



## Case Narrative

**Analysis:** Mercury on Sorbent Tubes  
**Preparation SOP:** NMAM 6009 MOD  
**Analysis SOP:** NMAM 6009 MOD

**Client:** Atmospheric Analysis & Consulting, Inc.  
**Matrix:** Hopcalite/Hydrar Sorbent Tubes  
**ALS Workorder ID:** 1313504

**General Set Information:** Eight samples were analysed for mercury on sorbent tubes.

**Method Summary:** Sorbent material is transferred into digestion vessels and dissolved in 5mL of a solution that is 50% concentrated nitric acid and 50% concentrated hydrochloric acid. The acid solution and dissolved sorbent material is diluted to 50mL final volume with ASTM Type II water. Digested samples are then analysed using a CETAC M-7500 cold vapour mercury analyser with a CETAC ASX-130 autosampler, utilizing stannous chloride as a reducing reagent.

**Sample Preparation:** All samples were prepared in accordance with published procedures.

**Hold Time:** All samples were prepared and analysed within the appropriate hold time.

**Instrument Calibration:** Instrument calibration was performed at the range of 0.01 to 1.0 µg/sample utilizing solutions prepared at the same time and by the same process as the field samples and quality control samples. Calibration results are within acceptable criteria.

**Initial and Continuing Calibration Verification Data:** Initial and continuing calibration verifications were performed in accordance with published procedures. All calibration verifications were within control limits. All calibration blank concentrations were less than the reporting limit.

**Method and Sample QC Data:** The reagent blank and method blank concentrations were less than the reporting limit. The LCS and LCSD results were within control limits. The relative percent difference between the LCS and LCSD is within control limits.

**Dilutions:** No dilutions were required.

**Matrix Spike and Matrix Spike Duplicate Analysis:** NA

**Post-Digestion Spike analysis:** NA.

**NC/CAR:** None were required.

**Flagging Codes:** Refer to the last page of the report for all applicable flagging codes.



**Sample Calculation:** The analysis instrument produces results in  $\mu\text{g}/\text{sample}$ . Reported results are calculated by the following equation; results are reported to two significant figures.

$$\text{mg of mercury per m}^3 = [(A)(B)(C)] / [(D)(E)]$$

A = Analyte concentration from instrument determination ( $\mu\text{g}/\text{sample}$ )

B = Dilution performed at time of analysis if applicable

C = Conversion factor: ( $1\text{ mg}/1000\mu\text{g}$ )

D = Air volume per sample

E = Conversion factor: ( $1\text{ m}^3/1000\text{L}$ ) if air volume provided in L

$$\text{Example Calculation: } [(0.5\mu\text{g}/\text{sample})(1\text{ mg}/1000\mu\text{g})] / [(500\text{L})(1\text{ m}^3/1000\text{L})] = 0.001\text{ mg}/\text{m}^3$$

- Note that because the conversion factors cancel mathematically the same result will be obtained by simply dividing the  $\mu\text{g}/\text{sample}$  result by the sample air volume in L.

**Miscellaneous Comments:** None were required.

*Christopher R Hansen*  
Christopher R. Hansen

*05/21/2013*  
May 21, 2013



## Case Narrative

**Analysis:** Hydrogen Cyanide  
**Preparation SOP:** NMAM 6010 MOD  
**Analysis SOP:** NMAM 6010 MOD

**Client:** Atmospheric Analysis & Consulting, Inc.  
**Matrix:** Soda Lime Tubes  
**ALS Work Order ID(s):** 133504

**General Set Information:** Eight samples from this work order were analysed for hydrogen cyanide collected on soda lime.

**Method Summary:** The front and back sections from each soda lime tube are emptied into separate dram vials. The soda lime is desorbed in 20 mL of 0.25N NaOH for at least one hour with occasional agitation. Cyanide is reacted with Chloramine-T and a pyridine-barbituric acid solution in a phosphate buffer. The resulting species is quantitated by automated colorimetry at 570nm on a WestCo SmartChem (Instrument ID: WET01).

**Sample Preparation:** All samples were prepared in accordance with published procedures.

**Hold Times:** The hold times were met for both preparation and analysis.

**Instrument Calibration Data:** Instrument calibration was performed in accordance with published procedures. Calibration results are within control limits.

**Initial and Continuing Calibration Data:** Initial and continuing calibration verifications were performed in accordance with published procedures. One calibration verification failed control limits. All field samples analysed since the previous passing calibration verification sample were re-analyzed immediately. All other calibration verifications were within control limits. All calibration blank concentrations were less than the reporting limit.

**Dilutions:** None were required.

**Method QC Data:** The method blank concentration was less than the reporting limit. The LCS and LCSD results were within method control limits. The relative percent difference (RPD) between the LCS and LCSD was within control limits.

**NC/CAR:** None were required.

**Flagging Codes:** Refer to laboratory report.



**Sample Calculation:** The analysis instrument produces results in  $\mu\text{g/L}$ . The final results are calculated by the equation below. Results are reported to two significant figures on the sample report and three significant figures on the QC report.

Result for soda lime tubes:  $(A) \times (B) \times (C) \times (D) = (\mu\text{g HCN/sample})$

A = Analyte concentration from the instrument determination ( $\mu\text{g/L}$ )

B = Conversion factor from  $\mu\text{g CN}$  to  $\mu\text{g HCN}$  (1.039)

C = Conversion factor from  $\mu\text{g/L}$  to  $\mu\text{g/sample}$

D = Dilution(s) performed before to prep and at time of analysis if any

**Miscellaneous Comments:** Samples were analysed with work orders 1313581, and 1313648.

Elijah Gregory

May 22<sup>nd</sup>, 2013



## ANALYTICAL REPORT

Report Date: May 21, 2013

Eric Grosjean  
Atmospheric Analysis & Consulting, Inc.  
1534 Eastman Avenue  
Suite A  
Ventura, CA 93003

Phone: (805) 650-1642  
Fax: (805) 650-1644  
E-mail: egrosjean@aaclab.com

Workorder: **34-1313504**  
Client Project ID: 130559/Landfill 051413  
Purchase Order: 130559  
Project Manager: Paul Pope

### Analytical Results

Sample ID: <b>130559-62848</b>		Media: SKC 226-28, Soda Lime-200/600		Collected: 05/08/2013
Lab ID: 1313504001		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6010		Sampling Parameter: Air Volume Not Applicable		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Hydrogen Cyanide	<0.21	NA	NA	0.21

Sample ID: <b>130559-62858</b>		Media: SKC 226-28, Soda Lime-200/600	Collected: 05/08/2013	
Lab ID: 1313504002		Sampling Location: Landfill	Received: 05/14/2013	
Method: NIOSH 6010		Sampling Parameter: Air Volume 89.1 L	Analyzed: 05/21/2013	
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Hydrogen Cyanide	<0.21	<2.4	<2.1	0.21

Sample ID: <b>130559-62867</b>		Media: SKC 226-28, Soda Lime-200/600	Collected: 05/07/2013	
Lab ID: 1313504003		Sampling Location: Landfill	Received: 05/14/2013	
Method: NIOSH 6010		Sampling Parameter: Air Volume 92.2 L	Analyzed: 05/21/2013	
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Hydrogen Cyanide	<0.21	<2.3	<2.1	0.21

Sample ID: <b>130559-62876</b>		Media: SKC 226-28, Soda Lime-200/600	Collected: 05/07/2013	
Lab ID: 1313504004		Sampling Location: Landfill	Received: 05/14/2013	
Method: NIOSH 6010		Sampling Parameter: Air Volume 77.2 L	Analyzed: 05/21/2013	
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Hydrogen Cyanide	<0.21	<2.7	<2.5	0.21

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## ANALYTICAL REPORT

Workorder: **34-1313504**

Client Project ID: 130559/Landfill 051413

Purchase Order: 130559

Project Manager: Paul Pope

### Analytical Results

Sample ID: <u>130559-62885</u>		Media: SKC 226-28, Soda Lime-200/600		Collected: 05/08/2013
Lab ID: 1313504005		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6010		Sampling Parameter: Air Volume 73.2 L		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Hydrogen Cyanide	<0.21	<2.9	<2.6	0.21

Sample ID: <b>130559-62894</b>		Media: SKC 226-28, Soda Lime-200/600	Collected: 05/07/2013	
Lab ID: 1313504006		Sampling Location: Landfill	Received: 05/14/2013	
Method: NIOSH 6010		Sampling Parameter: Air Volume 90.9 L	Analyzed: 05/21/2013	
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Hydrogen Cyanide	<0.21	<2.3	<2.1	0.21

Sample ID: <b>130559-62903</b>		Media: SKC 226-28, Soda Lime-200/600		Collected: 05/07/2013
Lab ID: 1313504007		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6010		Sampling Parameter: Air Volume 88.3 L		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Hydrogen Cyanide	<0.21	<2.4	<2.2	0.21

Sample ID: <b>130559-62912</b>		Media: SKC 226-28, Soda Lime-200/600	Collected: 05/08/2013	
Lab ID: 1313504008		Sampling Location: Landfill	Received: 05/14/2013	
Method: NIOSH 6010		Sampling Parameter: Air Volume 87.6 L	Analyzed: 05/21/2013	
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Hydrogen Cyanide	<0.21	<2.4	<2.2	0.21

Sample ID: <u>130559-62850</u>		Media: SKC 226-17-1A, Hopcalite Tube	Collected: 05/08/2013	
Lab ID: 1313504009		Sampling Location: Landfill	Received: 05/14/2013	
Method: NIOSH 6009		Sampling Parameter: Air Volume Not Applicable	Analyzed: 05/21/2013	
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Mercury	<0.010	NA	NA	0.010

Sample ID: <b>130559-62860</b>		Media: SKC 226-17-1A, Hopcalite Tube	Collected: 05/08/2013	
Lab ID: 1313504010		Sampling Location: Landfill	Received: 05/14/2013	
Method: NIOSH 6009		Sampling Parameter: Air Volume 93.6 L	Analyzed: 05/21/2013	
Analyte	ug/sample	ug/m³	ppb	RL (ug/sample)
Mercury	<0.010	<0.11	<0.013	0.010



## ANALYTICAL REPORT

Workorder: **34-1313504**

Client Project ID: 130559/Landfill 051413

Purchase Order: 130559

Project Manager: Paul Pope

### Analytical Results

Sample ID: <b>130559-62869</b>		Media: SKC 226-17-1A, Hopcalite Tube		Collected: 05/07/2013
Lab ID: 1313504011		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6009		Sampling Parameter: Air Volume 95 L		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m <sup>3</sup>	ppb	RL (ug/sample)
Mercury	<0.010	<0.11	<0.013	0.010

Sample ID: <b>130559-62878</b>		Media: SKC 226-17-1A, Hopcalite Tube		Collected: 05/07/2013
Lab ID: 1313504012		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6009		Sampling Parameter: Air Volume 100 L		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m <sup>3</sup>	ppb	RL (ug/sample)
Mercury	<0.010	<0.10	<0.012	0.010

Sample ID: <b>130559-62887</b>		Media: SKC 226-17-1A, Hopcalite Tube		Collected: 05/08/2013
Lab ID: 1313504013		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6009		Sampling Parameter: Air Volume 80.9 L		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m <sup>3</sup>	ppb	RL (ug/sample)
Mercury	<0.010	<0.12	<0.015	0.010

Sample ID: <b>130559-62896</b>		Media: SKC 226-17-1A, Hopcalite Tube		Collected: 05/07/2013
Lab ID: 1313504014		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6009		Sampling Parameter: Air Volume 99 L		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m <sup>3</sup>	ppb	RL (ug/sample)
Mercury	<0.010	<0.10	<0.012	0.010

Sample ID: <b>130559-62905</b>		Media: SKC 226-17-1A, Hopcalite Tube		Collected: 05/07/2013
Lab ID: 1313504015		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6009		Sampling Parameter: Air Volume 98.8 L		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m <sup>3</sup>	ppb	RL (ug/sample)
Mercury	<0.010	<0.10	<0.012	0.010

Sample ID: <b>130559-62914</b>		Media: SKC 226-17-1A, Hopcalite Tube		Collected: 05/08/2013
Lab ID: 1313504016		Sampling Location: Landfill		Received: 05/14/2013
Method: NIOSH 6009		Sampling Parameter: Air Volume 92.1 L		Analyzed: 05/21/2013
Analyte	ug/sample	ug/m <sup>3</sup>	ppb	RL (ug/sample)
Mercury	<0.010	<0.11	<0.013	0.010



## ANALYTICAL REPORT

Workorder: **34-1313504**

Client Project ID: 130559/Landfill 051413

Purchase Order: 130559

Project Manager: Paul Pope

### Report Authorization

Method	Analyst	Peer Review
NIOSH 6009	Christopher R. Hansen	Kevin Tucker
NIOSH 6010	Elijah Gregory	Mary N. Karanu

### Laboratory Contact Information

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Web: [www.alssl.com](http://www.alssl.com)

### General Lab Comments

The results provided in this report relate only to the items tested.  
Samples were received in acceptable condition unless otherwise noted.  
Samples have not been blank corrected unless otherwise noted.  
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	ACCLASS (DoD ELAP)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>
	Utah (NELAC)	DATA1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwlabservice.htm">http://ndep.nv.gov/bsdwlabservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx</a>
	Florida (TNI)	E871067	<a href="http://www.dep.state.fl.us/labs/bars/sas/qa/">http://www.dep.state.fl.us/labs/bars/sas/qa/</a>
	Texas (TNI)	T104704456-11-1	<a href="http://www.tceq.texas.gov/field/qa/lab_accred_certif.html">http://www.tceq.texas.gov/field/qa/lab_accred_certif.html</a>
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Lead Testing:			
CPSC	ACCLASS (ISO 17025, CPSC)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>
Soil, Dust, Paint ,Air	AIHA (ISO 17025, AIHA ELLAP and NLLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACCLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

\*\* No result could be reported, see sample comments for details.

