



AN ENVIRONMENTAL ANALYTICAL LABORATORY

COMPREHENSIVE VALIDATION PACKAGE

ATL Applications INVENTORY SHEET

WORK ORDER # 1006498

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Completed by:

Kara McKiernan

(Signature)

Kara McKiernan/ Document Control

07/06/10

(Print Name & Title)

(Date)

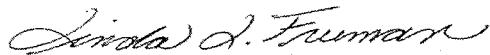
WORK ORDER #: 1006498

Work Order Summary

CLIENT:	Mr. Brian Baker Environmental Health & Engineering, Inc. 117 Fourth Avenue Needham, MA 02494	BILL TO:	Accounts Payable Environmental Health & Engineering, Inc. 117 Fourth Avenue Needham, MA 02494
PHONE:	800-825-5343	P.O. #	1001213
FAX:	781-247-4305	PROJECT #	17131
DATE RECEIVED:	06/19/2010	CONTACT:	Ausha Scott
DATE COMPLETED:	06/30/2010		

FRACTION #	NAME	TEST
01A	111376	ATL Applications
01AA	111376 Lab Duplicate	ATL Applications
02A	111392	ATL Applications
03A	Method Blank	ATL Applications
03B	Method Blank	ATL Applications
04A	LCS	ATL Applications

CERTIFIED BY:



DATE: 06/30/10

Laboratory Director

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Hydrogen Sulfide by Radiello 170
Environmental Health & Engineering, Inc.
Workorder# 1006498

Two Radiello 170 (H₂S) samples were received on June 19, 2010. The procedure involves adsorption of H₂S by zinc acetate to form zinc sulfide. The sulfide is then recovered by extraction with water and addition of ferric chloride in a strongly acidic solution to produce methylene blue. Methylene blue absorbance is then measured at 665 nm using a spectrophotometer.

Sampling rate of 69 mL/min for H₂S was provided by the manufacturer

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Results were calculated based on 25 deg C without temperature correction. The actual exposure time was used to calculate sample concentrations and reporting limits.

An exposure time of 20170 minutes was used for the QC samples.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Sample Results and Raw Data

AIR TOXICS LTD.
ATL Application # 59 for RAD 170 (Hydrogen Sulfide)

Spectrophotometer

Field Sample ID.	Lab Sample I.D.	Collection Date	Analysis Date	Dilution Factor	Reporting Limit (ug)	Reporting Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
111376	1006498-01A	6/18/2010	6/28/2010	1.00	0.80	0.54	ND	ND
111376 Lab Duplicate	1006498-01AA	6/18/2010	6/28/2010	1.00	0.80	0.54	ND	ND
111392	1006498-02A	6/18/2010	6/28/2010	1.00	0.80	0.54	ND	ND
Method Blank	1006498-03A	NA	6/28/2010	1.00	0.80	0.54	ND	ND
Method Blank	1006498-03B	NA	6/28/2010	1.00	0.80	0.54	ND	ND
LCS	1006498-04A	NA	6/28/2010	1.00	0.80	0.54	%Rec	
							113	

COMMENTS: 1. NA=Not Applicable

2. ND=Not Detected

3. Exposure time of 20170 minutes was assumed for the QC samples.

4. Background subtraction not performed.

Hydrogen Sulfide Radtello Calculation Worksheet

Workorder #:1006498

Sampling Rate (ng/ppb/min) 0.096 Typically 0.096 for H₂S

Sampling T (deg C) 25 Typically 25

Volume (mL) 10.5 Typically 10.5 for H₂S

Date of Analysis: 6/28/2010

Corrected Q 0.096

Takes into account temp

LabSampleID

Client

Collection

Date of

Abs

Duration

(min)

DF

DF

Conc (ug/mL) of

sulfide

Conc (ug) of sulfide

Conc (ug) of H₂S

(Abs-Y-int)/DF

Conc(ug/mL)xvol (mL)

conc (ug sulfide) *MW H₂S

MW Sulfide

Slope

(Abs-Y-int)/DF

Conc(ug/mL)xvol (mL)

