLE SUMMARY

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
180-28205-1	121713001	Water	12/17/2013 1131	12/18/2013 1000
180-28205-2	121713002	Water	12/17/2013 1300	12/18/2013 1000
180-28205-3	121713003	Water	12/17/2013 1322	12/18/2013 1000
180-28205-4	121713004	Water	12/17/2013 1512	12/18/2013 1000

EXECUTIVE SUMMARY - Detections

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

Lab Sample ID Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
180-28205-3	**121713003**					
Available cyanide		0.0025		0.0020	mg/L	OIA-1677

METHOD SUMMARY

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Cyanide, Available (Flow Injection)	TAL PIT	OI CORP OIA-1677	

Lab References:

TAL PIT = TestAmerica Pittsburgh

Method References:

OI CORP = OI Corporation Instrument Manual.

METHOD / ANALYST SUMMARY

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

Method	Analyst	Analyst ID
OI CORP OIA-1677	Johnson, Paul	PGJ

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

General Chemistry

Client Sample ID: **121713001**

Lab Sample ID: 180-28205-1 Date Sampled: 12/17/2013 1131
Client Matrix: Water Date Received: 12/18/2013 1000

Analyte	Result	Qual	Units	RL	Dil	Method
Available cyanide	0.0020	U	mg/L	0.0020	1.0	OIA-1677

Analysis Batch: 180-93124 Analysis Date: 12/23/2013 1036

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

General Chemistry

Client Sample ID: **121713002**

Lab Sample ID: 180-28205-2 Date Sampled: 12/17/2013 1300
Client Matrix: Water Date Received: 12/18/2013 1000

Analyte	Result	Qual	Units	RL	Dil	Method
Available cyanide	0.0020	U	mg/L	0.0020	1.0	OIA-1677

Analysis Batch: 180-93124 Analysis Date: 12/23/2013 1038

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

General Chemistry

Client Sample ID: **121713003**

Lab Sample ID: 180-28205-3 Date Sampled: 12/17/2013 1322
Client Matrix: Water Date Received: 12/18/2013 1000

Analyte	Result	Qual	Units	RL	Dil	Method
Available cyanide	0.0025		mg/L	0.0020	1.0	OIA-1677

Analysis Batch: 180-93124 Analysis Date: 12/23/2013 1039

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

General Chemistry

Client Sample ID: **121713004**

Lab Sample ID: 180-28205-4 Date Sampled: 12/17/2013 1512
Client Matrix: Water Date Received: 12/18/2013 1000

Analyte	Result	Qual	Units	RL	Dil	Method
Available cyanide	0.0020	U	mg/L	0.0020	1.0	OIA-1677

Analysis Batch: 180-93124 Analysis Date: 12/23/2013 1041

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

Method Blank - Batch: 180-93124 **Method: OIA-1677**
Preparation: N/A

Lab Sample ID:	MB 180-93124/35	Analysis Batch:	180-93124	Instrument ID:	ALPKEM2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	C:\FLOW_4\122313A.RST
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	
Analysis Date:	12/23/2013 1035	Units:	mg/L	Final Weight/Volume:	
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Result	Qual	RL
Available cyanide	0.0020	U	0.0020

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 180-93124 **Method: OIA-1677**
Preparation: N/A

LCS Lab Sample ID:	LCS 180-93124/33	Analysis Batch:	180-93124	Instrument ID:	ALPKEM2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	C:\FLOW_4\122313A.RST
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	
Analysis Date:	12/23/2013 1032	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 180-93124/34	Analysis Batch:	180-93124	Instrument ID:	ALPKEM2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	C:\FLOW_4\122313A.RST
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	
Analysis Date:	12/23/2013 1033	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				
Leach Date:	N/A				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Available cyanide	101	103	82 - 132	2	20		

Laboratory Control/
Laboratory Duplicate Data Report - Batch: 180-93124 **Method: OIA-1677**
Preparation: N/A

LCS Lab Sample ID:	LCS 180-93124/33	Units:	mg/L	LCSD Lab Sample ID:	LCSD 180-93124/34
Client Matrix:	Water			Client Matrix:	Water
Dilution:	1.0			Dilution:	1.0
Analysis Date:	12/23/2013 1032			Analysis Date:	12/23/2013 1033
Prep Date:	N/A			Prep Date:	N/A
Leach Date:	N/A			Leach Date:	N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Available cyanide	0.100	0.100	0.101	0.103

DATA REPORTING QUALIFIERS

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

Lab Section	Qualifier	Description
General Chemistry		
	U	Indicates the analyte was analyzed for but not detected.

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:180-93124					
LCS 180-93124/33	Lab Control Sample	T	Water	OIA-1677	
LCSD 180-93124/34	Lab Control Sample Duplicate	T	Water	OIA-1677	
MB 180-93124/35	Method Blank	T	Water	OIA-1677	
180-28205-1	121713001	T	Water	OIA-1677	
180-28205-2	121713002	T	Water	OIA-1677	
180-28205-3	121713003	T	Water	OIA-1677	
180-28205-4	121713004	T	Water	OIA-1677	

Report Basis

T = Total

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

Laboratory Chronicle

Lab ID: 180-28205-1 **Client ID:** 121713001

Sample Date/Time: 12/17/2013 11:31 Received Date/Time: 12/18/2013 10:00

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
A:OIA-1677	180-28205-A-1		180-93124		12/23/2013 10:36	1	TAL PIT	PGJ