< This testing result is less than the numerical value.

( ) This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.





# Quality Control Sample Batch Report

## Analysis Information

**Workorder:** 1313504

**Limits:** Historical/Performance

**Basis:** ALS Laboratory Group

**Preparation:** NA

**Batch:** NA

**Prepared By:** NA

**Analysis:** NIOSH 6009

**Batch:** IHG/2305 (HBN: 106989)

**Analyzed By:** Christopher R. Hansen

## Blank

**LRB:** 334208

**Analyzed:** 05/21/2013 10:44

**Units:** ug/sample

Analyte	Result	MDL	RL
Mercury	ND	NA	0.0100

**LMB:** 334209

**Analyzed:** 05/21/2013 10:45

**Units:** ug/sample

Analyte	Result	MDL	RL
Mercury	ND	NA	0.0100

## Laboratory Control Sample - Laboratory Control Sample Duplicate

**LCS:** 334210

**Analyzed:** 05/21/2013 10:46

**Dilution:** 1

**Units:** ug/sample

**LCSD:** 334211

**Analyzed:** 05/21/2013 10:47

**Dilution:** 1

**Units:** ug/sample

Analyte	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Mercury	0.512	0.500	102	80.3	128.9	0.508	102	0.961	0.0	15.0



## Quality Control Sample Batch Report

### Analysis Information

**Workorder:** 1313504

**Limits:** Historical/Performance

**Basis:** ALS Laboratory Group

**Preparation:** NA

**Batch:** NA

**Prepared By:** NA

**Analysis:** NIOSH 6009

**Batch:** IHG/2305 (HBN: 106989)

**Analyzed By:** Christopher R. Hansen

### Initial Calibration Verification

<b>ICV:</b> 334206 <b>Analyzed:</b> 05/21/2013 10:41 <b>Units:</b> ug/sample <b>Criteria:</b> $\pm 20\%$			
Analyte	Result	Target	% Rec.
Mercury	0.516	0.500	103

### Continuing Calibration Verification

<b>CCV:</b> 334212 <b>Analyzed:</b> 05/21/2013 10:53 <b>Units:</b> ug/sample <b>Criteria:</b> $\pm 20\%$				<b>CCV:</b> 334215 <b>Analyzed:</b> 05/21/2013 11:03 <b>Units:</b> ug/sample <b>Criteria:</b> $\pm 20\%$		
Analyte	Result	Target	% Rec.	Result	Target	% Rec.
Mercury	0.512	0.500	102	0.516	0.500	103

### Initial Calibration Blank

<b>ICB:</b> 334207 <b>Analyzed:</b> 05/21/2013 10:42  <b>Units:</b> ug/sample		
Analyte	Result	Qual.
Mercury	ND	U

### Continuing Calibration Blank

<b>CCB:</b> 334213 <b>Analyzed:</b> 05/21/2013 10:54  <b>Units:</b> ug/sample			<b>CCB:</b> 334216 <b>Analyzed:</b> 05/21/2013 11:04  <b>Units:</b> ug/sample	
Analyte	Result	Qual.	Result	Qual.
Mercury	ND	U	ND	U

### QC Data Approved and Reviewed by

<u>Christopher R. Hansen</u> <b>Analyst</b>	<u>Kevin Tucker</u> <b>Peer Review</b>	<u>5/21/2013</u> <b>Date</b>
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### Symbols and Definitions

- \* - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- - Sample and Matrix Duplicate less than 5 times the reporting limit

RPD - Relative % Difference (Spike / Spike Duplicate)  
ND - Not Detected (U - Qualifier also flags analyte as not detected)  
QC results are not adjusted for moisture correction, where applicable



## Quality Control Sample Batch Report

### Analysis Information

**Workorder:** 1313504

**Limits:** Historical/Performance

**Basis:** ALS Laboratory Group

**Preparation:** NA

**Batch:** NA

**Prepared By:** NA

**Analysis:** NIOSH 6010

**Batch:** IWC/1862 (HBN: 107209)

**Analyzed By:** Elijah Gregory

### Blank

**LMB:** 334850

**Analyzed:** 05/21/2013 14:36

**Units:** ug/sample

Analyte	Result	MDL	RL
Cyanide	ND	NA	0.200

### Laboratory Control Sample - Laboratory Control Sample Duplicate

**LCS:** 334851

**Analyzed:** 05/21/2013 14:36

**Dilution:** 1

**Units:** ug/sample

**LCSD:** 334852

**Analyzed:** 05/21/2013 14:37

**Dilution:** 1

**Units:** ug/sample

Analyte	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Cyanide	1.79	2.00	89.4	56.2	128.2	1.75	87.5	2.07	0.0	20.0



## Quality Control Sample Batch Report

### Analysis Information

**Workorder:** 1313504

**Limits:** Historical/Performance

**Basis:** ALS Laboratory Group

**Preparation:** NA

**Batch:** NA

**Prepared By:** NA

**Analysis:** NIOSH 6010

**Batch:** IWC/1862 (HBN: 107209)

**Analyzed By:** Elijah Gregory

### QC Data Approved and Reviewed by

Elijah Gregory

Analyst

Mary N. Karanu

Peer Review

5/21/2013

Date

### Symbols and Definitions

- \* - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- - Sample and Matrix Duplicate less than 5 times the reporting limit

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

QC results are not adjusted for moisture correction, where applicable



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Ship: Subcontractor Lab:  
ONTRAC ALS-Salt Lake City UT  
2200 Apple Paul E Pope

Ship:  
ONTRAC STD OVN  
AAC Account

1 800-356-9135

Terms are pay when paid

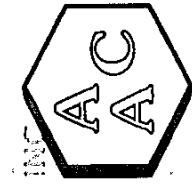
960 West LeVoy Drive, Salt Lake City, UT 84123



1313504

## CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client Name AAC, Inc.	Project Name Landfill	Analysis Requested		Send Report:
Project Mgr (Print Name) Eric Grosjean	Project Number 130559	Hold for Backup	Sample Volume, Liters	Attn: Eric Grosjean
Sampler's Name (Print Name)	Sampler's Signature	NIOSH 6010 HCN		Phone #: 805-650-1642
AAC Sample No.	Date Sampled	Time Sampled	Client Sample ID/Description	Type/No. of containers
130559-62848	05/08/13		Trip Blank	Tube 1
130559-62858	05/08/13		BZ-2	Tube 1
130559-62867	05/07/13		U-1	Tube 1
130559-62876	05/07/13		U-2	Tube 1
130559-62885	05/08/13		U-3	Tube 1
130559-62894	05/07/13		D-1	Tube 1
130559-62903	05/07/13		D-2	Tube 1
130559-62912	05/08/13		D-3	Tube 1
Relinquished by (Signature)	Print name: Eric Grosjean	Date/Time 05/09/13 13:02	Received by (Signature)	Print Name
Relinquished by (Signature)	Print name: Eric Grosjean	Date/Time 05/14/13 0940	Received by (Signature)	Print Name



ATMOSPHERIC ANALYSIS & CONSULTING, INC.  
1534 Eastman Avenue, Suite A  
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AAC Project No.

130559

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Subcontractor Lab:  
ALS-Salt Lake City UT  
Paul E Pope  
1 800-356-9135  
960 West LeVoy Drive, Salt Lake City, UT 84123

Ship:  
ONTRAC STD OVN  
AAC Account

Terms are pay when paid

## CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client Name AAC, Inc.		Project Name Landfill		Analysis Requested			Send Report:		
Project Mgr (Print Name) Eric Grosjean		Project Number 130559		NIOSH 6009 Mercury			Attn: Eric Grosjean		
Sampler's Name (Print Name)		Sampler's Signature		Hold for Backup			Phone #: 805-650-1642		
AAC Sample No.		Time Sampled		Client Sample ID/Description		Type/No. of containers		Sample Volume, Liters	
130559-62850	05/08/13	Tube	Trip Blank	1	Tube	X			
130559-62860	05/08/13	Tube	BZ-2	1	Tube	X		93.6	
130559-62869	05/07/13	Tube	U-1	1	Tube	X		95.0	
130559-62878	05/07/13	Tube	U-2	1	Tube	X		100	
130559-62887	05/08/13	Tube	U-3	1	Tube	X		80.9	
130559-62896	05/07/13	Tube	D-1	1	Tube	X		99.0	
130559-62905	05/07/13	Tube	D-2	1	Tube	X		98.9	
130559-62914	05/08/13	Tube	D-3	1	Tube	X		97.1	
Relinquished by (Signature)		Print name: Eric Grosjean		Received by (Signature)		Print Name			
Relinquished by (Signature)		Print name: Eric Grosjean		Received by (Signature)		Print Name			

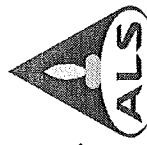


**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**

# Batch Worklist



Batch: IHG/ 2305  
 Rule: IH Mercury, Air  
 Workorder: 1313504  
 Workorder: 1313648

Created: 5/16/2013 12:26  
 Analyst: C. Hansen

Instrument:  
 Status: WP

HBN: 106989



Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Mx	Type	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	334206	ICV			3	ICV		N6009.CIQ	6118		5/20/2013	
2	334207	ICB			3	ICB		N6009.CIQ	6118		5/20/2013	
3	334208	RB			1	LRB		N6009...IQ	6118		5/20/2013	
4	334209	MB			1	LMB		N6009...IQ	6118		5/20/2013	
5	334210	LCS			1	LCS		N6009...IQ	6118		5/20/2013	
6	334211	LCSD			1	LCSD		N6009...IQ	6118		5/20/2013	
7	1313504009	130559-62850			1	FLDBK	1313504009-A	N6009....I	5975		5/21/2013	
8	1313504010	130559-62860			1	SAMPLE	1313504010-A	N6009....I	5975		5/21/2013	
9	1313504011	130559-62869			1	SAMPLE	1313504011-A	N6009....I	5975		5/21/2013	
10	1313504012	130559-62878			1	SAMPLE	1313504012-A	N6009....I	5975		5/21/2013	
11	334212	CCV			3	CCV		N6009.CIQ	6118		5/20/2013	
12	334213	CCB			3	CCB		N6009.CIQ	6118		5/20/2013	
13	1313504013	130559-62887			1	SAMPLE	1313504013-A	N6009....I	5975		5/21/2013	
14	1313504014	130559-62896			1	SAMPLE	1313504014-A	N6009....I	5975		5/21/2013	
15	1313504015	130559-62905			1	SAMPLE	1313504015-A	N6009....I	5975		5/21/2013	
16	1313504016	130559-62914			1	SAMPLE	1313504016-A	N6009....I	5975		5/21/2013	
17	334214	130559-62914(1313504016REP)			1	REP		N6009...IQ	6118		5/20/2013	
18	1313648003	130577-62966			1	SAMPLE	1313648003-A	N6009....I	5975		5/23/2013	
19	1313648004	130577-62967			1	SAMPLE	1313648004-A	N6009....I	5975		5/23/2013	
20	334215	CCV			3	CCV		N6009.CIQ	6118		5/20/2013	
21	334216	CCB			3	CCB		N6009.CIQ	6118		5/20/2013	



# NMAM 6009 MOD Hg on Hopcalite Sorbent Tubes/Badges:

## Sample, Set, Prep-Batching Information

Workorder ID	Sample #s	HBN	Account	Level
1313504	009-016	106989	7003	TH-4
1313648	003, 089	↓	↓	↓
1313581	003, 007, 011, 015	107113	↓	TH-2
1313685	001, 002	↓	↓	TH-1
1313688	001-006	↓	↓	↓
1313733	010, 011	↓	↓	↓
1313764	008-010	↓	↓	↓
CH 05/20/2013				

## Sample Media Type Information

Tube Sets	1313504, 648, 581, 685, 733, 764
Badge Sets	1313688

## Preparation Information

Preparer Name: Christopher R Hansen	
Prep Start Date: 05/20/2013	Prep Start Time: 13:13

## Method Information

QC and sample hopcalite materials are transferred into digestion vessels. (Blank tubes are always used for hopcalite QC material)

Hopcalite QC matrix:	Lot ID: Tube, carulite (HYDRAR)
MB, LCS, LCSD, RLVS	7883 SKC Ex, May/2017

10 mL of ASTM Type II H<sub>2</sub>O is added to digestion vessels for standards and RB (all digestion vessels that do not contain hopcalite material). Mercury Standards and QCs spiked as indicated. [Hg] in µg/sample. LCS, LCSD, and RLVS are spiked on hopcalite QC material.

