

LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

ERM July 29, 2014

5761 N. Church Street Glen Rock, PA 17327 ATTN: Mr. Jeff Boggs

SUBJECT: Harbor Point, MD, Hexavalent Chromium Monitoring, Data Validation

Dear Mr. Boggs,

Enclosed is the final validation report for the fraction listed below. This SDG was received on July 25, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32256:

SDG Fraction

4072220 Hexavalent Chromium

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1
 Development, Version 1, Baltimore Works Site, Baltimore, Maryland, March
 2014
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Project Manager/Chemist

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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring

Collection Date: July 18 through July 21, 2014

LDC Report Date: July 29, 2014

Matrix: Air

Parameters: Hexavalent Chromium

Validation Level: EPA Level IV

Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 4072220

Sample Identification

OAM 1 (07/18/14) PAM-1 (07/21/14)DUP OAM 2 (07/18/14) PAM-1D (07/21/14)DUP

PAM-1 (07/18/14)

PAM-1D (07/18/14)

PAM-2 (07/18/14)

PAM-3 (07/18/14)

PAM-4 (07/18/14)

DAM 04 (07/10/11)

PAM-21 (07/18/14)

PAM-31 (07/18/14)

OAM 1 (07/21/14)

OAM 2 (07/21/14)

PAM-1 (07/21/14)

PAM-1D (07/21/14)

PAM-2 (07/21/14)

PAM-3 (07/21/14)

PAM-4 (07/21/14)

PAM-21 (07/21/14)

PAM-31 (07/21/14)

PAM-1 (07/18/14)DUP

PAM-1D (07/18/14)DUP

The date was appended to the sample ID to differentiate between samples.

Introduction

This data review covers 22 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per ASTM D7614 for Hexavalent Chromium.

This review follows the Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland (March 2014) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the method blanks.

Samples PAM-31 (07/18/14) and PAM-31 (07/21/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (07/18/14) and PAM-21 (07/21/14) were identified as field blanks. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analysis was not required by the method.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples PAM-1 (07/18/14) and PAM-1D (07/18/14) and samples PAM-1 (07/21/14) and PAM-1D (07/21/14) were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

	Concentrat	ion (ng/m³)	222		
Analyte	PAM-1 (07/18/14)	PAM-1D (07/18/14)	RPD (Limits)	Flags	A or P
Hexavalent chromium	0.142	0.159	11 (≤20)	-	-

	Concentrati	ion (ng/m³)				
Analyte	PAM-1 (07/21/14)	PAM-1D (07/21/14)	RPD (Limits)	Flags	A or P	
Hexavalent chromium	0.0515	0.0548	6 (≤20)	-	-	

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Data Qualification Summary - SDG 4072220

No Sample Data Qualified Due to QA/QC Exceedences in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 4072220

No Sample Data Qualified Due to Laboratory Blank Contamination in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Field Blank Data Qualification Summary - SDG 4072220

No Sample Data Qualified Due to Field Blank Contamination in this SDG

LDC #: 32256A6

VALIDATION COMPLETENESS WORKSHEET

Level IV

SDG #: 4072220 Laboratory: Eastern Research Group Page: 1 of \
Reviewer: 50
2nd Reviewer:

METHOD: Hexavalent Chromium (ASTM D7614)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments ,
ı.	Technical holding times	A	Sampling dates: 7/8/14 - 7/21/14
11	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	7	Not Rea.
VI.	Duplicates	À	りって
VII.	Laboratory control samples	A	uslo
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD= (3,4) (12,13)
ΧI	Field blanks	100	EB= 8,17 TB= 9,18

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank
EB = Equipment blank

Validated Samples:

Airo

							
1	OAM 1 (07/18/14)	11	OAM 2 (07/21/14)	21	PAM-1 (07/21/14)DUP	31	
2	OAM 2 (07/18/14)	12	PAM-1 (07/21/14)	22	PAM-1D (07/21/14)DUP	32	
3	PAM-1 (07/18/14)	13 _	PAM-1D (07/21/14)	23		33	
4	PAM-1D (07/18/14)	14_	PAM-2 (07/21/14)	24		34	
5	PAM-2 (07/18/14)	15	PAM-3 (07/21/14)	25		35	
6	PAM-3 (07/18/14)	16	PAM-4 (07/21/14)	26		36	
7	PAM-4 (07/18/14)	17	PAM-21 (07/21/14)	27		37	
8	PAM-21 (07/18/14)	18	PAM-31 (07/21/14)	28		38	
9	PAM-31 (07/18/14)	19	PAM-1 (07/18/14)DUP	29		39	
10	OAM 1 (07/21/14)	20	PAM-1D (07/18/14)DUP	30		40	

Notes:	 		
		_	

Method: Inorganics (EPA Method See Low)

	Ī		Ī-	
Validation Area .	Yes	No	NA	Findings/Comments
I. Technical holding times	,	,	,	
All technical holding times were met.				
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial calibration correlation coefficients > 0.995?				
Were all initial and continuing calibration verification %Rs within the 9 8-110 % QC limits?	/			
Were titrant checks performed as required? (Level IV only)			4	
Were balance checks performed as required? (Level IV only)				
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		1		
IV. Matrix spike/Matrix spike duplicates and Duplicates	,			
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.	/			·
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			·
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 50 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments						
VII. Sample Result Verification										
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/									
Were detection limits < RL?										
VIII. Overall assessment of data										
Overall assessment of data was found to be acceptable.	1									
IX. Field duplicates										
Field duplicate pairs were identified in this SDG.	/									
Target analytes were detected in the field duplicates.	/									
X. Field blanks										
Field blanks were identified in this SDG.	/									
Target analytes were detected in the field blanks.		/								