conc (ug sulfide) *MW H₂S

MW Sulfide

Qx Duration

Q includes conversion from

Sulfide to H₂S

Conc (ug) x 1000

ppbx mw

24.45

T Corrected, no Blank correction

Conc (ppb) of H₂S

Conc (ug/m3) of H₂S

LabSampleID	Client	Collection	Date of	Abs	Duration (min)	DF	DF	Conc (ug/mL) of sulfide	Conc (ug) of sulfide	Conc (ug) of H ₂ S	Conc (ppb) of H ₂ S	Conc (ug/m3) of H ₂ S
01A 01AA 02A	111376 Lab Duplicate 111392	6/18/2010 6/18/2010	6/18/2010 0.037 20170	0.074 1.00 1.00	20130 0.00149279 -0.01665767	1.00 -0.0149279 -0.01665767	0.032896251 0.034755119 -0.03581832	0.34541064 0.364928745 -0.376759239	0.36708093 0.387823557 -0.40039627	0.179 0.189 -0.008	0.249 0.263 -0.011	
03A 03B 04A	Method Blank Method Blank LCS	NA NA NA	0.029 0.033 0.2	20170 20170 20170	-0.008928259 -0.005210525 -0.150004488	-0.093746719 -0.054710509 -0.058142924	-0.376759239 -0.40039627 -0.40339627	-0.40339627 -0.40339627 -0.40339627	-0.40339627 -0.40339627 -0.40339627	-0.048 -0.028 -0.039	-0.067 -0.039 -0.813	

LabSampleID	Client	Collection	Date of	Abs	Duration (min)	DF	DF	Conc (ug/mL) of sulfide	Conc (ug) of sulfide	Conc (ug) of H ₂ S	Conc (ppb) of H ₂ S	Conc (ug/m3) of H ₂ S
01A 01AA 02A	111376 Lab Duplicate 111392	6/18/2010 6/18/2010	6/18/2010 0.037 20170	0.074 1.00 1.00	20130 0.00149279 -0.01665767	1.00 -0.0149279 -0.01665767	0.032896251 0.034755119 -0.03581832	0.34541064 0.364928745 -0.376759239	0.36708093 0.387823557 -0.40039627	0.179 0.189 -0.008	0.249 0.263 -0.011	
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LabSampleID	Client	Collection	Date of	Abs	Duration (min)	DF	DF	Conc (ug/mL) of sulfide	Conc (ug) of sulfide	Conc (ug) of H ₂ S	Conc (ppb) of H ₂ S	Conc (ug/m3) of H ₂ S
01A 01AA 02A	111376 Lab Duplicate 111392	6/18/2010 6/18/2010	6/18/2010 0.037 20170	0.074 1.00 1.00	20130 0.00149279 -0.01665767	1.00 -0.0149279 -0.01665767	0.032896251 0.034755119 -0.03581832	0.34541064 0.364928745 -0.376759239	0.36708093 0.387823557 -0.40039627	0.179 0.189 -0.008	0.249 0.263 -0.011	
03A 03B 04A	Method Blank Method Blank LCS	NA NA NA	0.029 0.033 0.2	20170 20170 20170	-0.008928259 -0.005210525 -0.150004488	-0.093746719 -0.054710509 -0.058142924	-0.376759239 -0.40039627 -0.40339627	-0.40339627 -0.40339627 -0.40339627	-0.40339627 -0.40339627 -0.40339627	-0.048 -0.028 -0.039	-0.067 -0.039 -0.813	

QC Results and Raw Data

Spectrophotometer Logbook

©Air Toxics Ltd.

Logbook#: 1927

Work Order: 1006498

Date: 6/28/19

Method: Rad 170

Analyst: DR / MS

Wavelength: 665

Standard ID	Concentration	ABS
	sulfide (mg/mL)	
Level 1 1993-73 -E	0.0716	0.097
Level 2 -D	0.143	0.187
Level 3 -C	0.286	0.356
Level 4 -B	0.572	0.684
Level 5 ↓ -A	1.145	1.255
ICV 1993-74	0.286	0.357

$$r = 0.9982$$

$$m = \underline{1.676}$$

$$b = \underline{0.0386}$$

— 1 —

ICV % Recovery

$$\text{ICV \% Recovery} = \frac{0.387}{\text{DR } 61/2610}$$

Procedure:

- 1.) Add 10 mL of H₂O to sample tube, cap and vortex for 1 minute.
 - 2.) Add 0.5 mL of Ferric Chloride-Amine solution and cap immediately.
 - 3.) Allow color to develop for 30 minutes.
 - 4.) Measure absorbance at 665nm.