Standard Name	Spiking Volume	Spike ID	Pipette Used	[Hg]
S0/CB/CCB/ RB	NONE	NONE	NONE	0
S0.01	100µL B	18987	Hg-3	0.01
S0.05	500µL B	↓	632733B	0.05
S0.10	100µL A	↑ 18988	Hg-3	0.10
S0.50/CCV	500µL A	↓ 18986	632733B	0.50
S1.00	1000µL A	↓	↓	1.00
ICV	500µL ICV	↓	↓	0.50
MB	NONE	NONE	NONE	0
LCS, LCSD	500µL ICV/A	18985	632733B	0.50
RLVS (optional)	100µL B	NA	NA	0.01

2.5 mL HNO<sub>3</sub> and then 2.5 mL HCl is added to each vessel. Allow QCs and samples to digest until completely dissolved (about one hour).

HNO <sub>3</sub>	Lot: 52045	Manufacturer:	EMD
HCl	Lot: 52250	Manufacturer:	EMD
Start Time:	17:20	End Time:	18:25

Dilute all standards QCs and samples to final volume of 50 mL with ASTM Type II H<sub>2</sub>O. Cap tightly and shake to mix. Since the final volumes of the instrument calibration standards and all the QCs and samples are the same, the targets of the instrument calibration standards are entered into the method in µg/sample. Therefore all results are given in µg/sample.

## Prep comments:

No chain of custody for TH level 4 samples  
All samples were received from the sample receiving one to the metals lab at 12:00 05/20/13 by Christopher Hansen  
CH 05/20/13  
Two sets of RB, MB, LCS, LCSD were prepared.

Sample 131364804 after digestion contains an undissolved fibrous object.

## Analysis Information

Analyst Name:	Christopher R Hansen		
Date Received for Analysis:	05/22/13	Time Received:	09:58

## CVAA Instrument Information

Type: Cold vapor atomic absorption	Wavelength: 253.7 nm
Name: CETAC M-7500	Lab ID: AAC102

## Reagent Information

10% SnCl <sub>2</sub> + 7% HCl	Reagent Notebook Info:	Book: 2243	Page: 92	Entry: 26
5% HCl + 5% HNO <sub>3</sub>	Reagent Notebook Info:	Book: 2243	Page: 92	Entry: 28

## Run Information

Run Date: 05/21/13	Start Time: 10:34	End Time: 11:48
Analysis HBN: 107113	Run Data File: CV2-13126	

## Dilution Information

Sample	Dilution	Pipette(s)	Reason
1313685 001	3X	22031181	Hg > 51.00
CH 05/21/2013			

## Sample Result Information

Data Conversion: (µg/sample result)(dilution factor) = (µg/sample final result)
Conversion For Tubes: (ug/sample)(1sample/#L)(1000L/m^3)(1mg/1000ug)=mg/m^3
Conversion For Badges: (ug/sample)(1sample/#)minutes)(1min/20cm^3)(1x10^6cm^3/m^3)(1mg/1000ug)=mg/m^3
QC Control Limits: Calibration R <sup>2</sup> 0.995 minimum; ICV ± 20%; CCV/CCVA ± 20%; LCS/LCSD ± 20%; RPD = 20% max
Reporting Limit (RL) = 0.01 ug/sample Hg.
This log page, batch sheets, and any associated data is scanned and saved as a PDF file named for the analysis HBN and stored in a network folder also named for the analysis HBN. Saved to: \\alslts013\DataReview
Mercury reagents notebook pages are scanned and saved online to: \\alslts013\pccommon\Mercury\Reagents
ALS Method: NMAM 6009 MOD (NIOSH 6009 MOD)

## Additional Information

Analysis comments:
NA CH 05/21/2013

# TITLE ALS Mercury Analysis Log Book

Project No.

NA

Book No.

4723

From Page No.	X											
Date	Start Time	End Time	Total Time	Initials	Account	Workorder ID/Comments	CLP SDG	Matrix	No. of samples	Instrument ID	File Name	
04/25/13	11:20	11:36	16 min	CH	8201	1310118	MBARW1	Water	1	AACV02	CV2-13100	
04/25/13	↓	↓	↓	↓	↓	1310212	MBARX5	↓	1	↓	↓	
04/26/13	10:02	10:27	25 min	CH	1101	131225, 228, 229, 230, 234, 243, 434	NA	DS Bulk	7	AACV02	CV2-13101	
04/26/13	10:30	10:53	23 min	CH	8201	1310212	MBARX5	Soil	6	AACV02	CV2-13102	
04/26/13	17:49	18:27	38 min	CH	7003	131469, 226, 474	NA	Hopcalite	13	AACV02	CV2-13103	
04/29/13	23:50	24:14	24 min	CH	8102 8001	1311366, 131551	NA	TCLP	2	AACV02	CV2-13104	
04/30/13	13:15	14:10	55 min	KT	1101	1310922, 939, 1369, 120, 72, 73, 74, 452, 449, 511, 229, 541, 486, 915, 576, 491, 121, 23-26, 722, 730, 735	NA	DS Bulk	26	AACV02	CV2-13105	
04/30/13	15:32	16:07	35 min	CH	8201	1310118	MBARW1	Soil	15	AACV02	CV2-13106a	
05/02/13	14:52	16:28	96 min	CH	8001	1310869	NA	Ghost wipes	5	AACV02	CV2-13107c	
05/02/13	17:18	19:14	116 min	CH	8001 7003	1310869 (dilutions)	NA	Ghost wipes	20	AACV02	CV2-13108a	
05/06/13	14:07	15:41	94 min	CH	7003	1311935, 1311936, 1312126, 1312323	NA	Hopcalite	25	AACV02	CV2-13109	
05/06/13	15:47	16:09	22 min	CH	1101	1311965, 966, 1312158-151	NA	DS Bulk	6	AACV02	CV2-13110	
05/08/13	12:35	13:03	28 min	CH	1101	1312186, 239, 259, 260, 262, 619, 655, 671	NA	DS Bulk	10	AACV02	CV2-13111	
05/08/13	17:14	17:59	45 min	CH	8001	1311571	NA	Soil	16	AACV02	CV2-13112	
05/08/13	21:07	21:24	17 min	CH	8201	1311445	MX1245	Soil	1	AACV02	CV2-13113	
05/10/13	10:37	11:16	39 min	CH	7003	1312633, 1312931	NA	Hopcalite	7	AACV02	CV2-13114	
05/10/13	15:41	16:17	36 min	CH	8001 1101	1311947, 12053, 12056, 12617, 1311547, 1311548, 1311549, 1311550, 1311551, 1311552, 1311553, 1311554, 1311555, 1311556, 1311557, 1311558, 1311559, 1311560, 1311561, 1311562, 1311563, 1311564, 1311565, 1311566, 1311567, 1311568, 1311569, 1311570, 1311571, 1311572, 1311573, 1311574, 1311575, 1311576, 1311577, 1311578, 1311579, 1311580, 1311581, 1311582, 1311583, 1311584, 1311585, 1311586, 1311587, 1311588, 1311589, 1311590, 1311591, 1311592, 1311593, 1311594, 1311595, 1311596, 1311597, 1311598, 1311599, 1311600, 1311601, 1311602, 1311603, 1311604, 1311605, 1311606, 1311607, 1311608, 1311609, 1311610, 1311611, 1311612, 1311613, 1311614, 1311615, 1311616, 1311617, 1311618, 1311619, 1311620, 1311621, 1311622, 1311623, 1311624, 1311625, 1311626, 1311627, 1311628, 1311629, 1311630, 1311631, 1311632, 1311633, 1311634, 1311635, 1311636, 1311637, 1311638, 1311639, 1311640, 1311641, 1311642, 1311643, 1311644, 1311645, 1311646, 1311647, 1311648, 1311649, 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1312538, 1312539, 1312540, 1312541, 1312542, 1312543, 1312544, 1312545, 1312546, 1312547, 1312548, 1312549, 1312550, 1312551, 1312552, 1312553, 1312554, 1312555, 1312556, 1312557, 1312558, 1312559, 1312560, 1312561, 1312562, 1312563, 1312564, 1312565, 1312566, 1312567, 1312568, 1312569, 1312570, 1312571, 1312572, 1312573, 1312574, 1312575, 1312576, 1312577, 1312578, 1312579, 1312580, 1312581, 1312582, 1312583, 1312584, 1312585, 1312586, 1312587, 1312588, 1312589, 1312590, 1312591, 1312592, 1312593, 1312594, 1312595, 1312596, 1312597, 1312598, 1312599, 1312600, 1312601, 1312602, 1312603, 1312604, 1312605, 1312606, 1312607, 1312608, 1312609, 1312610, 1312611, 1312612, 1312613, 1312614, 1312615, 1312616, 1312617, 1312618, 1312619, 1312620, 1312621, 1312622, 1312623, 1312624, 1312625, 1312626, 1312627, 1312628, 131						

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## Mercury Preparation/Analysis Reagents

**(2L) 5% Potassium Permanganate ( $\text{KMnO}_4$ ) W/V in DDI water:**

Dissolve 100g  $\text{KMnO}_4$  crystals in 2L ASTM Type II  $\text{H}_2\text{O}$  and mix thoroughly. Stir before using.

**(2L) 5% Potassium Persulfate ( $\text{K}_2\text{S}_2\text{O}_8$ ) W/V in DDI water:**

Dissolve 100g  $\text{K}_2\text{S}_2\text{O}_8$  crystals in 2L ASTM Type II  $\text{H}_2\text{O}$  and mix thoroughly. Stir before using.

*Potassium Persulfate is also known as Potassium Peroxydisulfate.*

**(2L) 12% Hydroxylamine Hydrochloride ( $\text{NH}_2\text{OH}\cdot\text{HCl}$ ) W/V in DDI water:**

Dissolve 240g  $\text{NH}_2\text{OH}\cdot\text{HCl}$  crystals in 2L ASTM Type II  $\text{H}_2\text{O}$  and mix thoroughly.

*Hydroxylamine Hydrochloride is also known as Hydroxylammonium Chloride ( $\text{NH}_3\text{OH}\cdot\text{Cl}$ ).*

**(2L) 10% Hydrochloric Acid ( $\text{HCl}$ ) V/V in DDI water:**

Add 200mL  $\text{HCl}$  to ASTM Type II  $\text{H}_2\text{O}$  then dilute to 2L to ASTM Type II  $\text{H}_2\text{O}$  and mix thoroughly.

**(2L) 5% Nitric Acid ( $\text{HNO}_3$ ) / 5% Hydrochloric Acid ( $\text{HCl}$ ) V/V in DDI water:**

Add 100mL concentrated  $\text{HNO}_3$  and 100mL concentrated  $\text{HCl}$  to ASTM Type II  $\text{H}_2\text{O}$  then dilute to 2L with ASTM Type II  $\text{H}_2\text{O}$  and mix thoroughly.

**(2L) 10% Stannous Chloride ( $\text{SnCl}_2$ ) W/V in 10%  $\text{HCl}$ :**

Dissolve 200g  $\text{SnCl}_2$  crystals in 200mL concentrated  $\text{HCl}$ . Dilute to 2L with ASTM Type II  $\text{H}_2\text{O}$  and mix thoroughly.

**(2L) 10% Stannous Chloride ( $\text{SnCl}_2$ ) W/V in 7%  $\text{HCl}$ :**

Dissolve 200g  $\text{SnCl}_2$  crystals in 140mL concentrated  $\text{HCl}$ . Dilute to 2L with ASTM Type II  $\text{H}_2\text{O}$  and mix thoroughly.

**(1L) 10% Stannous Chloride ( $\text{SnCl}_2$ ) W/V in 7%  $\text{HCl}$ :**

Dissolve 100g  $\text{SnCl}_2$  crystals in 70mL concentrated  $\text{HCl}$ . Dilute to 1L with ASTM Type II  $\text{H}_2\text{O}$  and mix thoroughly.

*Stannous Chloride is also known as Tin (II) Chloride Dihydrate.*

**Aqua Regia:**

Carefully add three parts concentrated  $\text{HCl}$  to one part concentrated  $\text{HNO}_3$ . Use fume hood as vapors will result.