Lab ID: 180-28205-2 **Client ID:** 121713002

Sample Date/Time: 12/17/2013 13:00 Received Date/Time: 12/18/2013 10:00

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
A:OIA-1677	180-28205-A-2		180-93124		12/23/2013 10:38	1	TAL PIT	PGJ

Lab ID: 180-28205-3 **Client ID:** 121713003

Sample Date/Time: 12/17/2013 13:22 Received Date/Time: 12/18/2013 10:00

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
A:OIA-1677	180-28205-A-3		180-93124		12/23/2013 10:39	1	TAL PIT	PGJ

Lab ID: 180-28205-4 **Client ID:** 121713004

Sample Date/Time: 12/17/2013 15:12 Received Date/Time: 12/18/2013 10:00

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
A:OIA-1677	180-28205-A-4		180-93124		12/23/2013 10:41	1	TAL PIT	PGJ

Lab ID: MB **Client ID:** N/A

Sample Date/Time: N/A Received Date/Time: N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
A:OIA-1677	MB 180-93124/35		180-93124		12/23/2013 10:35	1	TAL PIT	PGJ

Lab ID: LCS **Client ID:** N/A

Sample Date/Time: N/A Received Date/Time: N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
A:OIA-1677	LCS 180-93124/33		180-93124		12/23/2013 10:32	1	TAL PIT	PGJ

Lab ID: LCSD **Client ID:** N/A

Sample Date/Time: N/A Received Date/Time: N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
A:OIA-1677	LCSD 180-93124/34		180-93124		12/23/2013 10:33	1	TAL PIT	PGJ

Client: Natural Resource Technology, Inc. Job Number: 180-28205-1

Laboratory Chronicle

Lab References:
TAL PIT = TestAmerica Pittsburgh

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Pittsburgh Job No.: 180-28205-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
WAvCN.1StdCCV_00161	12/27/13	12/23/13	DI Water, Lot NA	1000 mL	WAvCN10Pi_00223	10 mL	Available cyanide	100 ug/L
.WAvCN10Pi_00223	12/27/13	12/23/13	DI Water, Lot DI Water	100 mL	WAvCN1000P_00009	1 mL	Available cyanide	10000 ug/L
..WAvCN1000P_00009	12/28/13	LabChem Inc, Lot C178-07			(Purchased Reagent)		Available cyanide	1000 mg/L
WAvCN0.1ICV_00159	12/27/13	12/23/13	DI Water, Lot NA	200 mL	WAvCN10Si_00224	2 mL	Available cyanide	100 ug/L
.WAvCN10Si_00224	12/27/13	12/23/13	DI Water, Lot DI Water	100 mL	WAvCN1000S_00012	1 mL	Available cyanide	10000 ug/L
..WAvCN1000S_00012	01/31/14	Ricca Chemical Co., Lot 2307A89			(Purchased Reagent)		Available cyanide	1000 mg/L
WAvCN0.1LCS_00166	12/27/13	12/23/13	DI Water, Lot NA	1000 mL	WHg210Pi_00235	10 mL	Available cyanide	100.116 ug/L
.WHg210Pi_00235	12/27/13	12/23/13	DI Water, Lot DI water	100 mL	WHg2CN1000P_00011	1 mL	Available cyanide	10011.6 ug/L
..WHg2CN1000P_00011	01/25/14	07/25/13	DI Water, Lot DI Water	500 mL	WHg(II) CNP_00003	2.43 g	Available cyanide	1001.16 mg/L
...WHg(II) CNP_00003	03/18/14	Sigma-Aldrich, Lot 030M1156V			(Purchased Reagent)		Available cyanide	0.206 g/g

903114
ID: WCN1000P_00019
Exp:12/29/13 Prpd:PGJ Opn:07/29/13
Cyanide 1000 ppm Primary

903115
ID: WAvCN1000P_00009
Exp:12/28/13 Prpd:PGJ Opn:07/29/13
Available Cyanide 1000 PP

LabChem
performance through chemistry
Jackson's Pointe Commerce Park - Building 1000
1010 Jackson's Pointe Court, Zelienople, PA 16063
Ph: 412-826-5230 | Fax: 724-473-0647 | www.labchem.com

CERTIFICATE OF ANALYSIS

Description: CYANIDE STANDARD, 1000ppm (1ml = 1mg CN)

Catalog Number: LC13545
Lot Number: C178-07

Mfg Date: 06/28/2013
Expiration Date: 12/28/2013

ANALYTICAL SECTION

Test	Specification	Test Result
Appearance	clear, colorless solution	Pass Test
Concentration ppm CN	1000ppm +/- 10ppm	1009ppm
Concentration mg CN/mL	1.000mg/mL +/- 0.010 mg CN/mL	1.009 mg CN/mL
Traceable to NIST	Potassium Chloride	999b

Submitted By: Greg Albright, Chemist Supervisor

Greg Albright

An ISO9001:2008 certified company. Registration # 0306-01

07/26/2013 9:13:31 AM

Form #17.12 06/19/2012

Page 1 of 1

908379
ID: WCN1000S_00012
Exp:01/31/14 Prpd:PGJ Opn:08/02/13
Cyanide 1000 ppm Secondar

908380
ID: WAvCN1000S_00012
Exp:01/31/14 Prpd:PGJ Opn:08/02/13
Available Cyanide 1000 pp

RIC EMICA PANY

Arlington, TX 76012
Pocomoke City, MD 21851
Batesville, IN 47006
http://www.riccachemical.com
1-888-GO-RICCA
customerservice@riccachemical.com

Certificate of Analysis

Cyanide Standard, 1 mL = 1 mg CN, 1000 ppm CN

Lot Number: 2307A89 Product Number: 2543 Expiration Date: JAN 2014 Manufacture Date:7/19/2013

This standard is prepared using accurate volumetric techniques from material that has been assayed against Silver Nitrate solution certified traceable to NIST Standard Reference Material 999. The certified value reported is the prepared value based upon the method of preparation of the material. The uncertainty in the prepared value is the combined uncertainty based on the stability of the assayed Potassium Cyanide, and the uncertainty in the mass and volume measurements.
Use 0.16% (w/v) (0.04 N) Sodium Hydroxide or 0.225 % (w/v) (0.04 N) Potassium Hydroxide to make dilutions of this standard.
Restandardize weekly if extreme accuracy is required.