MJS 6/28/10


Signed

6/28/10

Spectrophotometer Standard Preparation Log

@Air Toxics Ltd. Log Book #: 1993

Standard ID: 1993-31

Project: Amine Solution Rad 170

Analyst: M Skidmore

Preparation Date: 6/7/10

Expiration Date: 7/7/10

Solvent: HPLC H₂O

Solvent Lot #: DB 270

Procedure/Comments: _____

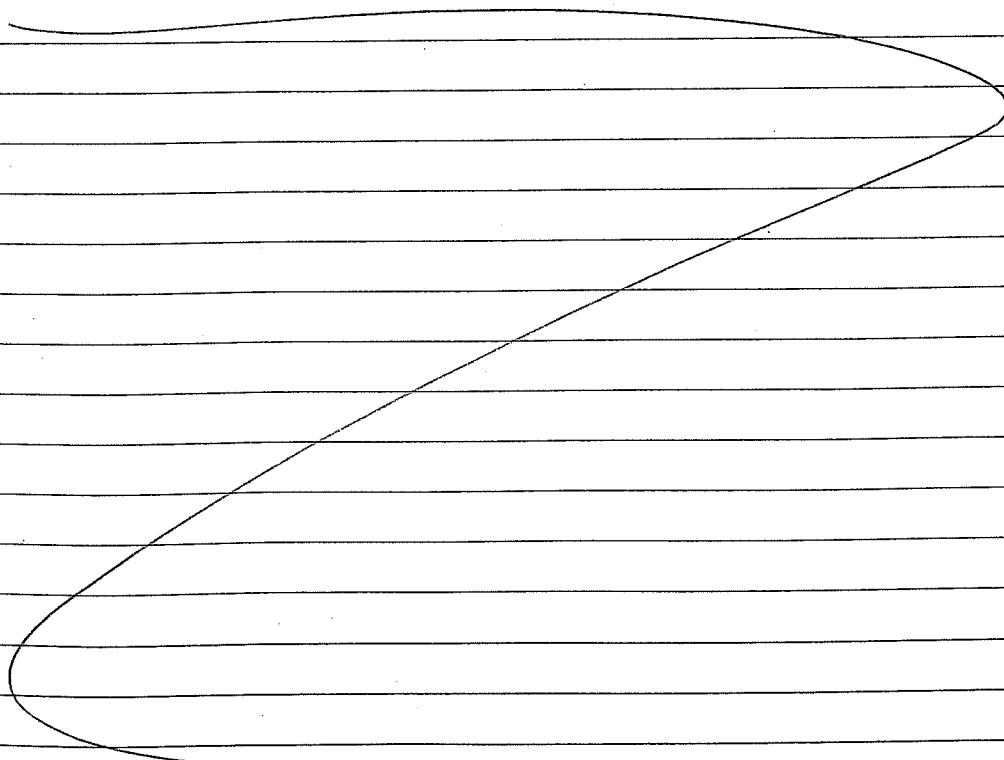
Sulfuric Acid Solution:

Slowly add 6.25 mL of concentrated sulfuric acid to 2.5 mL of D.I. H₂O, and let the solution cool. (sulfuric acid lot: 01428LS).

Amine Solution:

Dissolve 1.6875g of N,N-dimethyl-p-phenylenediammonium oxalate (located in ER1A; Lot: 63797PJ) in the above mentioned sulfuric acid solution. Dilute this solution to 250 mL with sulfuric acid-water 1:1 v/v. (This is roughly 120 mL H₂O + 120 mL sulfuric acid).

MJS 6/7/10



MJS 6/7/10

Spectrophotometer Standard Preparation Log

@Air Toxics Ltd. Log Book #: 1993

Standard ID: 1993-48

Project: Ferric chloride Solution

Analyst: M. Skidmore

Preparation Date: 6/14/10

Expiration Date: 6/14/11

Solvent: HPLC H₂O

Solvent Lot #: OB270

Procedure/Comments: Dissolve 25 g of ferric chloride hexahydrate (located in ER2C; lot: 73297) in 10 mL H₂O.