CH 10/20/2011

To Page No. X

Witnessed & Understood by me,

*Eligah Lacey*

Date

10/27/11

Invented by

NA

Date

10/20/2011

Recorded by

*Christopher R Hansen*

From Page No. X Entry / Reagent	Chemicals used	Chemical Source	Lot IDs	Measured with	Recipe Page	Date prepared	Expiration Date	Volume prepared	Initials
1 10% SnCl <sub>2</sub> in 7% HCl	SnCl <sub>2</sub> HCl	Alfa Aesar EMD	H12X004 51258	Balance 102887 Acid Dispenser	2243/89 201/89	09/05/12	09/05/13	8 L CH 09/05/12	CH
2 5% HNO <sub>3</sub> /5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52045 51181	Acid dispensers	2243/89	09/19/12	09/19/13	6 L	CH
3 12% NH <sub>2</sub> OH·HCl	NH <sub>2</sub> OH·HCl	Alfa Aesar	K24W004	Balance 102887	2243/89	09/19/12	09/19/13	8 L	CH
4 5% HNO <sub>3</sub> /5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52088 51181	Acid dispenser	2243/89	10/04/12	10/04/13	2 L	CH
5 5% HNO <sub>3</sub> /5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52045 51258	Acid dispensers	2243/89	10/05/12	10/05/13	8 L	CH
6 5% HNO <sub>3</sub> /5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52045 51258	Acid dispenser	2243/89	10/23/12	10/25/13	8 L	CH
7 10% SnCl <sub>2</sub> in 7% HCl	SnCl <sub>2</sub> HCl	Alfa Aesar EMD	H12X004 250 g 51258 (287.5 mL)	Balance 102887 Acid Dispenser	2243/89	10/26/12	10/26/13	2.5 L	CH
8 10% SnCl <sub>2</sub> in 7% HCl	SnCl <sub>2</sub> SnCl <sub>2</sub> HCl	Alfa Aesar EMD	H12X004 50 g F28Y014 200 g 51258 (287.5 mL)	Balance 102887 Acid Dispenser	2243/89	10/26/12	10/26/13	5 L (2.5L) twice CH 10/26/12	CH
9 5% HNO <sub>3</sub> + 5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52045 51258	Acid dispensers	2243/89	11/07/12	11/07/13	8 L	CH
10 12% NH <sub>2</sub> OH·HCl	NH <sub>2</sub> OH·HCl	Alfa Aesar	K24W004	bal. 102887	2243/89	11/26/12	11/26/13	4 L	KT
11 5% HNO <sub>3</sub> + 5% HCl	HCl, HNO <sub>3</sub>	EMD/EMD	52045/51258	Acid dispenser	2243/89	11/26/12	11/26/13	8 L	KT
12 10% SnCl <sub>2</sub> 7% HCl	SnCl <sub>2</sub> HCl	Alfa Aesar EMD	K28Y014 51258	bal. 102887 Acid disp.	2243/89	11/27/12	11/27/13	6 L	KT
13 5% HNO <sub>3</sub> /5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52045 51258	Acid dispensers	2243/89	12/14/12	12/14/13	10 L	CH
14 12% NH <sub>2</sub> OH·HCl	NH <sub>2</sub> OH·HCl	J.T. Baker	25789	Balance 102887	2243/89	01/02/13	01/02/14	4 L	CH
15 10% SnCl <sub>2</sub> in 10% HCl	SnCl <sub>2</sub> HCl	Alfa Aesar EMD	F28Y014 52250	Balance 102887	2243/89	01/08/13	01/08/14	1 L	CH
16 5% HNO <sub>3</sub> + 5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52088 52250	Acid dispensers	2243/89	01/09/13	01/09/14	8 L	CH
17 5% L 10% SnCl <sub>2</sub> in 7% HCl	SnCl <sub>2</sub> HCl	Alfa Aesar EMD	F28Y014 52250	Balance 102887 Acid dispensers	2243/89	1/10/13	01/10/14	6 L	KT
18 10% HCl	HCl	EMD	52250	Acid dispenser	2243/89	01/16/2013	01/16/14	2 L	CH
19 12% NH <sub>2</sub> OH·HCl	NH <sub>2</sub> OH·HCl	J.T. Baker	25789	Balance 102887	2243/89	02/01/13	02/01/14	4 L	CH
20 5% HNO <sub>3</sub> + 5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52088 52250	Acid dispenser	2243/89	02/05/13	02/05/14	8 L	CH
21 5% HNO <sub>3</sub> + 5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52088 52250	Acid dispensers	2243/89	02/26/13	02/26/14	8 L	CH
22 10% SnCl <sub>2</sub> in 7% HCl	SnCl <sub>2</sub> HCl	Alfa Aesar EMD	F28Y014 52250	Balance 102887 Acid dispenser	2243/89	03/20/13	03/20/14	4 L	CH
23 5% HNO <sub>3</sub> + 5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52088 52250	Acid dispensers	2243/89	03/26/13	03/26/14	8 L	CH
24 12% NH <sub>2</sub> OH·HCl	NH <sub>2</sub> OH·HCl	J.T. Baker	25789	Balance 102887	2243/89	04/08/13	04/08/14	6 L	CH
25 5% HNO <sub>3</sub> + 5% HCl	HNO <sub>3</sub> HCl	EMD/EMD	52088 52250	Acid dispensers	2243/89	04/15/13	04/15/14	8 L	KT
26 10% SnCl <sub>2</sub> in 7% HCl	SnCl <sub>2</sub> HCl	CH/EMD Alfa Aesar EMD	F28Y014 52250	Bhc. 102887 Acid Dispenser	2243/89	04/24/13	04/24/14	8 L	CH
27 5% HNO <sub>3</sub> + 5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52088-45 CH 52250 05/02/13	Acid dispensers	2243/89	05/02/13	05/02/14	2 L	CH
28 5% HNO <sub>3</sub> + 5% HCl	HNO <sub>3</sub> HCl	EMD EMD	52045 52250	Acid dispensers	2243/89	05/08/13	05/08/14	10 L	CH

To Page No. NA

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

# TITLE ALS Mercury Preparation Reagents Log Book

Project No. \_\_\_\_\_  
Book No. 3707

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No.	Reagent Name	Chemicals used	Chemical source	Chemical Lot ID	Balance/ Pipette used	Prep Recipe Book/page	Date prepared	Date Expires	Volume prepared	Initials
1	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/80	8/2/2011	8/2/2012	10 L	CH
2	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/80	8/22/2011	8/22/2012	10 L	CH
3	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/80	9/14/2011	9/14/2012	10 L	CH
4	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/80	10/06/2011	10/06/2012	10 L	CH
5	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/80	10/14/2011	10/14/2012	6 L	CH
6	5% K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Alfa Aesar	F22W007	102887	2243/80	10/14/2011	10/14/2012	4 L	CH
7	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	11/09/2011	11/09/2012	10 L	CH
8	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	12/22/2011	12/22/2012	8 L	CH
9	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	01/17/2012	01/17/2013	10 L	CH
10	5% K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Alfa Aesar	F22W007	102887	2243/89	01/17/2012	01/17/2013	4 L	CH
11	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	02/04/12	02/06/13	12 L	CH
12	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	02/27/12	02/27/13	10 L	CH
13	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	03/09/12	03/09/13	10 L	CH
14	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	03/28/12	03/28/13	6 L	CH
15	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	04/30/2012	04/30/2013	10 L	CH
16	5% K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Alfa Aesar	F22W007	102887	2243/89	05/09/12	05/09/13	4 L	CH
17	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	05/25/12	05/25/13	8 L	CH
18	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	05/25/12	05/25/13	2 L	CH
19	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	06/12/12	06/12/13	8 L	KT
20	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	07/18/2012	07/18/2013	10 L	CH
21	5% K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Alfa Aesar	F22W007	102887	2243/89	07/23/2012	07/23/2013	4 L	CH
22	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	08-28-12	08-28-13	2 L	KT
23	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	08/29/12	08/29/13	8 L	CH
24	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	E03X015	102887	2243/89	09/27/12	09/27/13	2 L	CH
25	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	10/8/12	10/8/13	8 L	KT
26	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	10/24/12	10/24/13	8 L	CH
27	5% K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Alfa Aesar	F22W007	102887	2243/89	11/09/12	11/09/13	6 L	CH
28	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	11/26/12	11/26/13	6 L	KT
29	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	12/19/2012	12/19/2013	8 L	CH
30	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	1-10-13	1-10-14	8 L	KT
31	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	02/25/13	02/25/14	8 L	CH
32	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	D12W012	102887	2243/89	04/08/13	04/08/14	8 L	CH
33	5% K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Alfa Aesar	F22W007	102887	2243/89	05/01/13	05/01/14	4 L	CH
34	5% KMnO <sub>4</sub>	KMnO <sub>4</sub>	Alfa Aesar	E03X015	102887	2243/89	05/01/13	05/01/14	8 L	CH

To Page No. X

Witnessed & Understood by me,

Date 05/01/2013

Invented by NA

Date 05/01/2013

Recorded by Christopher Hansen



## STANDARD REPORT

### Working Standard - Hg ICV Work

Hg ICV Work		Description - Hg ICV Working Solution			
Standard: 18985		Expires: 05/22/2013	Usable: Yes		
Lab Lot: IHg051513ICV		Created By: C. Hansen	Amount: 50 mL		
Part ID:		Create Date: 05/15/2013	Validated By:		
MFG: CRH		MFG Lot:	Validated Date:		
Pos.	Analyte	Name	Concentration		
1	7439-97-6	Mercury	1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume Added	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	48.95 mL	11/7/2015
15941	HNO3	Concentrated Nitric Acid	HNO3 (52045)	1 mL	8/6/2017
18149	Hg ICV Stock	Hg ICV Stock Solution	SPEX Hg-1000	0.05 mL	2/28/2014



## STANDARD REPORT

### Working Standard - Hg B Cal Sol

Hg B Cal Sol		Description - Hg B Calibration Solution			
Standard: 18987		Expires: 05/22/2013	Usable: Yes		
Lab Lot: IHg0515-052113B		Created By: C. Hansen	Amount: 50 mL		
Part ID:		Create Date: 05/15/2013	Validated By:		
MFG: CRH		MFG Lot:	Validated Date:		
Pos.	Analyte	Name	Concentration		
1	7439-97-6	Mercury	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume Added	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	48.5 mL	11/7/2015
15941	HNO3	Concentrated Nitric Acid	HNO3 (52045)	1 mL	8/6/2017
18984	Hg Working	Hg CCV/Calibration Working	IHg051513WS	0.5 mL	5/22/2013



## STANDARD REPORT

### Working Standard - Hg A Cal Sol

Hg A Cal Sol		Description - Hg A Calibration Solution			
Standard: 18986		Expires: 05/22/2013	Usable: Yes		
Lab Lot: IHg0515-052113A		Created By: C. Hansen	Amount: 50 mL		
Part ID:		Create Date: 05/15/2013	Validated By:		
MFG: CRH		MFG Lot:	Validated Date:		
Pos.	Analyte	Name	Concentration		
1	7439-97-6	Mercury	1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume Added	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	44 mL	11/7/2015
15941	HNO3	Concentrated Nitric Acid	HNO3 (52045)	1 mL	8/6/2017
18984	Hg Working	Hg CCV/Calibration Working	IHg051513WS	5 mL	5/22/2013





## STANDARD REPORT

### Constituent

#### Stock Standard - Hg WS Stock

Hg WS Stock		Description - Hg CCV/Cal Stock Solution	
Standard: 17082	Expires: 12/1/2013	Usable: Yes	
Lab Lot: InorganicVenturesHg1000	Created By: C. Hansen	Amount: 125 mL	
Part ID: AAHG1-1	Create Date: 11/30/2012	Validated By:	
MFG: Inorganic Ventures	MFG Lot: F2-HG02101	Validated Date:	
Pos.	Analyte	Name	Concentration
1	7439-97-6	Mercury	1000 mg/L



## STANDARD REPORT

### Constituent

#### Stock Standard - Hg ICV Stock

Hg ICV Stock		Description - Hg ICV Stock Solution	
Standard: 18149	Expires: 2/28/2014	Usable: Yes	
Lab Lot: SPEX Hg-1000	Created By: C. Hansen	Amount: 125 mL	
Part ID: CLHG4-2Y	Create Date: 3/1/2013	Validated By:	
MFG: SPEX CertiPrep	MFG Lot: CL5-163HGY	Validated Date:	
Pos.	Analyte	Name	Concentration
1	7439-97-6	Mercury	1000 ug/mL



## STANDARD REPORT

### Constituent

#### Working Standard - Hg Working

Hg Working		Description - Hg CCV/Calibration Working			
Standard: 18984		Expires: 05/22/2013	Usable: Yes		
Lab Lot: IHg051513WS		Created By: C. Hansen	Amount: 50 mL		
Part ID:		Create Date: 05/15/2013	Validated By:		
MFG: CRH		MFG Lot:	Validated Date:		
Pos.	Analyte	Name	Concentration		
1	7439-97-6	Mercury	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume Added	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	48.5 mL	11/7/2015
15941	HNO3	Concentrated Nitric Acid	HNO3 (52045)	1 mL	8/6/2017
17082	Hg WS Stock		InorganicVenturesHg10	0.5 mL	12/1/2013



## STANDARD REPORT

### Constituent

#### Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Expires: 11/7/2015	Usable: Yes	
Lab Lot: LAB 109	Created By: ALS Support (Lims)	Amount: 100 L	
Part ID:	Create Date: 10/6/2005	Validated By:	
MFG: DCL In House	MFG Lot:	Validated Date:	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			



## STANDARD REPORT

### Constituent

#### Solvent Standard - HNO<sub>3</sub>

HNO <sub>3</sub>		Description - Concentrated Nitric Acid	
Standard: 15941	Expires: 8/6/2017	Usable: Yes	
Lab Lot: HNO <sub>3</sub> (52045)	Created By: C. Hansen	Amount: 2.5 L	
Part ID:	Create Date: 8/6/2012	Validated By:	
MFG: EMD OmniTrace	MFG Lot: 52045	Validated Date:	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# Raw Data