Contains:

Name	CAS#	Grade
Potassium Cyanide, KCN	151-50-8	ACS
Sodium Hydroxide, NaOH	1310-73-2	ACS
Water, Deionized, H2O	7732-18-5	ACS, ASTM D 1193 (Type I), EP, USP

Test Name	Assay Method	Specification	Result
Appearance	Clarity, Color, Odor	Clear, colorless, cyanide odor	Passed Test
Certified Concentration	Based on accurate volumetric preparation	1000 ± 5 ppm CN-	1000 ppm CN-

Specification	Reference	Method Number
Stock Standard Cyanide Solution	APHA	4500-CN- F
Stock Cyanide Solution	APHA	4500-CN- E
Stock Cyanide Solution	APHA	4500-CN- K
Stock Cyanide Solution	APHA	4500-CN- H
Cyanide Reference Solution (1000 mg/L)	EPA (SW-846)	7.3.3.2
Cyanide Calibration Stock Solution (1,000 mg/L CN-)	EPA (SW-846)	9213
Stock Cyanide Solution	EPA	335.3
Stock Cyanide Solution	EPA	335.2
Cyanide Solution Stock	ASTM	D 4282
Simple Cyanide Solution, Stock (1.0 g/L CN)	ASTM	D 4374

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Shelf Life (unopened container):

Part Number	Shelf Life
2543-4	6 months
2543-32	6 months
2543-16	6 months

Recommended Storage: 2°C - 8°C (36°F - 46°F)

LaNelle Ohlhausen
Quality Assurance

This Certificate of Analysis is designed to comply with ISO Guide 31 "Reference Materials -- Contents of Certificates and Labels."

Version: 2

To determine manufacture site using lot number, visit http://www.riccachemical.com/Documents/lot.pdf.

Certification Summary

Client: Natural Resource Technology, Inc.
Project/Site: Willow/Hawthorne

TestAmerica Job ID: 180-28205-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Pittsburgh	Arkansas DEQ	State Program	6	88-0690
TestAmerica Pittsburgh	California	NELAP	9	4224CA
TestAmerica Pittsburgh	Connecticut	State Program	1	PH-0688
TestAmerica Pittsburgh	Florida	NELAP	4	E871008
TestAmerica Pittsburgh	Illinois	NELAP	5	002602
TestAmerica Pittsburgh	Kansas	NELAP	7	E-10350
TestAmerica Pittsburgh	L-A-B	DoD ELAP		L2314
TestAmerica Pittsburgh	Louisiana	NELAP	6	04041
TestAmerica Pittsburgh	New Hampshire	NELAP	1	203011
TestAmerica Pittsburgh	New Jersey	NELAP	2	PA005
TestAmerica Pittsburgh	New York	NELAP	2	11182
TestAmerica Pittsburgh	North Carolina DENR	State Program	4	434
TestAmerica Pittsburgh	Pennsylvania	NELAP	3	02-00416
TestAmerica Pittsburgh	South Carolina	State Program	4	89014
TestAmerica Pittsburgh	US Fish & Wildlife	Federal		LE94312A-1
TestAmerica Pittsburgh	USDA	Federal		P330-10-00139
TestAmerica Pittsburgh	USDA	Federal		P-Soil-01
TestAmerica Pittsburgh	Utah	NELAP	8	STLP
TestAmerica Pittsburgh	Virginia	NELAP	3	460189
TestAmerica Pittsburgh	West Virginia DEP	State Program	3	142
TestAmerica Pittsburgh	Wisconsin	State Program	5	998027800

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

GENERAL CHEMISTRY

COVER PAGE
GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job Number: 180-28205-1

SDG No.:

Project: Willow/Hawthorne

Client Sample ID	Lab Sample ID
121713001	180-28205-1
121713002	180-28205-2
121713003	180-28205-3
121713004	180-28205-4

Comments:

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: 121713001
Lab Sample ID: 180-28205-1
Lab Name: TestAmerica Pittsburgh
Job No.: 180-28205-1
SDG ID.:
Matrix: Water
Date Sampled: 12/17/2013 11:31
Reporting Basis: WET
Date Received: 12/18/2013 10:00

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
	Available cyanide	0.0020	0.0020		mg/L	U		1	OIA-1677

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: 121713002
Lab Sample ID: 180-28205-2
Lab Name: TestAmerica Pittsburgh
Job No.: 180-28205-1
SDG ID.:
Matrix: Water
Date Sampled: 12/17/2013 13:00
Reporting Basis: WET
Date Received: 12/18/2013 10:00

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
	Available cyanide	0.0020	0.0020		mg/L	U		1	OIA-1677

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: 121713003
Lab Sample ID: 180-28205-3
Lab Name: TestAmerica Pittsburgh
Job No.: 180-28205-1
SDG ID.:
Matrix: Water
Date Sampled: 12/17/2013 13:22
Reporting Basis: WET
Date Received: 12/18/2013 10:00