Spectrophotometer Standard Preparation Log

@Air Toxics Ltd. Log Book #: 1993

Standard ID: 1993-71

Project: Rad 170 H₂S LCS

Analyst: D Randolph / M Skidmore

Preparation Date: 6/28/10

Expiration Date: 6/28/10

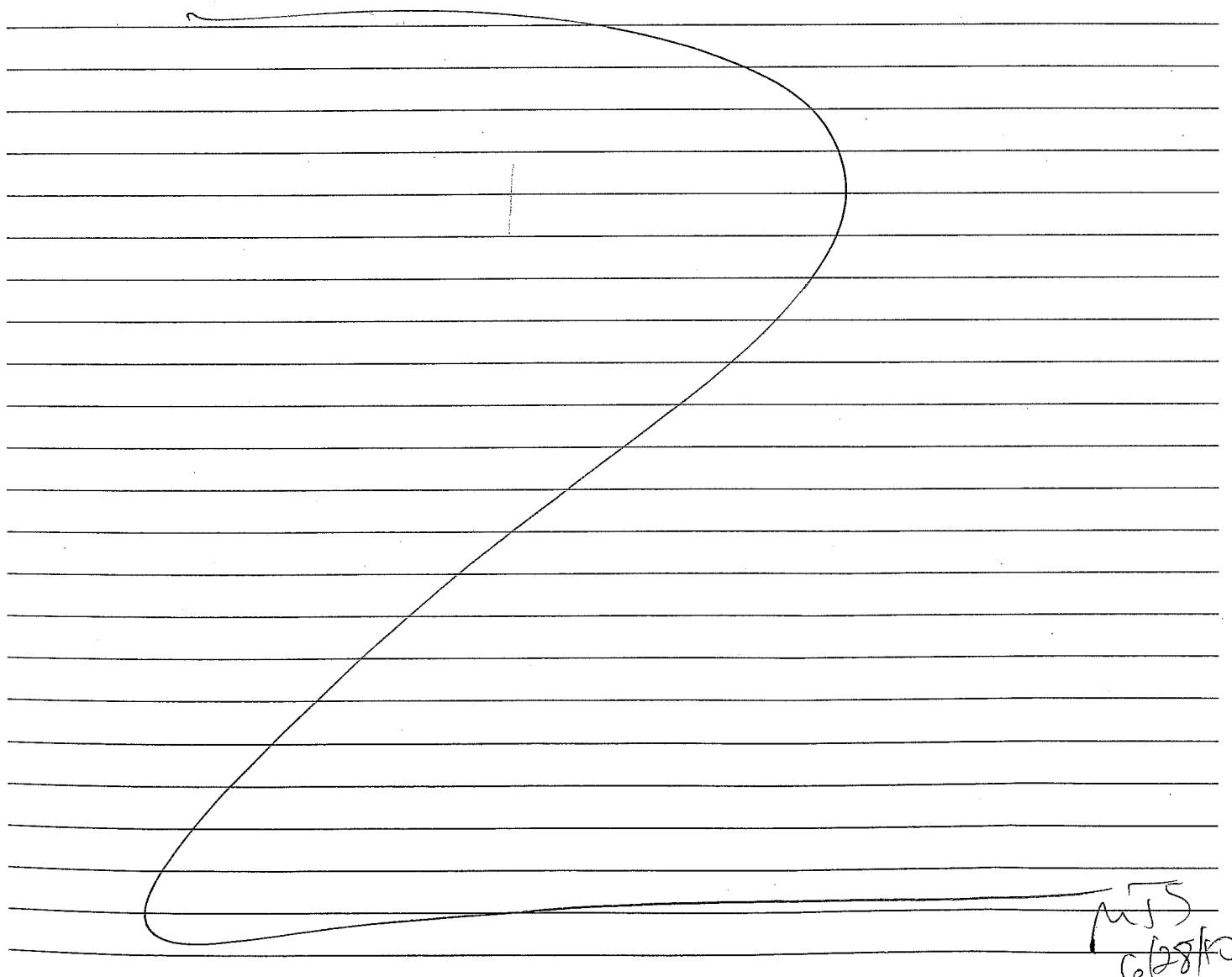
Solvent: HPLC H₂O

Solvent Lot #: DB631

Procedure/Comments:

A Rad 170 cartridge (lot: 10081) was placed in a 40 mL VOA vial. 10.0 mL of D.I. H₂O was aliquoted into the vial. 1.0 mL of H₂S gas (1476-1499, 1000 ppm) was injected into the vial, into the H₂O. The solution was allowed to gently shake for 2 hours. Then 0.5 mL of the ferric-chloride-amine (1993-72) was added to the vial and capped immediately. The solution was allowed to sit for 30 minutes and the absorbance was measured at 665 nm.