# Mercury Condensed Data Summary

Sample ID	Time Stamp	Sample Type	Average Conc.	Conc. Units	Average Intensity
S0 (µg/sample)	5/21/2013 10:34	Standard	0	ug/sample	-25.23
S0.01 (µg/sample)	5/21/2013 10:36	Standard	0.01	ug/sample	2193.4
S0.05 (µg/sample)	5/21/2013 10:37	Standard	0.05	ug/sample	10879
S0.10 (µg/sample)	5/21/2013 10:38	Standard	0.1	ug/sample	22584
S0.50 (µg/sample)	5/21/2013 10:39	Standard	0.5	ug/sample	108740
S1.00 (µg/sample)	5/21/2013 10:40	Standard	1	ug/sample	211000
334206 - ICV	5/21/2013 10:41	ICV	0.5156	ug/sample	109760
334207 - ICB	5/21/2013 10:42	ICB	-0.0042	ug/sample	-165.55
334208 - RB	5/21/2013 10:44	Reagent Blank	-0.0037	ug/sample	-67.914
334209 - MB	5/21/2013 10:45	Method Blank	-0.0024	ug/sample	217.91
334210 - LCS	5/21/2013 10:46	LCS	0.5124	ug/sample	109080
334211 - LCSD	5/21/2013 10:47	LCS	0.5075	ug/sample	108040
<b>1313504009</b>	<b>5/21/2013 10:48</b>	<b>Unknown</b>	<b>-0.003</b>	<b>ug/sample</b>	<b>82.168</b>
<b>1313504010</b>	<b>5/21/2013 10:49</b>	<b>Unknown</b>	<b>-0.0028</b>	<b>ug/sample</b>	<b>125.79</b>
<b>1313504011</b>	<b>5/21/2013 10:50</b>	<b>Unknown</b>	<b>-0.0029</b>	<b>ug/sample</b>	<b>119.96</b>
<b>1313504012</b>	<b>5/21/2013 10:51</b>	<b>Unknown</b>	<b>-0.0028</b>	<b>ug/sample</b>	<b>138.81</b>
334212 - CCV	5/21/2013 10:53	CCV	0.5116	ug/sample	108920
334213 - CCB	5/21/2013 10:54	CCB	-0.0039	ug/sample	-107.77
<b>1313504013</b>	<b>5/21/2013 10:55</b>	<b>Unknown</b>	<b>-0.0027</b>	<b>ug/sample</b>	<b>160.93</b>
<b>1313504014</b>	<b>5/21/2013 10:56</b>	<b>Unknown</b>	<b>-0.0018</b>	<b>ug/sample</b>	<b>341.64</b>
<b>1313504015</b>	<b>5/21/2013 10:57</b>	<b>Unknown</b>	<b>-0.0024</b>	<b>ug/sample</b>	<b>206.21</b>
<b>1313504016</b>	<b>5/21/2013 10:58</b>	<b>Unknown</b>	<b>-0.0027</b>	<b>ug/sample</b>	<b>157.55</b>
334214 - 1313504016REP	5/21/2013 10:59	Duplicate	-0.0027	ug/sample	159.06
<b>1313648003</b>	<b>5/21/2013 11:00</b>	<b>Unknown</b>	<b>-0.0022</b>	<b>ug/sample</b>	<b>256.35</b>
<b>1313648004</b>	<b>5/21/2013 11:02</b>	<b>Unknown</b>	<b>-0.0018</b>	<b>ug/sample</b>	<b>340.46</b>
334215 - CCV	5/21/2013 11:03	CCV	0.5164	ug/sample	109930
334216 - CCB	5/21/2013 11:04	CCB	-0.0037	ug/sample	-48.339

The original data contains multiple batches of samples. Each batch is reported only with applicable samples and QC information as indicated by the batch HBN.

Batch data is indicated by boxed areas. Field sample data is in bold.

Additional run data not pertaining to this batch is not included in this summary.

See the original instrument raw data for the full analytical sequence.

Workorder: 1313504, 1313648

Method: NMAM-6009 MOD (HOPCALITE TUBES and/or BADGES)

Instrument: AACV02

Conversion For Tubes: (ug/sample){1sample/[#]L}(1000L/m^3)(1mg/1000ug)=mg/m^3

Conversion For Badges: (ug/sample){1sample/[#]minutes}(1min/20cm^3)(1x10^6cm^3/m^3)(1mg/1000ug)=mg/m^3

Batch HBN: 106989

Data File: CV2-13126

Correlation Coefficient: 0.99977

Prep Date: 05/20/2013

Analyst: Christopher R. Hansen

*Christopher R. Hansen*  
05/21/2013

# ALS Environmental - SLC

Report Generated By CETAC QuickTrace

Analyst: christopher.hansen *Christopher Hansen*

Worksheet file: C:\Program Files\QuickTrace\Worksheets\CV2-13126.wsz

Date Started: 5/21/2013 10:17:02 AM

Comment: HBN: 106989, 107113

## Results

Sample Name	Type	Date/Time	Conc (ug/sample)	µAbs	Flags
S0 (µg/sample)	STD	05/21/13 10:34:56 am	0.0000	-25	
S0.01 (µg/sample)	STD	05/21/13 10:36:03 am	0.0100	2193	
S0.05 (µg/sample)	STD	05/21/13 10:37:11 am	0.0500	10879	
S0.10 (µg/sample)	STD	05/21/13 10:38:18 am	0.1000	22584	
S0.50 (µg/sample)	STD	05/21/13 10:39:27 am	0.5000	108740	
S1.00 (µg/sample)	STD	05/21/13 10:40:35 am	1.0000	211002	

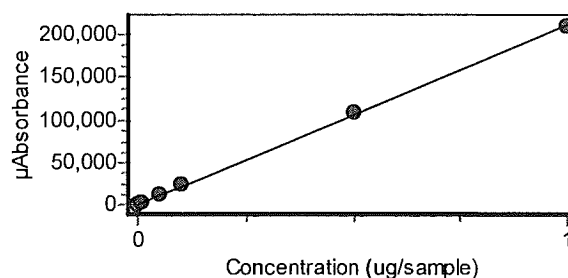
### Calibration

Equation:  $A = 723.562 + 211464.500C$

R2: 0.99977

SEE: 1439.0420

Flags:



334206 - ICV	ICV	05/21/13 10:41:45 am	0.5156	109759	
% Recovery 103.12					
334207 - ICB	ICB	05/21/13 10:42:55 am	-0.0042	-166	
334208 - RB	RB	05/21/13 10:44:02 am	-0.0037	-68	
334209 - MB	MB	05/21/13 10:45:09 am	-0.0024	218	



Sample Name	Type	Date/Time	Conc (ug/sample)	µAbs	Flags
334210 - LCS % Recovery 102.48	LCS	05/21/13 10:46:16 am	0.5124	109083	
334211 - LCSD % Recovery 101.50	LCS	05/21/13 10:47:24 am	0.5075	108038	
1313504009	UNK	05/21/13 10:48:32 am	-0.0030	82	
1313504010	UNK	05/21/13 10:49:38 am	-0.0028	126	
1313504011	UNK	05/21/13 10:50:45 am	-0.0029	120	
1313504012	UNK	05/21/13 10:51:52 am	-0.0028	139	
334212 - CCV % Recovery 102.33	CCV	05/21/13 10:53:01 am	0.5116	108918	
334213 - CCB	CCB	05/21/13 10:54:10 am	-0.0039	-108	
1313504013	UNK	05/21/13 10:55:17 am	-0.0027	161	
1313504014	UNK	05/21/13 10:56:25 am	-0.0018	342	
1313504015	UNK	05/21/13 10:57:32 am	-0.0024	206	
1313504016	UNK	05/21/13 10:58:39 am	-0.0027	158	
334214 - 1313504016REP RPD 0.00	DUP	05/21/13 10:59:46 am	-0.0027	159	
1313648003	UNK	05/21/13 11:00:53 am	-0.0022	256	
1313648004	UNK	05/21/13 11:02:01 am	-0.0018	340	
334215 - CCV % Recovery 103.28	CCV	05/21/13 11:03:10 am	0.5164	109928	
334216 - CCB	CCB	05/21/13 11:04:19 am	-0.0037	-48	

Sample Name	Type	Date/Time	Conc (ug/sample)	µAbs	Flags
334602 - RB	RB	05/21/13 11:05:26 am	-0.0035	-23	
334603 - MB	MB	05/21/13 11:06:34 am	-0.0027	160	
334604 - LCS % Recovery 103.35	LCS	05/21/13 11:07:41 am	0.5168	110002	
334605 - LCSD % Recovery 104.07	LCS	05/21/13 11:08:48 am	0.5203	110755	
1313581003	UNK	05/21/13 11:09:56 am	-0.0023	237	
1313581007	UNK	05/21/13 11:11:03 am	-0.0020	311	
1313581011	UNK	05/21/13 11:12:11 am	-0.0025	187	
1313581015	UNK	05/21/13 11:13:18 am	-0.0025	189	
1313685001	UNK	05/21/13 11:14:26 am	1.5069	319369 O	
			<del>CH 05/21/13</del>		
1313685002	UNK	05/21/13 11:15:34 am	-0.0009	542	
CCV % Recovery 100.63	CCV	05/21/13 11:16:43 am	0.5032	107123	
CCB	CCB	05/21/13 11:17:52 am	-0.0036	-43	
1313688001	UNK	05/21/13 11:19:00 am	0.1605	34673	
1313688002	UNK	05/21/13 11:20:08 am	0.1321	28660	
1313688003	UNK	05/21/13 11:21:15 am	0.0385	8870	
1313688004	UNK	05/21/13 11:22:23 am	0.1704	36762	
1313688005	UNK	05/21/13 11:23:31 am	0.2204	47328	

Sample Name	Type	Date/Time	Conc (ug/sample)	µAbs	Flags
1313688006	UNK	05/21/13 11:24:39 am	0.0100	2843	
334606 - 1313688006REP RPD 0.09	DUP	05/21/13 11:25:47 am	0.0100	2841	
1313733010	UNK	05/21/13 11:26:56 am	-0.0027	153	
1313733011	UNK	05/21/13 11:28:04 am	-0.0027	158	
CCV % Recovery 104.23	CCV	05/21/13 11:29:13 am	0.5211	110924	
CCB	CCB	05/21/13 11:30:22 am	-0.0037	-69	
1313764008	UNK	05/21/13 11:31:30 am	-0.0019	321	
1313764009	UNK	05/21/13 11:32:38 am	-0.0025	187	
1313764010	UNK	05/21/13 11:33:47 am	-0.0028	123	
CCV % Recovery 104.29	CCV	05/21/13 11:34:56 am	0.5214	110991	
CCB	CCB	05/21/13 11:36:05 am	-0.0038	-73	
1313685001 (3x)	UNK	05/21/13 11:45:49 am	0.5750	122324	
CCV % Recovery 105.43	CCV	05/21/13 11:46:58 am	0.5271	112192	
CCB	CCB	05/21/13 11:48:07 am	-0.0038	-72	

# Analysis Parameters

**Instrument** M-7500 Mercury Analyzer

## Conditions

Gas flow (mL/min)	Sample Uptake (s)	Rinse (s)	Read delay (s)	Replicates (#)	Replicate time (s)	Pump speed (%)	Wavelength (nm)
215	20.00	40.00	32.00	1	2.00	100	253.65
ASX Pump Rate (%)							
100							

## Instrumental Zero

Zero before first sample: No

Zero periodically: Yes  
Before each calibration.

## Baseline Correction

#1 Start time (s)	#1 End time (s)	#2 Start time (s)	#2 End time (s)
7.00	11.00		

## Standby Mode

Enabled: Yes

Standby Options: gas off, lamp off

## Autodilution

Enabled: No

Condition:

Tube # range:

If no autodilution tubes remaining

## Calibration

### Settings

Algorithm	Through blank	Weighted fit	Cal. Type	Racalibration rate	Reslope rate	Reslope standard
Linear	No	No	Normal	0	0	N/A

### Limits

Calibration slope		Reslope		Coeff. of Determination
Lower (%)	Upper (%)	Lower (%)	Upper (%)	
20	150	75	125	0.99500

Error action: Flag and continue

## QC

GLP Override: Yes

## QC Tests

**CCB**

Concentration

ug/sample

0.0100

Failure flag: Q

Error action for manually inserted QC: Flag and continue

**ICB**

Concentration

ug/sample

0.0100

Failure flag: Z

Error action for manually inserted QC: Flag and continue

**CCV**

Concentration

ug/sample

0.5000

Low Limit

%

80.0000

High Limit

%

120.0000

Failure flag: Q

Error action for manually inserted QC: Flag and continue

**ICV**

Concentration

ug/sample

0.5000

Low Limit

%

90.0000

High Limit

%

110.0000

Failure flag: Q

Error action for manually inserted QC: Flag and continue

**LCS**

Concentration

ug/sample

0.5000

Low Limit

%

80.0000

High Limit

%

120.0000

Failure flag: L

Error action for manually inserted QC: Flag and continue

**DUP**

Concentration

ug/sample

0.0100

Low Limit

ug/sample

0.0000

High Limit

ug/sample

100.0000

RPD

20.0000

Failure flag: D

Error action for manually inserted QC: Flag and continue

**MB**

Concentration

ug/sample

0.0100

Failure flag: Z

Error action for manually inserted QC: Flag and continue

**RB**

Concentration

ug/sample

0.0100

Failure flag: Z

Error action for manually inserted QC: Flag and continue



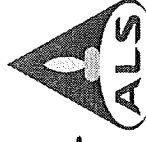
**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