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
	Available cyanide	0.0025	0.0020		mg/L			1	OIA-1677

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: 121713004
Lab Sample ID: 180-28205-4
Lab Name: TestAmerica Pittsburgh
Job No.: 180-28205-1
SDG ID.:
Matrix: Water
Date Sampled: 12/17/2013 15:12
Reporting Basis: WET
Date Received: 12/18/2013 10:00

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
	Available cyanide	0.0020	0.0020		mg/L	U		1	OIA-1677

2-IN
CALIBRATION QUALITY CONTROL
GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job No.: 180-28205-1

SDG No.:

Analyst: PGJ Batch Start Date: 12/23/2013

Reporting Units: mg/L Analytical Batch No.: 93124

Sample Number	QC Type	Time	Analyte	Result	Spike Amount	(%) Recovery	Limits	Qual	Reagent
14	ICV	10:03	Available cyanide	0.104	0.100	104	85-115		WAvCN0.1ICV_00159
15	ICB	10:05	Available cyanide	0.0020				U	
30	CCV	10:27	Available cyanide	0.105	0.100	105	86-118		WAvCN.1StdCCV_0016 1
31	CCB	10:29	Available cyanide	0.0020				U	
46	CCV	10:51	Available cyanide	0.105	0.100	105	86-118		WAvCN.1StdCCV_0016 1
47	CCB	10:53	Available cyanide	0.0020				U	

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM II-IN

3-IN
METHOD BLANK
GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job No.: 180-28205-1

SDG No.:

Method	Lab Sample ID	Analyte	Result	Qual	Units	RL	Dil
Batch ID: 93124	Date: 12/23/2013 10:35						
OIA-1677	MB 180-93124/35	Available cyanide	0.0020	U	mg/L	0.0020	1

FORM III-IN

7A-IN
LAB CONTROL SAMPLE
GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job No.: 180-28205-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 93124		Date: 12/23/2013 10:32									
						LCS Source:	WAvCN0.1LCS_00166				
OIA-1677	LCS 180-93124/33	Available cyanide	0.101		mg/L	0.100	101	82-132	2	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA-IN

7A-IN
LAB CONTROL SAMPLE DUPLICATE
GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job No.: 180-28205-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 93124	Date: 12/23/2013 10:33										
						LCSD Source: WAvCN0.1LCS_00166					
OIA-1677	LCSD 180-93124/34	Available cyanide	0.103		mg/L	0.100	103	82-132	2	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA-IN

9-IN
DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job Number: 180-28205-1

SDG Number:

Matrix: Water Instrument ID: ALPKEM2

Method: OIA-1677 MDL Date: 01/10/2013 08:36

Analyte	Wavelength/ Mass	RL (mg/L)	MDL (mg/L)
Available cyanide		0.002	0.0018

9-IN
CALIBRATION BLANK DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job Number: 180-28205-1

SDG Number:

Matrix: Water Instrument ID: ALPKEM2

Method: OIA-1677 XMDL Date: 01/10/2013 08:36

Analyte	Wavelength/ Mass	XRL (mg/L)	XMDL (mg/L)
Available cyanide		0.002	0.0018

13-IN
ANALYSIS RUN LOG
GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job No.: 180-28205-1

SDG No.:

Instrument ID: ALPKEM2 Method: OIA-1677

Start Date: 12/23/2013 09:44 End Date: 12/23/2013 11:18

Lab Sample ID	D/F	Type	Time	Analytes																			
				CNAm																			
ICV 180-93124/14	1		10:03	X																			
ICB 180-93124/15	1		10:05	X																			
CCV 180-93124/30	1		10:27	X																			
CCB 180-93124/31	1		10:29	X																			
LCS 180-93124/33	1	T	10:32	X																			
LCSD 180-93124/34	1	T	10:33	X																			
MB 180-93124/35	1	T	10:35	X																			
180-28205-1	1	T	10:36	X																			
180-28205-2	1	T	10:38	X																			
180-28205-3	1	T	10:39	X																			
180-28205-4	1	T	10:41	X																			
CCV 180-93124/46	1		10:51	X																			
CCB 180-93124/47	1		10:53	X																			