DR 6/28/10



MJS
6/28/10

Spectrophotometer Standard Preparation Log

@Air Toxics Ltd. Log Book #: 1993

Standard ID: 1993-72

Project: Ferric Chloride Amine Solution

Analyst: D. Randolph / M. Skidmore

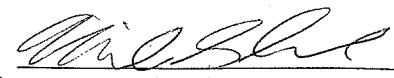
Preparation Date: 6/28/10

Expiration Date: 6/28/10

HPLC H₂O w/IS 6/30/10
Solvent: ~~HPLC H₂O~~ DR 6/25/n

Solvent Lot #: DB 631

Procedure/Comments: Add 2.0mL of Ferric chloride solution (1993-48; exp. 6/14/11)
with 10.0mL of amine solution (1993-31; exp. 7/7/10).



6/28/10
Date

Fayne
Reviewed

DR 6/28/10

6/30/10
Date

Rev. 8/97

Spectrophotometer Standard Preparation Log

@Air Toxics Ltd. Log Book #: 1993

Standard ID: 1993-73

Solvent: HPLC H₂O

Solvent Lot #: DB631

Project: Rad 176 Calibration Curve

Analyst: D Randolph / M. Skidmore

Preparation Date: 6/28/10

Expiration Date: 6/28/10

Procedure/Comments:

Solution A: 2 mL of Code Rad 171 (1476-1736, exp 2/3/11) (located in ER1B) with
98 mL of D.I. H₂O = 1.145 µg/mL

Solution B: 2.5 mL of Solution A with 2.5 mL of D.I. H₂O = 0.572 µg/mL

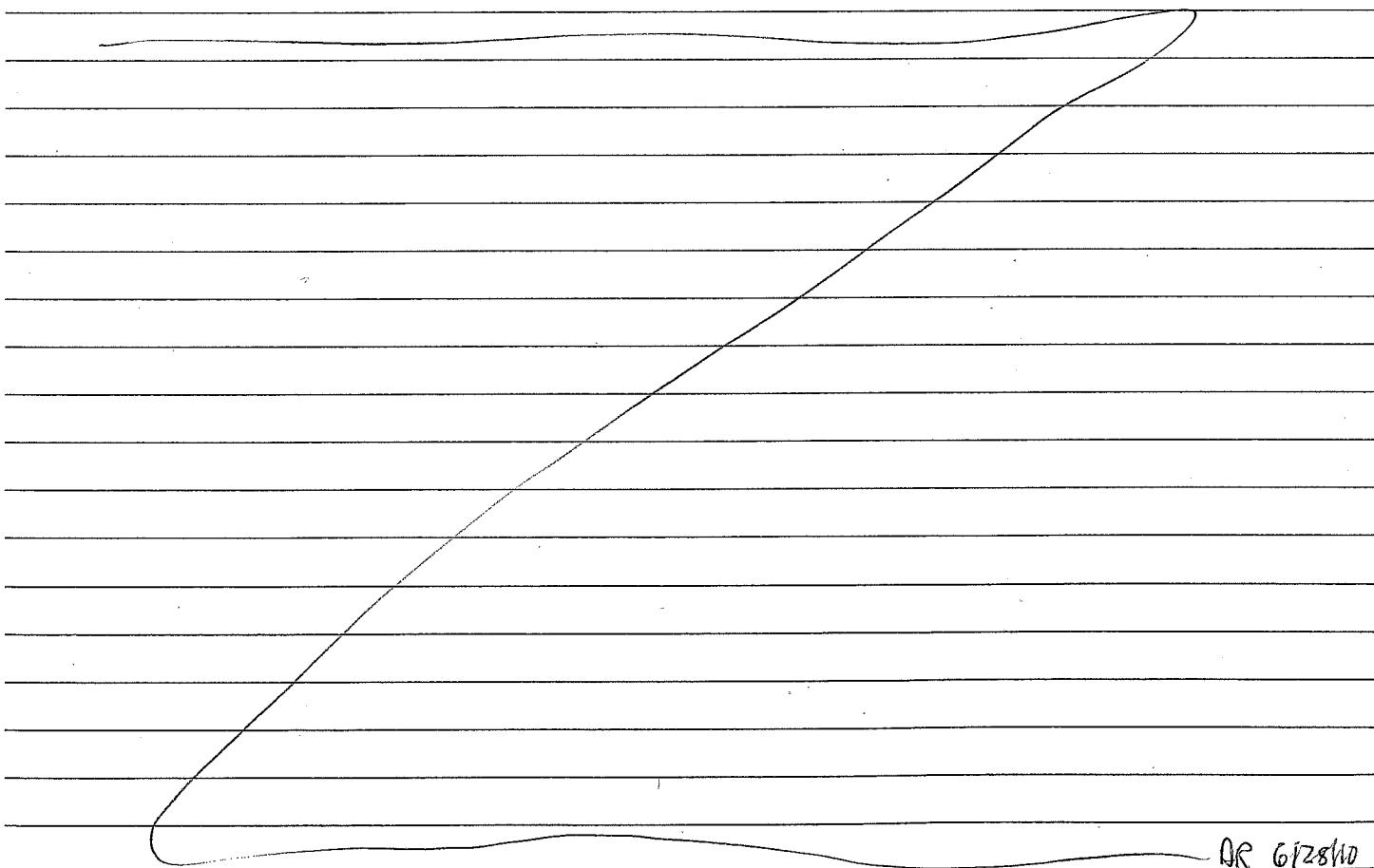
Solution C: 1.25 mL of Solution A with 3.75 mL of D.I. H₂O = 0.286 µg/mL