6010

# **Analytical Documentation**

# Batch Worklist



HBN: 107209



Created: 5/21/2013 08:16

Instrument: WVP

Analyst: E. Gregory

Field Media

Workorder: 1313504 SKC 226-28 Lot 8238 Exp DEC/2017  
 Workorder: 1313581 Lot 6856 Exp APR/2016; (010,014) Lot 7542 Exp APR/2017  
 Workorder: 1313648 Lot 7542 Exp APR/2017; (002) Lot 6856 Exp MAR/2016;

Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Mx	Type	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	334850	LMB			1	LMB		N6010...1Q	6136		5/21/2013	
2	334851	LCS			1	LCS		N6010...1Q	6136		5/21/2013	
3	334852	LCSD			1	LCSD		N6010...1Q	6136		5/21/2013	
4	1313504001	130559-62848			1	FLDBK	1313504001-A	N6010...1	5975		5/21/2013	
5	1313504002	130559-62858			1	SAMPLE	1313504002-A	N6010...1	5975		5/21/2013	
6	1313504003	130559-62867			1	SAMPLE	1313504003-A	N6010...1	5975		5/21/2013	
7	1313504004	130559-62876			1	SAMPLE	1313504004-A	N6010...1	5975		5/21/2013	
8	1313504005	130559-62885			1	SAMPLE	1313504005-A	N6010...1	5975		5/21/2013	
9	1313504006	130559-62894			1	SAMPLE	1313504006-A	N6010...1	5975		5/21/2013	
10	1313504007	130559-62903			1	SAMPLE	1313504007-A	N6010...1	5975		5/21/2013	
11	1313504008	130559-62912			1	SAMPLE	1313504008-A	N6010...1	5975		5/21/2013	
12	1313581002	58U1-3 HCN			1	SAMPLE	1313581002-A	N6010...1	5975		5/21/2013	
13	1313581006	58D1-3 HCN			1	SAMPLE	1313581006-A	N6010...1	5975		5/21/2013	
14	1313581010	580S-3 HCN			1	SAMPLE	1313581010-A	N6010...1	5975		5/21/2013	
15	1313581014	58B-11 HCN			1	FLDBK	1313581014-A	N6010...1	5975		5/21/2013	
16	1313648001	130577-62964			1	SAMPLE	1313648001-A	N6010...1	5975		5/23/2013	
17	1313648002	130577-62965			1	SAMPLE	1313648002-A	N6010...1	5975		5/23/2013	

QC Media

SKC 226-28 Lot 7542 Exp APR/2017



Set ID's: 1313504  
Sample ID's: 1313504001 – 008; 1313581002, 006, 010, 014; 1313648001 - 002  
Matrix: Soda Lime Tubes  
Analyst/Date: Elijah Gregory 05/21/13  
Analyte/Method: HCN / NIOSH 6010Mod  
Batch/HBN ID: IWC/1862 / 107209  
Reporting Limit: (HCN) 0.21 µg CN/sample

**SAMPLE PREPARATION/ANALYSIS:** Front (F) and back (B) sections of each tube are added separately to dram vials. 20mL of 0.25N NaOH are added to each and desorbed for a minimum of one hour [1000 - 1330] with occasional agitation. For particulate cyanide, the glass wool plug at the tube inlet and the glass fiber filter disk are desorbed the same as the soda lime. Then an aliquot of each front section and back section is filtered with a 0.45µm PES membrane filter to remove turbidity prior to analysis on a SmartChem Discrete AA (WET01). In variation to the method 0.25N NaOH is used instead of water to stabilize the cyanide, and 20mL is used instead of 10mL to allow for complete desorption.

**REAGENTS:**

0.25 N NaOH	05/15/13 MK Horizon # 18957
Chloramine-T	05/21/13 EG Notebook # 2082, pg.51
Pyridine	04/29/12 EG Notebook # 2082, pg.50
Phosphate Buffer	04/16/13 EG Notebook # 2082, pg.49

**STANDARDS:** Working Stock: [17291] 1000 mg/L Check Stock: [18176] 1000 mg/L  
Int. Working: [19078, 5000 µg/L] Int. Check: [19079, 50000 µg/L]  
Working Stds: prepared per analysis Check Std: prepared per analysis  
*ICV is 0.200mL of Int. Check Std. [19079] brought to 50mL with 0.25N NaOH = 200µg/L.*

**INSTRUMENT PARAMETERS:** See instrument printout for operating parameters.  
Plan #: 20130521002, 20130521003

**CONVERSIONS/CALCULATIONS:**  
Conversion: (MW, HCN) 27.026/ (MW, CN) 26.018 = 1.039  
HCN: µg CN/L x 0.020 L/sample x 1.039 HCN = 0.02078 [conversion factor (CF) = 0.02078]

**REPORTING LIMIT:**  
(HCN) RL: 10 µg/L x 0.02078 = 0.2078 µg HCN/sample → 0.21 µg HCN/sample

**DILUTIONS:**  
None.

**COMMENTS:** QC's are reported as µg CN/sample, results are not converted to HCN.  
(HCN) QC media is Soda Lime Tube, SKC Cat. No. 226-28 Lot 7542 (Exp. APR/2017).  
Client field media was Soda Lime Tube, SKC Cat. No. 226-28, see batch worklist in \\DataReview\107209 for individual lot numbers.  
LCS/LCSD: 0.04 mL/20 mL x 0.02 x 50,000 µg/L [19079] = 2 µg CN/sample.

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## STANDARD REPORT

### Working Standard - CN INT wkg

CN INT wkg			Description - CN INT WKG		
Standard: 19078		Expires: 05/21/2013	Usable: Yes		
Lab Lot: CN INT wkg	Created By: E. Gregory		Amount: 50 mL		
Part ID:		Create Date: 05/21/2013	Validated By:		
MFG: EG	MFG Lot: In House		Validated Date:		
Pos.	Analyte	Name	Concentration		
1	57-12-5	Cyanide	5000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume Added	Expires
17291	CN stock	CN stock	CN stock	0.25 mL	5/31/2013
18957	0.25N NaOH	0.25N NaOH	0.25N NaOH	49.75 mL	5/15/2014



## STANDARD REPORT

### Constituent

#### Stock Standard - CN stock

CN stock		Description - CN stock	
Standard: 17291	Expires: 5/31/2013	Usable: Yes	
Lab Lot: CN stock	Created By: E. Gregory	Amount: 120 mL	
Part ID:	Create Date: 12/14/2012	Validated By:	
MFG: Ricca	MFG Lot: 1211497	Validated Date:	
Pos.	Analyte	Name	Concentration
1	57-12-5	Cyanide	1000 ug/mL



## STANDARD REPORT

### Constituent

#### Solvent Standard - 0.25N NaOH

0.25N NaOH		Description - 20g pellets diluted to 2L with DDI	
Standard: 18957	Expires: 5/15/2014	Usable: Yes	
Lab Lot: 0.25N NaOH	Created By: M. Karanu	Amount: 2 L	
Part ID:	Create Date: 5/15/2013	Validated By:	
MFG: EMD	MFG Lot: B0510904036	Validated Date:	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			



## STANDARD REPORT

### Working Standard - CN ENV wkg

CN ENV wkg				Description - CN ENV wkg	
Standard: 19079		Expires:	05/21/2013	Usable:	Yes
Lab Lot:	CN ENV wkg	Created By:	E. Gregory	Amount:	10 mL
Part ID:		Create Date:	05/21/2013	Validated By:	
MFG:	EG	MFG Lot:	In House	Validated Date:	
Pos.	Analyte	Name		Concentration	
1	57-12-5	Cyanide		50000 ug/L	
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume Added	Expires
18176	CN stock	CN stock	CN stock	0.5 mL	1/31/2014
18957	0.25N NaOH	0.25N NaOH	0.25N NaOH	9.5 mL	5/15/2014



## STANDARD REPORT

### Constituent

#### Stock Standard - CN stock

CN stock		Description - CN stock	
Standard: 18176	Expires: 1/31/2014	Usable: Yes	
Lab Lot: CN stock	Created By: E. Gregory	Amount: 120 mL	
Part ID:	Create Date: 3/7/2013	Validated By:	
MFG: ULTRA Scientific	MFG Lot: P01284	Validated Date:	
Pos.	Analyte	Name	Concentration
1	57-12-5	Cyanide	1000 ug/mL



## STANDARD REPORT

### Constituent

Solvent Standard - 0.25N NaOH

0.25N NaOH		Description - 20g pellets diluted to 2L with DDI	
Standard: 18957	Expires: 5/15/2014	Usable: Yes	
Lab Lot: 0.25N NaOH	Created By: M. Karanu	Amount: 2 L	
Part ID:	Create Date: 5/15/2013	Validated By:	
MFG: EMD	MFG Lot: B0510904036	Validated Date:	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			

TITLE Instrument Log (INST. ID: WET01)

Project No. —  
Book No. 4222

ALS  
Environmental  
DATA  
CHEM

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From Page No. <u>X</u>								
Date	Time ON	Time OFF	Analyte	Analyst	Work Order ID(s)	Comments		
05/21/13	12:55	13:34	NH <sub>3</sub>	NK	1313538, 1313681	Great!		
05/21/13	14:23	15:58	HCN	EG	1313504, 1313581, 1313648	Good! AccuCal		



# TITLE Reagent Preparation - Water lab

Project No. \_\_\_\_\_  
Book No. 2082

ALS-SLC

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From Page No. _____	Analyte	Reagent	Chemical	Manufacturer/Lot #	Pipettor/Balance	Analyst/Date
	TKN	Stock Buffer	sodium phosphate dibasic, anhydrous	Mallinckrodt/7117KJRA	102838(3.55g)/50mL	EH 04/04/13
	↓	↓	sodium hydroxide	EMD/80510904036	102838(1.0g)/100mL	exp. 04/04/14
	TKN	Salicylate Color	Sodium salicylate	Mall./12094 AOS605	102838(7.6g)/25mL + 0.15mL time	EH 04/04/13
	TKN	4% Sulfuric Acid	-SAME-	EMD/50280	WC#4 (4mL)/100mL	EH 04/05/13
	TKN/TP	Digestion Soln.	H <sub>2</sub> SO <sub>4</sub> , conc.	EMD/50280	Grad. cyl. (100mL) + WC#4 (1.25mL)	EH exp. 05/09/13
	↓	↓	mercuric oxide, red	Fisher/975522	102838 (1.0g)/500mL	exp. 04/05/14
	↓	↓	potassium sulfate	Amresco/1042C266	102838 (66.5g)/100mL	exp. 04/05/14
	TKN	6% NaOCl	NaOCl	Baker/0000023399	WC#4 (1.5mL)/25mL	EH 04/05/13
	CAT	Extraction/Digestion Solution	NaOH pellets	EMD/80310906036	102838 (4g)/200mL	EH 04/08/13
	↓	↓	Na <sub>2</sub> CO <sub>3</sub>	Aldrich/02108AR	102838 (6g)/100mL	exp. 07/08/13
	NH <sub>3</sub>	Dechlorinating Agent	Sodium Thiosulfate	Baker/L06467	102838 (0.175g)/50mL	EH 04/08/13
	NH <sub>3</sub>	6% NaOCl	NaOCl	Baker/0000023399	WC#4 (1.5mL)/25mL	EH 04/08/13
	NH <sub>3</sub>	1:1 NaOCl	-SAME-	Baker/0000023399	WC#4 (10mL)/20mL	EH 04/08/13
amenable CN	5% Calcium Hypochlorite	-SAME-	-SAME-	Baker/L34659	102838 (2.5g)/50mL	EH exp. 04/09/13
CN	Releasing Soln.	MgCl <sub>2</sub> • 6H <sub>2</sub> O	CALBIOLCHEM/D00127194	102838 (32.2g)/110.8g	EH 04/09/13	
part #133333	↓	↓	H <sub>2</sub> SO <sub>4</sub> , conc.	EMD/50280	102838 (139g)/100mL	exp. 04/09/14
TKN	25% NaOH	NaOH pellets	EMD/80510904036	102838 (200g)/100mL	MK 04/09/13	
CN	Chloramine-T	-SAME-	TCL America/AYNVA	102838 (0.25g)/25mL	EH 04/09/13	
TKN	Salicylate Color	Sodium salicylate	Mallinckrodt/12094 AOS605	102838 (7.6g)/25mL + 0.15mL time	EH 04/11/13	
TKN	4% Sulfuric Acid	-SAME-	EMD/50280	WC#4 (4mL)/100mL	EH 04/12/13	
TKN	6% NaOCl	NaOCl	Baker/0000023399	WC#4 (1.5mL)/25mL	EH 04/12/13	
TOC	20% H <sub>3</sub> PO <sub>4</sub>	conc. H <sub>3</sub> PO <sub>4</sub>	EMD/50196	Grad. cyl. (40mL)/20mL	MK 04/15/13	
amenable CN	5% Calcium Hypochlorite	-SAME-	Baker/L34659	102838 (2.5g)/50mL	EH exp. 04/23/13	
CN	Chloramine-T	-SAME-	TCL America/AYNVA	102838 (0.25g)/25mL	EH 04/16/13	
CN	Phosphate Buffer	NaH <sub>2</sub> PO <sub>4</sub> • H <sub>2</sub> O	EMD/A904649	102838 (69g)/500mL	EH exp. 1 year	
SiO <sub>2</sub>	Ascorbic Acid	-Same-	Mall./8829135602	102838 (0.85g)/50mL	MK 04/18/13	
↓	↓	15% SDS	[EG 08/31/12, 2082/38]	PL-214 (0.25mL)/100mL	MK 04/18/13	
↓	oxalic acid	-Same-	Baker/K07331	102838 (2.5g)/50mL	MK 04/18/13	
↓	Ammonium molybdate tetrahydrate	-Same-	EMD/47290033	102838 (0.5g)/50mL	MK 04/18/13	
↓	↓	1:1 H <sub>2</sub> SO <sub>4</sub>	[MK 04/25/12, 2082/31]	PL-214 (0.25mL)/100mL	MK 04/18/13	
↓	↓	15% SDS	[EG 08/31/12, 2082/38]	PL-214 (0.25mL)/100mL	MK 04/18/13	
MBAS	Wash Solution	6N H <sub>2</sub> SO <sub>4</sub>	[EH 03/25/13, 2082/48]	grad. cyl. (20.5mL)/500mL	EH 04/19/13	
↓	↓	NaH <sub>2</sub> PO <sub>4</sub> • H <sub>2</sub> O	EMD/A904649	102838 (25g)/100mL	exp. 04/19/14	
AKR.DST	0.02N NaOH	0.1N NaOH	[EH 03/26/13, 2082/48]	grad. cyl. (50mL)/250mL	EH 04/19/13	
CN	Chloramine-T	-SAME-	TCL America/AYNVA	102838 (0.25g)/25mL	EH 04/23/13	
					EH make daily	
					To Page No. X	