Prep Types

T = Total/NA

Peak Table:Cyanide, Amenable

File name: C:\FLOW_4\122313A.RST
Date: 23-Dec-13
Operator: P.JOHNSON

P. Johnson 12.23.13

Peak	Cup	Name	R	Type	Dil	Wt	Height	Calc. (ppb)	Flags
1	1	SYNC	1	SYNC	1	1	229109	195.991364	
2	0	BLANK	1	BLNK	1	1	1571	-0.297221	LO
3	0	BLANK	2	BLNK	1	1	307	-1.387484	LO
B	0	BASELINE	1	RB	1	1	0	-1.652590	BL
5	2	Cal 0.000 ppb	1	C	1	1	287	-1.405210	LO
6	3	Cal 2.000 ppb	1	C	1	1	2948	0.890574	
7	4	Cal 5.000 ppb	1	C	1	1	6889	4.289981	
8	5	Cal 10.000 ppb	1	C	1	1	14253	10.643256	
9	6	Cal 20.000 ppb	1	C	1	1	26900	21.552685	
10	7	Cal 100.000 ppb	1	C	1	1	120589	102.374596	
11	8	Cal 200.000 ppb	1	C	1	1	232196	198.654114	
12	0	BLANK	1	BLNK	1	1	1287	-0.542271	LO
B	0	BASELINE	1	RB	1	1	0	-1.652590	BL
14	9	ICV	1	U	1	1	122457	103.986145	
15	10	ICB	1	U	1	1	832	-0.934513	LO
B	0	BASELINE	1	RB	1	1	0	-1.652590	BL
17	11	LCS	1	U	1	1	116339	98.708832	
18	12	LCSSD	1	U	1	1	118048	100.182632	
19	13	MB	1	U	1	1	967	-0.818474	LO
20	14	180-28258-A-1	1	U	1	1	401	-1.306506	LO
21	15	180-28217-A-1	1	U	1	1	625	-1.113257	LO
22	16	180-28217-A-2	1	U	1	1	237	-1.448368	LO
23	17	190-2876-C-1	1	U	1	1	48442	40.136147	
24	18	180-28207-A-1	1	U	1	1	913	-0.864600	LO
25	19	180-28253-A-1	1	U	1	1	25735	20.547661	
26	20	180-28267-A-1	1	U	1	1	2591	0.582487	
27	21	190-2884-C-1	1	U	2	1	6026	7.091534	
28	22	190-2904-B-1	1	U	1	1	5131	2.774051	
29	23	190-2911-B-2	1	U	1	1	749	-1.006647	LO
30	24	CCV	1	U	1	1	123824	105.165237	
31	25	CCB	1	U	1	1	760	-0.996864	LO
B	0	BASELINE	1	RB	1	1	0	-1.652590	BL
33	26	LCS	1	U	1	1	119301	101.263741	
34	27	LCSD	1	U	1	1	121478	103.142296	
35	28	MB	1	U	1	1	1002	-0.788274	LO
36	29	180-28205-A-1	1	U	1	1	1104	-0.699893	LO
37	30	180-28205-A-2	1	U	1	1	962	-0.822856	LO
38	31	180-28205-A-3	1	U	1	1	4842	2.524588	
39	32	180-28205-A-4	1	U	1	1	2277	0.312061	
40	33	180-28296-A-1	1	U	1	1	825	-0.940702	LO
41	34	180-28296-A-2	1	U	1	1	210	-1.471301	LO
42	35	180-28296-A-3	1	U	1	1	2276	0.311077	
43	36	180-28296-A-4	1	U	1	1	258	-1.430453	LO
44	37	180-28296-A-6	1	U	1	1	748	-1.007442	LO
45	38	180-28296-A-8	1	U	1	1	-33	-1.681465	LO
46	39	CCV	1	U	1	1	123545	104.924988	
47	40	CCB	1	U	1	1	670	-1.074651	LO
B	0	BASELINE	1	RB	1	1	0	-1.652590	BL
49	41	LCS	1	U	1	1	119028	101.028328	
50	42	LCSD	1	U	1	1	120415	102.224670	
51	43	MB	1	U	1	1	1118	-0.688473	LO
52	44	180-28296-A-9	1	U	1	1	1157	-0.654742	LO
53	45	180-28296-A-10	1	U	1	1	422	-1.288187	LO
54	46	180-28296-A-11	1	U	1	1	92	-1.573468	LO
55	47	180-28296-A-12	1	U	1	1	106	-1.561428	LO
56	48	180-28296-A-14	1	U	1	1	150	-1.523540	LO
57	49	180-28296-A-15	1	U	1	1	884	-0.890349	LO
58	50	180-28296-A-17	1	U	1	1	238	-1.447509	LO
59	51	180-28296-A-22	1	U	1	1	1351	-0.487419	LO
60	52	180-28296-A-23	1	U	1	1	41	-1.617510	LO
61	53	180-28296-A-24	1	U	1	1	512	-1.211110	LO
62	54	CCV	1	U	1	1	123400	104.799690	
63	55	CCB	1	U	1	1	864	-0.906827	LO

Peak	Cup	Name	R	Type	Dil	Wt	Height	Calc. (ppb)	Flags
B	0	BASELINE	1	RB	1	1	0	-1.652590	BL