Solution D: 0.625 mL of Solution A with 4.375 mL of D.I. H₂O = 0.143 µg/mL

Solution E: 0.375 mL of Solution A with 5.625 mL of D.I. H₂O = 0.0716 µg/mL

Note: Each solution was measured immediately after it was prepared. Solution A is only
stable in the flask it was prepared in.

DR 6/28/10



DR 6/28/10

Spectrophotometer Standard Preparation Log

@Air Toxics Ltd. Log Book #: 1993

Standard ID: 1993-74
Project: Rad 170 ICL
Analyst: Fm
Preparation Date: 6/28/10
Expiration Date: 6/28/10

Solvent: HPLC H₂O
Solvent Lot #: DB6B1

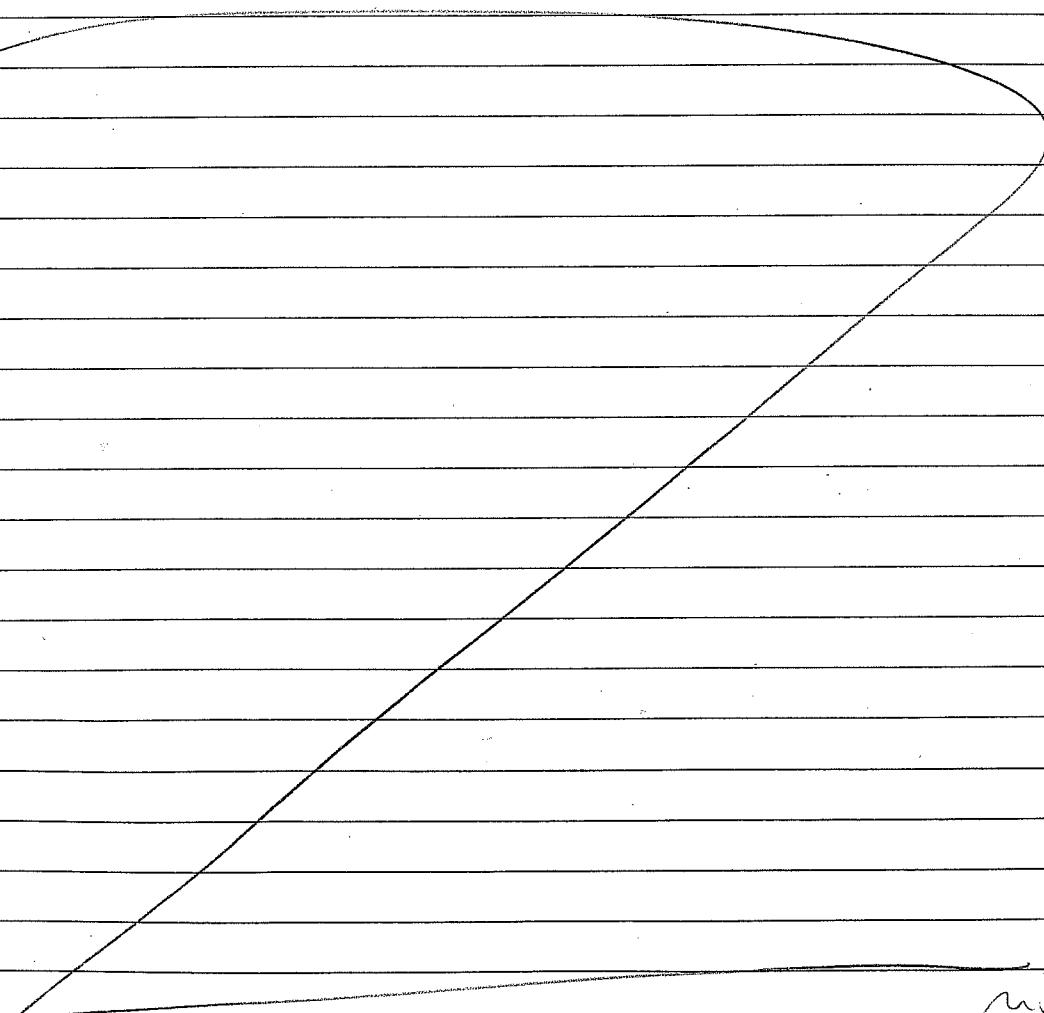
Procedure/Comments: _____

— Solution A: 2 mL of Code Rad 171 (1476-1736, exp 2/3/11) (located in ER1B) with
98 mL of D.I. H₂O = 1.145 µg/mL

— Solution C: 1.25 mL of Solution A with 3.75 mL of D.I. H₂O = 0.286 µg/mL

— Note: Each solution was measured immediately after it was prepared. Solution A is only
stable in the flask it was prepared in.

Fm 6/30/10



*MJS
6/30/10*

Shipping/ Receiving Documents



180 Blue Ravine Road, Suite B
Folsom, CA 95630

Phone (916) 985-1000 FAX (916) 985-1020
Hours 8:00 A.M. to 6:00 P.M. Pacific

COMPANY: Environmental Health & Engineering, Inc.
ATTENTION: Mr. Brian Baker
FAX #: 781-247-4305
FROM: Sample Receiving
Workorder #: 1006498
of pages (Including Cover): 4

7/6/2010

Thank you for selecting Air Toxics Ltd. We have received your samples and have found discrepancies.
In order to expedite analysis and reporting, please review the attached information for accuracy.

Corrections can be faxed to Ausha Scott at 916-985-1020.

ATL will proceed with the analysis as specified on the Chain of Custody and Sample Login page.

In accordance with your company's contract, this account is required to have a PO that is fully executed by both parties which also covers the cost of the workorder before any data can be released. Please ensure that you have given all appropriate information to our Project Manager so that there will be no delay in reporting of the data you are requesting.