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Witnessed & Understood by me,

Date

Invented by

N/A

Date

04/24/13

Recorded by

Elijah Young

04/23/13

Harry Karam

# TITLE Reagent Preparation - Water Lab

Project No. \_\_\_\_\_  
Book No. 2082

ALS-SLC

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From Page No. _____					
Analyte	Reagent	Chemical	Manufacturer/ Lot #	Pipet/Balance	Analyst/Date
NH <sub>3</sub>	1:1 NaOCl	- SAME -	Baker / 0000023399	WC#4 (10mL) / 20mL DPI H <sub>2</sub> O	EM 09/23/13 make daily
CN	Chloramine-T	- SAME -	TCI America / QYNVA	102838 (0.25g) / 25mL DPI H <sub>2</sub> O	EM 04/24/13 make daily
TKN	Salicylate color	Sodium Salicylate	Mall. / 12094405605	102838 (7.5g) / 25mL DPI H <sub>2</sub> O	EM 04/24/13 make daily
TKN	6% NaOCl	NaOCl	Baker / 0000023399	WC#4 (1.5mL) / 25mL DPI H <sub>2</sub> O	EM 04/25/13 ex. 04/25/13
↓	4% Sulfuric acid	conc. H <sub>2</sub> SO <sub>4</sub>	EMD / 50280	WC#4 (4mL) / 100mL DPI H <sub>2</sub> O	EM 04/25/13 ex. 1mL
CN	Chloramine-T	- SAME -	TCI America / QYNVA	102838 (0.25g) / 25mL DPI H <sub>2</sub> O	EM 04/25/13 make daily
amenable CN	5% Calcium Hypochlorite	- SAME -	Baker / L34659	102838 (2.5g) / 50mL DPI H <sub>2</sub> O	EM 04/26/13 ex. 05/02/13
CN	Chloramine-T	- SAME -	TCI America / QYNVA	102838 (0.25g) / 25mL DPI H <sub>2</sub> O	EM 04/26/13 make daily
CN	Color solution	Barbituric Acid	Aldrich / 07021HU	102838 (7.5g) / 50mL DPI H <sub>2</sub> O	EM 04/29/13
↓	↓	Pyridine	EM Science / 36282	WC#4 (37.5mL) / 50mL DPI H <sub>2</sub> O	EM 04/29/13
↓	↓	HCl, conc.	EMD / 52250	WC#4 (7.5mL) / 50mL DPI H <sub>2</sub> O	EM 04/29/13
CN	Chloramine-T	- SAME -	TCI America / QYNVA	102838 (0.25g) / 25mL DPI H <sub>2</sub> O	EM 04/29/13 make daily
CN	Chloramine-T	- SAME -	TCI America / QYNVA	102838 (0.25g) / 25mL DPI H <sub>2</sub> O	EM 04/30/13 make daily
TKN	Salicylate color	Sodium Salicylate	Mall. / 12094405605	102838 (7.5g) / 25mL DPI H <sub>2</sub> O	EM 04/30/13 ex. 05/07/13
TKN	6% NaOCl	NaOCl	Baker / 0000023399	WC#4 (1.5mL) / 25mL DPI H <sub>2</sub> O	EM 05/02/13 ex. 05/02/13
TKN	Salicylate color	Sodium Salicylate	Mall. / 12094405605	102838 (7.5g) / 25mL DPI H <sub>2</sub> O	EM 05/02/13 ex. 05/02/13
TKN	6% NaOCl	NaOCl	Baker / 0000023399	WC#4 (1.5mL) / 25mL DPI H <sub>2</sub> O	EM 05/03/13 ex. 05/03/13
CN	Chloramine-T	- SAME -	TCI America / QYNVA	102838 (0.25g) / 25mL DPI H <sub>2</sub> O	EM 05/03/13 make daily
CN	Chloramine-T	- SAME -	TCI America / QYNVA	102838 (0.25g) / 25mL DPI H <sub>2</sub> O	EM 05/06/13 make daily
TKN	Salicylate color	Sodium Salicylate	Mallinckrodt / 12094405605	102838 (7.5g) / 25mL DPI H <sub>2</sub> O	EM 05/06/13 ex. 05/13/13
amenable CN	5% Calcium Hypochlorite	- SAME -	Baker / L34656	102838 (2.5g) / 50mL DPI H <sub>2</sub> O	EM 05/07/13 ex. 05/14/13
amenable CN	0.1N NaAsO <sub>2</sub>	- SAME -	Aldrich / SLBF3312V	102838 (0.64g) / 50mL DPI H <sub>2</sub> O	EM 05/07/13 ex. 05/14/13
CN	Chloramine-T	- SAME -	TCI America / QYNVA	102838 (0.25g) / 25mL DPI H <sub>2</sub> O	EM 05/07/13 make daily
TKN	6% NaOCl	NaOCl	Baker / 0000023399	WC#4 (1.5mL) / 25mL DPI H <sub>2</sub> O	EM 05/07/13 make daily
TKN	4% Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub> , conc.	EMD / 50280	WC#4 (4mL) / 100mL DPI H <sub>2</sub> O	EM 05/07/13 ex. 06/07/13
total polyphenols Acid insol. Ash	Sodium Carbonate	- SAME -	Aldrich / 02108AR	102838 (5.0g) / 25mL DPI H <sub>2</sub> O	EM 05/07/13 ex. 05/09/14
NO/NO <sub>2</sub>	2N HCl	HCl, conc.	EMD / 52250	acid disp. (33.4mL) / 200mL DPI H <sub>2</sub> O	EM 05/10/13 CONSUMED
NO/NO <sub>2</sub>	Absorbing Soln.	Triethanolamine	Baker / HS1616	102838 (15g) / 1L	MK 05/10/13
↓	↓	n-Butyl alcohol	B&J / BN461	PL-214 (0.5mL) / DPI H <sub>2</sub> O	exp. 08/10/13
NO/NO <sub>2</sub>	Sulfanilamide	Sulfanilamide	Baker / E03H08	102838 (4g) / 200mL	MK 05/10/13
↓	Soln.	H <sub>3</sub> PO <sub>4</sub> , conc.	EMD / 50196	WC#4 (10mL) / DPI H <sub>2</sub> O	exp. 08/10/13
TOC	20% H <sub>3</sub> PO <sub>4</sub>	H <sub>3</sub> PO <sub>4</sub> , conc.	EMD / 50196	WC#4 (40mL) / 200mL DPI H <sub>2</sub> O	EM 05/14/13 ex. 1yr.
Hardness	Buffer	MgSO <sub>4</sub>	J.T. Baker / J34160	102838 (0.312g) / 100mL	EM 05/14/13
↓	↓	EDTA, powder	J.T. Baker / K16643	102838 (0.476g) / DPI	exp. 06/14/13
↓	↓	NH <sub>4</sub> OH, liq.	BDH / 2011030472	acid disp. (57.2mL) / H <sub>2</sub> O	↓
↓	↓	NH <sub>4</sub> Cl	Mallinckrodt / 3384 KMET	102838 (6.762g) / H <sub>2</sub> O	↓

Witnessed & Understood by me,

Nancy Kavan

Date

05/14/13

Invented by N/A

Recorded by

Eligah Luning

Date

05/14/13

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# TITLE Reagent Preparation - Water Lab

Project No. \_\_\_\_\_  
Book No. 2082

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From Page No. X	Analyte	Reagent	Chemical	Manufacturer/ Lot #	Pipettor/Balance	Analyst/Date
	hardness	1N NH <sub>4</sub> OH	- SAME -	BDH/2011030472	WC#4 (7mL) / 100 mL DDI H <sub>2</sub> O	EX 05/15/13 exp. 06/15/13
	CN	Chloramine-T	- SAME -	TCI America/QYNVA	102838(0.25g) / 25mL DDI H <sub>2</sub> O	MK 05/15/13 exp. 05/15/13
	SiO <sub>2</sub>	Ascorbic Acid	- SAME -	Mallinckrodt/8829Y35602	102838(0.88g) / 50mL	EX 05/17/13
	↓	↓	15% SDS	[EX] 08/31/12, 2082/39	PL-214(0.25mL) / DDI H <sub>2</sub> O	make daily
	SiO <sub>2</sub>	Oxalic Acid	- SAME -	Baker/K07331	102838(2.5g) / 50mL DDI H <sub>2</sub> O	EX 05/17/13 make daily
	SiO <sub>2</sub>	Ammonium Molybdate tetrahydrate	- SAME -	EMD/47290033	102838(0.5g) / 50mL DDI H <sub>2</sub> O	EX 05/17/13
	↓	↓	1:1 H <sub>2</sub> SO <sub>4</sub>	[EX] 05/17/13, 2082/51	PL-214(0.28mL) / DDI H <sub>2</sub> O	make daily
	↓	↓	15% SDS	[EX] 08/31/12, 2082/39	PL-214(0.25mL) / H <sub>2</sub> O	↓
	SiO <sub>2</sub>	1:1 H <sub>2</sub> SO <sub>4</sub>	H <sub>2</sub> SO <sub>4</sub> , conc.	EMD/50280	std. (100mL) / 200mL DDI H <sub>2</sub> O	EX 05/17/13 exp. 05/17/14
	CName	5% Calcium Hypochlorite	- SAME -	Baker/L34656	102838(2.5g) / 50mL DDI H <sub>2</sub> O	EX 05/17/13 exp. 05/17/13
	NO/NO <sub>2</sub>	Sulfanilamide solution	Sulfanilamide conc. H <sub>2</sub> PO <sub>4</sub>	Baker/E03H08	102838 (10g) / 500mL	MK 05/17/13
	↓	↓	Triethylamine	EMD/50960	WC#4 (25mL) / DDI H <sub>2</sub> O	ex. 08/17/13
	↓	↓	n-Butyl alcohol	Baker/H51616	102838 (15g) / 1L DDI H <sub>2</sub> O	MK 05/17/13
	CName	0.1N NaAsO <sub>2</sub>	- SAME -	B&J / BN401	PL-214 (0.5mL) / H <sub>2</sub> O	ex. 08/17/13
	CN	Chloramine-T	- SAME -	Aldrich/SLBF3392V	102838(0.64g) / 50mL DDI H <sub>2</sub> O	EX 05/17/13 exp. 05/24/13
	CName	5% Calcium Hypochlorite	- SAME -	TCI America/QYNVA	102838(0.25g) / 25mL DDI H <sub>2</sub> O	EX 05/17/13 make daily
	SiO <sub>2</sub>	Ascorbic Acid	- SAME -	Baker/L34656	102838(2.5g) / 50mL DDI H <sub>2</sub> O	EX 05/20/13
	↓	↓	15% SDS	[EX] 08/31/12, 2082/39	PL-214 (0.25mL) / DDI H <sub>2</sub> O	make daily
	SiO <sub>2</sub>	Oxalic Acid	- SAME -	Baker/K07331	102838(2.5g) / 50mL DDI H <sub>2</sub> O	EX 05/20/13
	SiO <sub>2</sub>	Ammonium Molybdate Tetrahydrate	- SAME -	EMD/47290033	102838(0.5g) / 50mL DDI H <sub>2</sub> O	EX 05/20/13
	↓	↓	1:1 H <sub>2</sub> SO <sub>4</sub>	[EX] 05/17/13, 2082/51	PL-214 (0.28mL) / DDI H <sub>2</sub> O	make daily
	↓	↓	15% SDS	[EX] 08/31/12, 2082/39	PL-214 (0.25mL) / H <sub>2</sub> O	make daily
	CN	Chloramine-T	- SAME -	TCI America/QYNVA	102838(0.25g) / 25mL DDI H <sub>2</sub> O	EX 05/20/13 make daily
	NH <sub>3</sub>	1:1 NaOCl	- SAME -	J.T. Baker/0000023399	WC#4 (10mL) / 20mL DDI H <sub>2</sub> O	EX 05/21/13 make daily
	CN	Chloramine-T	- SAME -	Acros/A0319842	102838(0.25g) / 25mL DDI H <sub>2</sub> O	EX 05/21/13 make daily
	HCHO	1% Sodium Bisulfite	NaHSO <sub>3</sub>	Mallinckrodt/7444X15620	102838(2g) / 200mL DDI H <sub>2</sub> O	EX 05/22/13 exp. 06/22/13
	HCHO	1% Chromotropic Acid	4,5-dihydroxy-2,7-naphtho- lane disulfonic acid 2Na	EMD/45112522	102838(0.25g) / 25mL DDI H <sub>2</sub> O	EX 05/22/13 exp. 06/22/13

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

To Page No. X



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# Raw Data

## ALS Environmental

INST. ID: WETO

NFOSH 6010

Elizabeth Jung

05/21/13

Method : CYN -Unit [ µg/L ] - CYANIDE

WO#: 1313504

1313581

1313648

HBN: 107209

conversion factor

0.020 for QC

0.02078 for samples

reporting limit

0.20 mg/sample for QCs

0.21 mg/sample for samples

dilutions

NONE.