Run Results Report

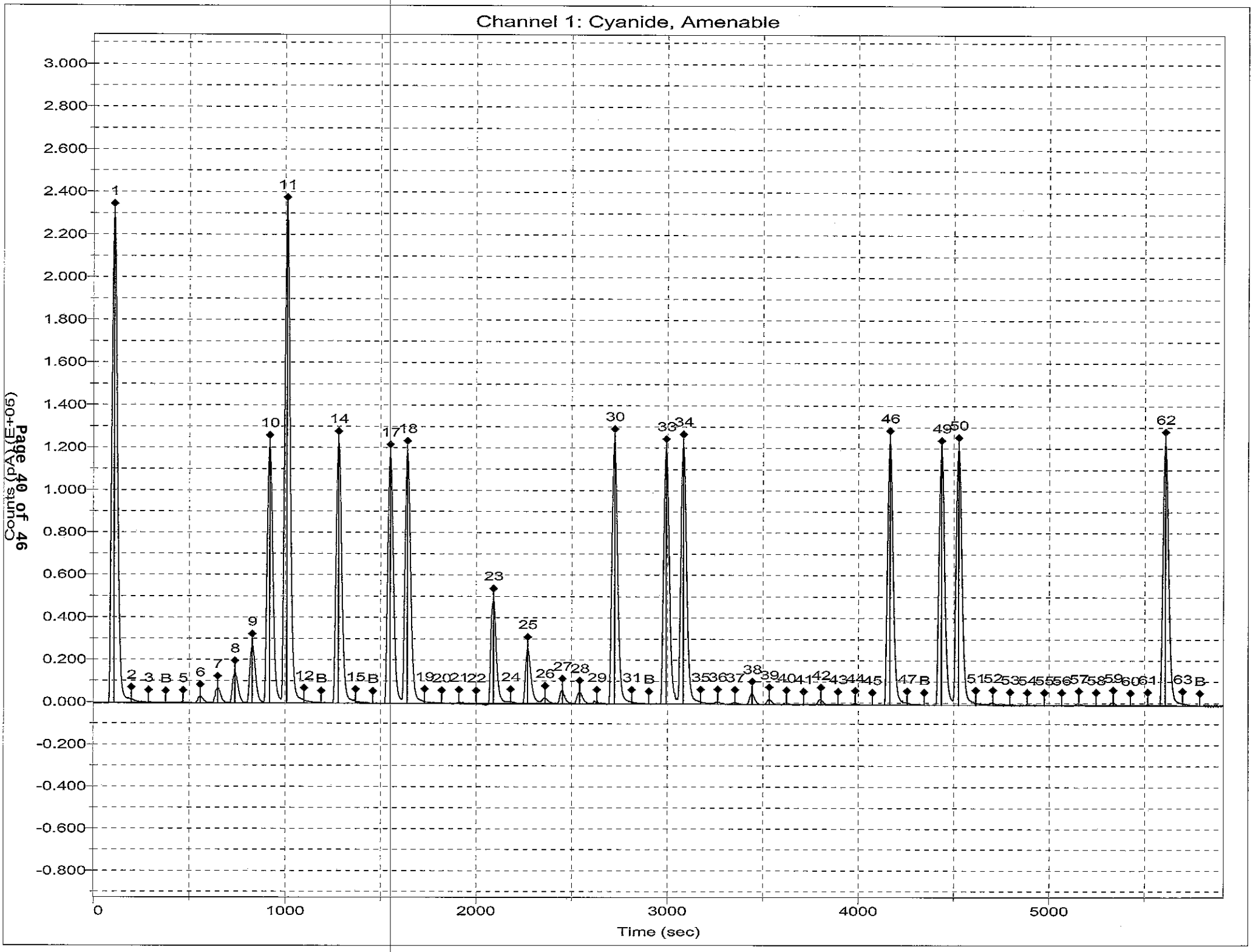
Facility Name	
Facility Location	
Department	
Operator Name	P.JOHNSON
Operator ID	P.JOHNSON
Platform	FS 3000
Software Rev Code	222
Data system ID	57
Result path	C:\FLOW_4\122313A.RST
Sample table path	C:\FLOW_4\CNAMPPB.TBL
Method path	C:\FLOW_4\CNAMPPB.MTH
Date acquired	23-Dec-13
Time acquired	11:22

P. Johnson 12.23.13

				|----- Cyanide, Amenable -----|	
Date	Time	Cup	Name	Response	Calc [ppb]	Flags
23-Dec-13	09:44	1	SYNC	229109	195.991	
23-Dec-13	09:45	0	BLANK	1571	-0.297	LO
23-Dec-13	09:47	0	BLANK	307	-1.387	LO
23-Dec-13	09:48	0	BASELINE	0	-1.653	BL
23-Dec-13	09:50	2	Cal 0.000 ppb	287	-1.405	LO
23-Dec-13	09:51	3	Cal 2.000 ppb	2948	0.891	
23-Dec-13	09:53	4	Cal 5.000 ppb	6889	4.290	
23-Dec-13	09:54	5	Cal 10.000 ppb	14253	10.643	
23-Dec-13	09:56	6	Cal 20.000 ppb	26900	21.553	
23-Dec-13	09:57	7	Cal 100.000 ppb	120589	102.375	
23-Dec-13	09:59	8	Cal 200.000 ppb	232196	198.654	
23-Dec-13	10:00	0	BLANK	1287	-0.542	LO
23-Dec-13	10:02	0	BASELINE	0	-1.653	BL
23-Dec-13	10:03	9	ICV	122457	103.986	
23-Dec-13	10:05	10	ICB	832	-0.935	LO
23-Dec-13	10:06	0	BASELINE	0	-1.653	BL
23-Dec-13	10:08	11	LCS	116339	98.709	
23-Dec-13	10:09	12	LCSSD	118048	100.183	
23-Dec-13	10:11	13	MB	967	-0.818	LO
23-Dec-13	10:12	14	180-28258-A-1	401	-1.307	LO
23-Dec-13	10:14	15	180-28217-A-1	625	-1.113	LO
23-Dec-13	10:15	16	180-28217-A-2	237	-1.448	LO
23-Dec-13	10:17	17	190-2876-C-1	48442	40.136	
23-Dec-13	10:18	18	180-28207-A-1	913	-0.865	LO
23-Dec-13	10:20	19	180-28253-A-1	25735	20.548	
23-Dec-13	10:21	20	180-28267-A-1	2591	0.582	
23-Dec-13	10:23	21	190-2884-C-1	6026	7.092	
23-Dec-13	10:24	22	190-2904-B-1	5131	2.774	
23-Dec-13	10:26	23	190-2911-B-2	749	-1.007	LO
23-Dec-13	10:27	24	CCV	123824	105.165	
23-Dec-13	10:29	25	CCB	760	-0.997	LO
23-Dec-13	10:30	0	BASELINE	0	-1.653	BL
23-Dec-13	10:32	26	LCS	119301	101.264	
23-Dec-13	10:33	27	LCSD	121478	103.142	
23-Dec-13	10:35	28	MB	1002	-0.788	LO
23-Dec-13	10:36	29	180-28205-A-1	1104	-0.700	LO
23-Dec-13	10:38	30	180-28205-A-2	962	-0.823	LO
23-Dec-13	10:39	31	180-28205-A-3	4842	2.525	
23-Dec-13	10:41	32	180-28205-A-4	2277	0.312	
23-Dec-13	10:42	33	180-28296-A-1	825	-0.941	LO
23-Dec-13	10:44	34	180-28296-A-2	210	-1.471	LO