Your prompt response is appreciated.

Environmental Health & Engineering, Inc.

CHAIN OF CUSTODY FORM

1006498

DATE: 18 Jun 10

FROM: Environmental Health and Engineering, Inc.
117 Fourth Avenue
Needham, MA 02494-2725

TO: AIR TOXICS

Please send invoices to ATTN: Accounts Payable
Please send reports to ATTN: Data Coordinator

In all correspondence regarding this matter, please refer to EH&E Project # 17131

The cost of this analysis will be covered by EH&E Purchase Order # 1001213

For EH & E Data Coordinator - URGENT DATA

Special instructions:

- Standard turn around time Rush by _____ date/time Other _____
 Fax results 781-247-4305
 RETURN SAMPLES Electronic transfer - datacoordinator@eheinc.com
 Additional report recipient bbaker@eheinc.com

Each signatory please return one copy of this form to the above address

Relinquished by: ~~Brian W. Harker~~ of Environmental Health & Engineering, Inc. Date: 6/18/10
Received by: Brian W. Harker of (company name) ATL Date: 6/19/10 930
Relinquished by: _____ of (company name) _____ Date: _____
Received by: _____ of (company name) _____ Date: _____
Relinquished by: _____ of (company name) _____ Date: _____
Received by: _____ of (company name) _____ Date: _____
Lab Data
Received by: _____ of Environmental Health & Engineering, Inc. Date: _____
Page 1 of 1

SAMPLE RECEIPT SUMMARY

WORKORDER 1006498

Client	Phone	Date Promised:
Mr. Brian Baker Environmental Health & Engineering, Inc. 117 Fourth Avenue Needham, MA 02494	800-825-5343	07/02/10 11:59 pm
	Fax	Date Completed:
	781-247-4305	6/30/10
		Date Received:
		6/19/10
		PO#:
		1001213
		Project#:
		17131
		Total \$:
Sales Rep:	TL	\$ 170.00
		Logged By:
		BSW

Fraction	Sample #	Analysis	Collected	Amount\$
01A	111376	ATL Applications	6/18/2010	\$80.00
01AA	111376 Lab Duplicate	ATL Applications	6/18/2010	\$0.00
02A	111392	ATL Applications	6/18/2010	\$80.00
03A	Method Blank	ATL Applications	NA	\$0.00
03B	Method Blank	ATL Applications	NA	\$0.00
04A	LCS	ATL Applications	NA	\$0.00