Smp#[Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Analysis Time
DIL-1	RBL	0.000	0.0025	0.00	2:23:37 PM
DIL-1	RBL	0.000	0.0048	0.00	2:23:55 PM
DIL-1	RBL	0.000	0.0008	0.00	2:24:49 PM
DIL-1	Std-1	0.000	0.0015	0.00	2:25:07 PM
SR5-1	Std-2	10.000	0.0150	0.00	2:27:49 PM
SR5-2	Std-3	50.000	0.0628	0.00	2:28:07 PM
SR5-3	Std-4	100.000	0.1143	0.00	2:29:02 PM
SR5-4	Std-5	200.000	0.2267	0.00	2:29:19 PM
SR5-5	Std-6	300.000	0.3331	0.00	2:32:02 PM
SR5-6	Std-7	400.000	0.4496	0.00	2:32:19 PM
1	ICV	185.886	0.2101	0.00	2:33:13 PM
2	ICB	-2.428	0.0011	0.00	2:33:31 PM
3	LMB	$0.01632 = 0.02 \times 0.816$	0.0047	0.00	2:36:14 PM
4	LCS	$1.78716 = 0.02 \times 89.358$	0.1029	0.00	2:36:31 PM
5	LCSD	$1.75046 = 0.02 \times 87.523$	0.1009	0.00	2:37:26 PM
6	1313504001-F	0.365	0.0042	0.00	2:37:43 PM
7	001-B	0.636	0.0045	0.00	2:40:26 PM
8	002-F	1.987	0.0060	0.00	2:40:43 PM
9	002-B	0.275	0.0041	0.00	2:41:38 PM
10	003-F	0.546	0.0044	0.00	2:41:56 PM
11	003-B	0.365	0.0042	0.00	2:44:38 PM
12	004-F	-3.050	0.0004	0.00	2:44:56 PM
13	CCV1	188.229	0.2127	0.00	2:45:50 PM
14	CCB1	-1.527	0.0021	0.00	2:46:08 PM
15	004-B	0.726	0.0046	0.00	2:48:50 PM
16	005-F	0.455	0.0043	0.00	2:49:08 PM
17	005-B	0.906	0.0048	0.00	2:50:02 PM
18	006-F	0.546	0.0044	0.00	2:50:20 PM
19	006-B	1.086	0.0050	0.00	2:53:02 PM
20	007-F	0.996	0.0049	0.00	2:53:20 PM
21	007-B	0.005	0.0038	0.00	2:54:14 PM
22	008-F	-0.626	0.0031	0.00	2:54:32 PM

Report Date :05/21/2013 Run Date :5/21/2013 Operator : KARANU

Plan # :20130521002

Plan Description : HCN-1313504

# ALS Environmental

Method : CYN -Unit [ µg/L ] - CYANIDE

Smp#[/Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Analysis Time
23	008-B	0.726	0.0046	0.00	2:57:14 PM
24	1313581002-F	-0.536	0.0032	0.00	2:57:32 PM
25	CCV2	181.922	0.2057	0.00	2:58:26 PM
26	CCB2	-0.626	0.0031	0.00	2:58:44 PM
27	<del>1313581002-B</del>	-0.986	0.0027	0.00	3:01:26 PM
28	1313581006-F	-0.356	0.0034	0.00	3:01:44 PM
29	1313581006-B	-0.626	0.0031	0.00	3:02:38 PM
30	1313581010-F	0.546	0.0044	0.00	3:02:56 PM
31	1313581010-B	-1.347	0.0023	0.00	3:05:37 PM
32	1313581014-F	0.726	0.0046	0.00	3:05:55 PM
33	1313581014-B	0.546	0.0044	0.00	3:06:49 PM
34	1313648001-F	-9.981	-0.0073	0.00	3:07:07 PM
35	1313648001-B	-4.230	-0.0009	0.00	3:09:49 PM
36	<del>1313648002-F</del>	-1.447	0.0054	0.00	3:10:07 PM
37	CCV3	178.858	0.2023	0.00	3:11:01 PM
38	CCB3	-1.076	0.0026	0.00	3:11:19 PM
39	<del>1313648002-B</del>	-1.347	0.0023	0.00	3:14:01 PM
40	CCV4	187.779	0.2122	0.00	3:14:19 PM
41	CCB4	-1.076	0.0026	0.00	3:15:13 PM

Report Date :05/21/2013

Run Date :5/21/2013

Operator : KARANU

Plan # :20130521002

Plan Description : HCN-1313504

# ALS Environmental

Method : CYN    -Unit [ µg/L ]    - CYANIDE

Smp#[/Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Analysis Time
DIL-1	RBL	0.000	0.0028	0.00	3:41:24 PM
DIL-1	RBL	0.000	0.0050	0.00	3:41:42 PM
DIL-1	RBL	0.000	0.0007	0.00	3:42:36 PM
1	1313581002-B	-2.323	0.0012	0.00	3:42:54 PM
2	1313581006-F	-1.783	0.0018	0.00	3:45:36 PM
3	1313581006-B	-2.053	0.0015	0.00	3:45:54 PM
4	1313581010-F	-0.863	0.0028	0.00	3:46:48 PM
5	1313581010-B	-3.855	-0.0005	0.00	3:47:06 PM
6	1313581014-F	-3.741	-0.0004	0.00	3:49:48 PM
7	1313581014-B	-2.594	0.0009	0.00	3:50:06 PM
8	1313648001-F	-8.233	-0.0054	0.00	3:51:00 PM
9	1313648001-B	-3.044	0.0004	0.00	3:51:18 PM
10	1313648002-F	-1.873	0.0017	0.00	3:54:00 PM
11	CCV5	202.480	0.2285	0.00	3:54:18 PM
12	CCB5	-3.405	0.0000	0.00	3:55:12 PM
13	1313648002-B	-3.495	-0.0001	0.00	3:55:30 PM
14	CCV6	205.363	0.2317	0.00	3:58:12 PM
15	CCB6	-2.954	0.0005	0.00	3:58:30 PM

Report Date :05/21/2013

Run Date :5/21/2013

Operator : KARANU

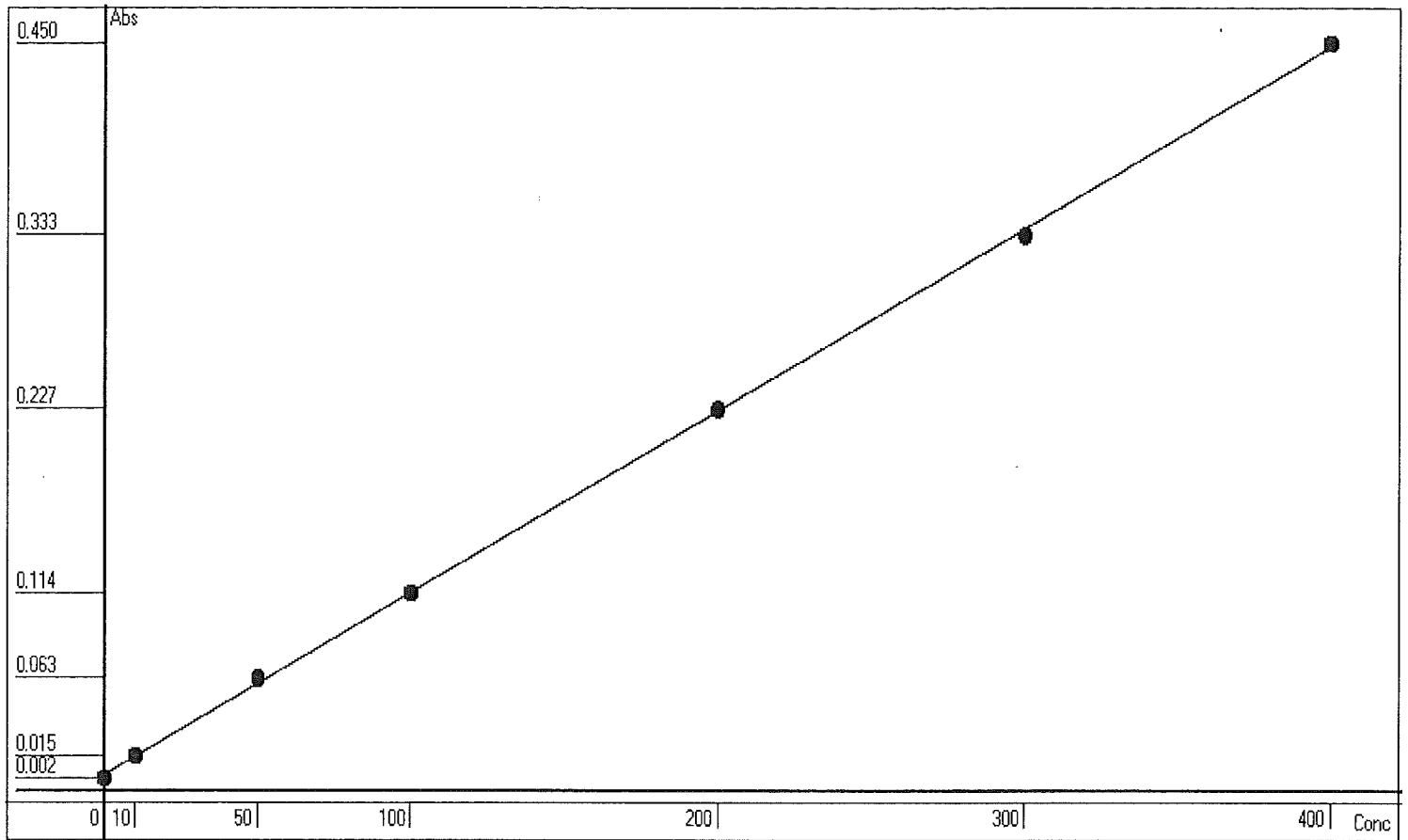
Plan # :20130521003

Plan Description : HCN-1313648

# Calibrant Report - CYN -

Calib Lot #:N/A Exp Date:1/1/2025 User:Westco Scientific

Plan # : 20130521002 Description : [HCN-1313504] Unit



Point	OD	Conc	Recalc Conc	% Error
1	0.0015	0	-2.0437	-204.37
2	0.0150	10	10.1202	1.20
3	0.0628	50	53.1892	6.38
4	0.1143	100	99.5919	-0.41
5	0.2267	200	200.8671	0.43
6	0.3331	300	296.7362	-1.09
7	0.4496	400	401.7056	0.43

Conc= +901.0249\*Abso -3.3952 R<sup>2</sup>=0.9998

RBL  
0.0016  
0

Report Date 5/21/2013 Run Date 5/21/2013



## CYN - CYANIDE

Type : End Point  
 Direction : Up  
 Unit : µg/L  
 Model : Linear  
 Unit Factor : 1  
 Factor : 1  
 Decimal : 3  
 Slope : 1  
 Intercept : 0  
 Linearity Low : -10  
 Linearity High : 400  
 Filter 1 : 570  
 Fluidics : Yes  
 Sample Blank : Yes \*

RBL 1 : 0.0017  
 Rbl Replicate : 3  
 Use RBL : Yes  
 Rgt Rate 1 : 0.0014  
 E.P. OD Limit : 0.0030

	Code	Vol	Delay	Read	Rinse
Reagent 1	CNSP	89	108	0	0
Reagent 2 *	CNCL	21	36	0	0
Reagent 3	CNPY	210	0	576	0

Diluent : NAOH  
 Sample Vol : 210

	Concentration	OD		Concentration	OD
C1	0	0.0015	C5	200	0.2267
C2	10	0.015	C6	300	0.3331
C3	50	0.0628	C7	400	0.4496
C4	100	0.1143	C8	-	-

Code : CN  
 Description : Cyanide  
 Lot# : N/A  
 Exp Date : 1/1/2025  
 User : Westco Scientific  
 Cal Replicate : 1  
 Std - Stock : 500

Report Date :05/22/2013    Run Date :05/21/2013    Operator : GREGORY    Plan # :20130521002  
 Plan Description : HCN-1313504