Result path	C:\FLOW_4\122313A.RST
Sample table path	C:\FLOW_4\CNAMPPB.TBL
Method path	C:\FLOW_4\CNAMPPB.MTH
Date acquired	23-Dec-13
Time acquired	11:22

				|------ Cyanide, Amenable -----|		
Date	Time	Cup	Name	Response	Calc [ppb]	Flags
23-Dec-13	10:45	35	180-28296-A-3	2276	0.311	
23-Dec-13	10:47	36	180-28296-A-4	258	-1.430	LO
23-Dec-13	10:48	37	180-28296-A-6	748	-1.007	LO
23-Dec-13	10:50	38	180-28296-A-8	-33	-1.681	LO
23-Dec-13	10:51	39	CCV	123545	104.925	
23-Dec-13	10:53	40	CCB	670	-1.075	LO
23-Dec-13	10:54	0	BASELINE	0	-1.653	BL
23-Dec-13	10:56	41	LCS	119028	101.028	
23-Dec-13	10:57	42	LCSD	120415	102.225	
23-Dec-13	10:59	43	MB	1118	-0.688	LO
23-Dec-13	11:00	44	180-28296-A-9	1157	-0.655	LO
23-Dec-13	11:02	45	180-28296-A-10	422	-1.288	LO
23-Dec-13	11:03	46	180-28296-A-11	92	-1.573	LO
23-Dec-13	11:05	47	180-28296-A-12	106	-1.561	LO
23-Dec-13	11:06	48	180-28296-A-14	150	-1.524	LO
23-Dec-13	11:08	49	180-28296-A-15	884	-0.890	LO
23-Dec-13	11:09	50	180-28296-A-17	238	-1.448	LO
23-Dec-13	11:11	51	180-28296-A-22	1351	-0.487	LO
23-Dec-13	11:12	52	180-28296-A-23	41	-1.618	LO
23-Dec-13	11:14	53	180-28296-A-24	512	-1.211	LO
23-Dec-13	11:15	54	CCV	123400	104.800	
23-Dec-13	11:17	55	CCB	864	-0.907	LO
23-Dec-13	11:18	0	BASELINE	0	-1.653	BL


Channel 1: Cyanide, Amenable
Counts (pA) (E+06)
Time (sec)
3.000
2.800
2.600
2.400
2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
-0.200
-0.400
-0.600
-0.800
0
1000
2000
3000
4000
5000

Cyanide, Amenable:Calibration 1: Peak 5-64

File name: C:\FLOW_4\122313A.RST
Date: 23-Dec-13
Operator: P.JOHNSON

P. Johnson 12.23.13

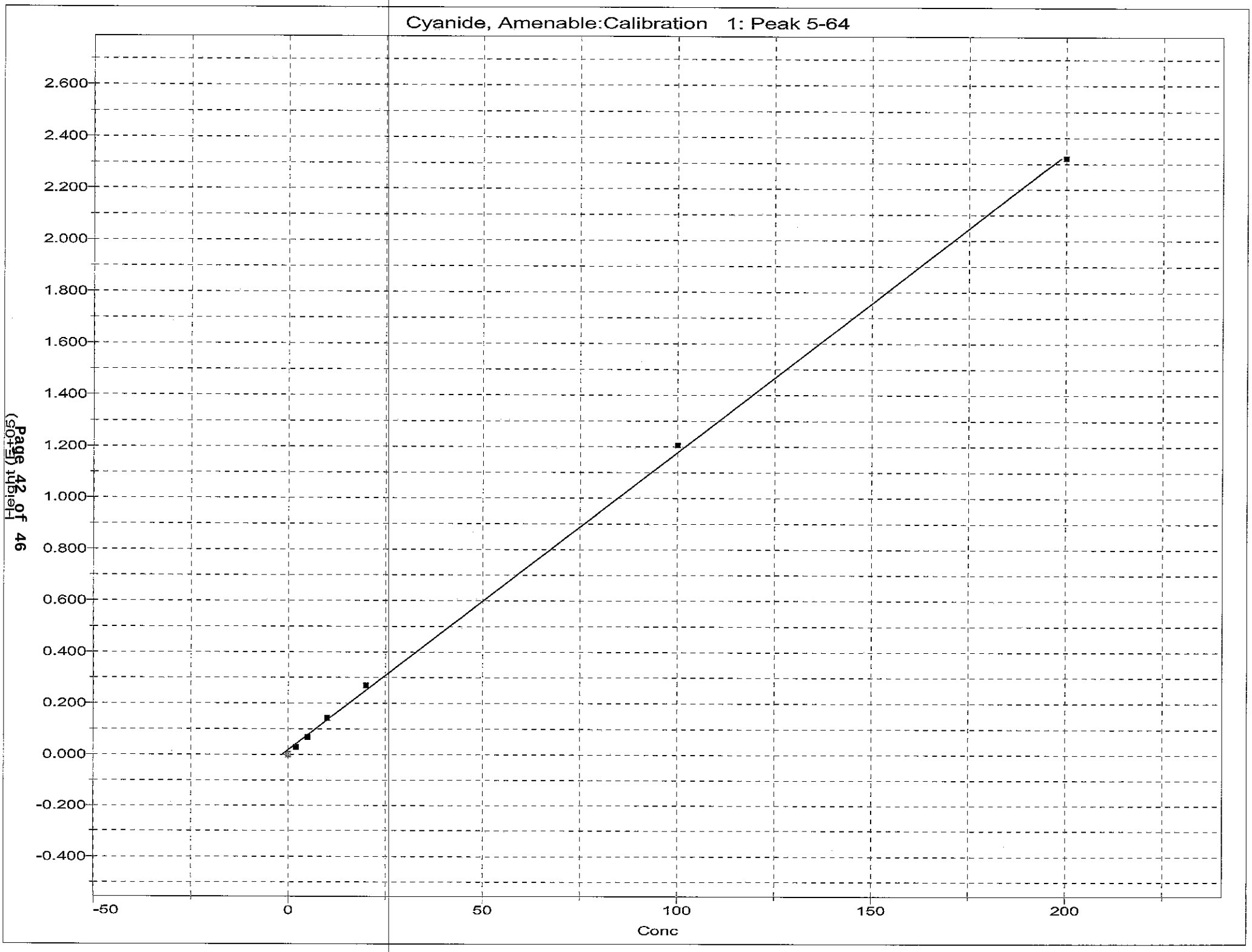
*	Name	Conc	Height
*	Cal 0.000 ppb	0.000000	286.763641
*	Cal 2.000 ppb	2.000000	2948.041748
*	Cal 5.000 ppb	5.000000	6888.644043
*	Cal 10.000 ppb	10.000000	14253.375977
*	Cal 20.000 ppb	20.000000	26899.615234
*	Cal 100.000 ppb	100.000000	120588.578125
*	Cal 200.000 ppb	200.000000	232196.046875