Misc. Charges eCVP (2) @ \$5.00 each. \$10.00

Note: Samples received after 3 P.M. PST are considered to be received on the following work day.
Atlas Project Name/Profile#: CPSC/14482

BILL TO: Accounts Payable
Environmental Health & Engineering, Inc.
117 Fourth Avenue
Needham, MA 02494

Analysis Code: Other GC

TERMS:

Reporting Method: ATL Application #59 H2S-Radiello 170

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

Other Records



Method : ATL Application #59 H2S-Radiello 170

CAS Number	Compound	Rpt. Limit (ug)
7783-06-4	Hydrogen Sulfide	1.2

@ Air Toxics Ltd	Title: Data Review Checklist				Release Date: 03/01/10
	Form #: F1.2	Revision #: 2	Revision Date: 03/01/10	Page #: 1 of 2	

DATA REVIEW CHECKLIST

Work Order #:

1006498

A₁ A₂ R T M Q

- | | | | | | | |
|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Analysis/Reporting vs. Project Profile/SOP requirements checked (i.e. 100% Dups, J-Flag to MDL, etc) |
| | | | | | | The final report has the correct reporting list, special units, and header info. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | | | Non-Standard sublist printed/verified, LOQ and LOD verified |
| | | | | | | Lab Narrative is correct (proper method & description/Receiving & Analytical notes correct) |
| | | | | | | Sample Discrepancy Report (SDR) is completed |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Corrective Action issued - # _____ |
| | | | | | | Unusual circumstances have been documented in the notes section below |

LUMEN validation report present and initialed

CIRCLE (YES / NO)

- | | | | | | |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Lab Blank, CCV, LCS and DUP met QC criteria |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Hold time is met for all samples |
| | | | | | Appropriate data qualifier flags are applied |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | | Manual integrations for samples and QC are properly documented |
| | | | | | Samples analyzed within the project or method specific clock |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Retention times have been verified |
| | | | | | Appropriate ICAL(s) included |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | At least one result per sample is verified against the target quant sheets/raw data |
| | | | | | Dilution factor correctly calculated (sample load volume, syringe and bag dilutions, can pressurization(s)) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Correct amount of sample analyzed (i.e. sample not over-diluted) |
| | | | | | Spectra verified - documentation of spectral defense included (Section 5A of eCVP pkg) |
| | | | | | TICs resemble reference spectra |
| | | | | | TICs between duplicate samples are consistent |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Checked samples for trends (i.e. Influent vs. Effluent, Field Dups, Field/Trip Blank, etc.) |
| | | | | | Data for multiple analyses of sample(s) has been evaluated for comparability of results |
| | | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Special units for all samples in the final report are correctly calculated |
| | | | | | Manually entered results checked (i.e. TPH/NMOC) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | Chain of Custody verified for any special comments (i.e. different compounds/RLs, action levels) |
| | | | | | Chain of Custody scanned correctly |
| | | | | <input type="checkbox"/> | Verify sample id's vs. chain of custody |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | | Date MDL(s) performed per instrument(s) <u>9/4/09</u> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | Samples pressurized w/ appropriate gas (N ₂ or He) <input type="checkbox"/> Other (i.e. Tedlar bag, cartridge, sorbent) |
| | | <input type="checkbox"/> | | | Final pressure consistent with canister size (6L vs. 1L) |
| | | <input type="checkbox"/> | | | Verify receipt pressures |
| | | <input type="checkbox"/> | | | Verify canister ID #'s |
| | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | Final invoice amount correct (adjusted for TAT, Penalties, Re-issue Charges etc.) |
| | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | Client LUMEN report reviewed for accuracy and completeness |
| | | <input checked="" type="checkbox"/> | | | Final PDF report reviewed for correctness |

Notes: (to include: noting samples with QA/QC problems, Blanks with positive hits, narratives, etc.)

A/R:

M/Q:

A ₁ /A ₂ (Analytical Review/Date)	R/T (Reporting Review/Date)	M (Management Review/Date)	Q (QA Review/Date)
<u>A₁: 6/30/10</u>	<u>R: 6/30/10</u>	<u>6/30/10</u>	
A ₂ :	T: <u>6/30/10</u>		

Note (1): Please check all the appropriate boxes. Indicate "NA" for any statement that does not apply.

Note (2): Management reviewer and reporting reviewer must be separate individuals.