Calib Coef:
y=bx+a
a: (intercept) 1.9157e+03
b: 1.1592e+03

Corr Coef: 0.999796

Carryover: n/a

No Drift Peaks


Cyanide, Amenable:Calibration 1: Peak 5-64
2.600
2.400
2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
-0.200
-0.400
-50
0
50
100
150
200
Conc

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: TestAmerica Pittsburgh Job No.: 180-28205-1

SDG No.:

Batch Number: 93124 Batch Start Date: 12/23/13 09:44 Batch Analyst: Johnson, Paul

Batch Method: OIA-1677 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	FinalAmount	WAvCN.1StdCCV 00161	WAvCN0.1ICV 00159	WAvCN0.1LCS 00166		
ICV 180-93124/14		OIA-1677		10 mL		10 mL			
CCV 180-93124/30		OIA-1677		10 mL	10 mL				
LCS 180-93124/33		OIA-1677		10 mL			10 mL		
LCSD 180-93124/34		OIA-1677		10 mL			10 mL		
CCV 180-93124/46		OIA-1677		10 mL	10 mL				

Batch Notes	
Ascorbic Acid Reagent ID Number	895860
Cadmiun Chloride Reagent ID number	476465
Sodium Hydroxide Reagent ID Number	1039209
Pipette ID	J1207624U,J1102764U
WAD AR Solution Reagent ID	1039211
WAD Carrier Solution Reagent ID	1039210
WAD A Reagent ID	992494
WAD B Reagent ID	992500

Basis	Basis Description

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Shipping and Receiving Documents

Burns & McDonnell
SINCE 1898

Request for Chemical Analysis and Chain of Custody Record

Burns & McDonnell Engineering
1431 Opus Place
Downers Grove, Illinois 60515
Phone: (630) 724-3200 Fax: (630) 724-3201

Attention: Sarah Meyer
Report to: smeyer@NaturalRt.com

Laboratory: Test America
Address: 301 Alpha Drive
City/State/ZIP: Pittsburgh, PA 15238
Telephone: 412-963-7058

Document Control No.: 69420-127-2013
Lab. Reference No. or Episode No.:

Project Number: 69420 (invoice to Integrys PO 3400002533)
Site Name: Peoples Gas – Willow Street/Hawthorn Ave OU

Sample Number: Group or SWMU Name	Sample Number: Sample Point	Sample Number: Sample Designator	Sample Event: Round	Sample Event: Year	Sample Depth (in feet): From	Sample Depth (in feet): To	Sample Collected: Date	Sample Collected: Time	Sample Type – Matrix: Liquid	Sample Type – Matrix: Solid	Sample Type – Matrix: Gas	Number of Containers	Parameter/Method Code: Available Cyanide*						Remarks
121713001							12/17/13	1131	X			1	X						
121713002							↓	1300	X			1	X						
121713003								1322	X			1	X						
121713004								1512	X			1	X						

180-28205 Chain of Custody

Sampler (signature): [signature]
Sampler (signature): [signature]
Custody Seal Number: 69420-122419, 69420-122420
Special Instructions: *Field Filtered & Preserved; 10-Day TAT

Relinquished By (signature) 1.: [signature] — Date/Time: 12/17/13 1203
Received By (signature): Via FedEx — Date/Time:
Ice Present in Container: Yes ☐ No ☐
Temperature Upon Receipt:

Relinquished By (signature) 2.: — Date/Time:
Received By (signature): [signature] — Date/Time: 12/18/13 10:50
Laboratory Comments:

061301 Form WCD-KC1-CHI

Login Sample Receipt Checklist

Client: Natural Resource Technology, Inc.

Job Number: 180-28205-1

Login Number: 28205

List Source: TestAmerica Pittsburgh

List Number: 1

Creator: Kovitch, Christina M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	