LDC#	32256A6
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VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:_	<u>\</u> of <u>\</u>
Reviewer:_	3 0
2nd Reviewer:	Ö

Inorganics: Method See Cover

	Concentr			
Analyte	3	4	RPD (≤20)	Qual. Parent Only
Hexavalent Chromium	0.142	0.159	11	

	Concent			
Analyte	12	13	RPD (≤20)	Qual. Parent Only
Hexavalent Chromium	0 .0515	C .0548	6	

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LDC #: 372 SONO

Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: \ of \
Reviewer: <u>ろの</u>
2nd Reviewer:

Method: Inorganics, Method	See Cover
The correlation coefficient (r) for the	ealibration of Cstb was recalculated.Calibration date: 7 23/14

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found X 100</u>

True

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	r or r ²	r or r ²	(Y/N)
Initial calibration		s1	0.05	0.0000154			
		s2	0.10	0.0000386	0.99993	0.99936	
		s3	0.20	0.0000741			
	Cx 2/2	s 4	0.50	0.0001968			9
		s5	1.00	0.0003834)
		s6	2.00	0.0007839			
TCU 10:32	A ().	Found	True				
Calibration verification	Crab	0.4934	Intendooz.		98.7%R	98.788	<u> </u>
au 11:31	Cv26				0.0 0/10		<u>ν</u>
Calibration verification	27	0.4978	. 5000 major		99.6%R	99.5%R	<u> </u>
Calibration verification							

mments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree with	ıin
.0% of the recalculated results	_

LDC #: 32256A6

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page:_	(of \
Reviewer:	30
2nd Reviewer:	

METHOD: Inorganics,	, Method	Geelove	
Percent recoveries (%	R) for a labora	atory control sam	ple and a matrix spike sample were recalculated using the following formula:
%R = <u>Found</u> x 100 True	Where,	Found =	concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
		True = con-	centration of each analyte in the source.
A sample and duplicat	te relative perd	cent difference (R	PD) was recalculated using the following formula:
RPD = <u>[S-D]</u> x 100	Where,	S =	Original sample concentration
(S+D)/2		D =	Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
Sample 1D	Type of Analysis	Liement	(uma)	(units)	%R / RPD	70K / KPD	(174)
LCS 11:01	Laboratory control sample	C426	1.0507mg/ml	1-00 ug/ml	106%R	(06%)	7
2	Matrix spike sample		(SSR-SR)				
9-5 80-51	Duplicate sample	Cr+6	0.0142ng/m3	0.0159ng/w3	11.3% 880	(1.2% \$\$\$	9

Comments: Refer to appropriat	te worksheet for list of qualification	ns and associated samples when repo	orted results do not agree within 10.09	% of the recalculated results.

LDU# 5 6786

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page:_	<u>of</u> _
Reviewer:	SO _
2nd reviewer.	

\	I/AHave resultsI/AAre results was all detect	ow for all questions answered "N". Not a been reported and calculated correctly within the calibrated range of the instruntion limits below the CRQL?	r? nents?	re identified as "N/	'A".
ompo	und (analyte) results t	for	rep	orted with a positi	ve detect wer
oncentr	iated and verified usiri	g the following equation;	naannan*mia	- (. 3.17E-06)	1
[(An	en-Co)/c]=v	Recalculation: (0.0) Main (nglml)(uf) What is a simple of the second secon	0.00367		= 0.0364
Av	ec = 0.0000 111 mA	w*min (ng/ml)(Ut)	(0.00	= (- Li na alua)) (10)	~¹)
ر <i>-</i>	-0.0003925	VG-1001 m ² =2001	. (0.6.	2.25 m3	= 0.0
		1000 11000		T	T ====================================
#	Sample ID	Analyte	Reported Concentration (w)	Calculated Concentration (VQ(M ²)	Acceptable (Y/N)
	. (Cxxx	8810.0	0.0188	7
	2)	0.0142	0.0141	
	3 4		0.0159	0.0159	
	9		0.0175	2.005	
	5		0.0185	0.0184	
	· 6		0.0207	0.0206	
	1	·	0.0184	0.0184	
	8		PO	NO	
	٩		ND	20	
	61		0.0314	0.0314	
	11		0.0250	0.0251	
	\2		0.0515	0.0515	
	13		8420.0	0.0548	
	14		0.0383	0.0383	
	15		0.0394	0.0393	
	16		0-0404	0.0405	
	17		<i>00</i>	0.0	
	18	4	<u> </u>	ND	7
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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/25/14 10:37

07/25/14 10:37 07/22/14

SUBMITTED:

AQS SITE

442 211E

SITE CODE:

Honeywell Hex Chrome Study

Description: (

OAM 1

Lab ID:

Sample Volume:

4072220-01

m³

Sampled: 07/18/14 16:03 Received: 07/22/14 12:08

Analysis Date: 07/23/14 13:18

Comments: 9

Start Time 7/17/14 16:46

Hexavalent Chromium

20.95

Results

ng/m³ Air

Flag

<u>MDL</u>

Hexavalent Chromium

Analyte

CAS Number 1854-02-99

0.0188

ng/m³ Air 0.0036

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Environmental Resources Management, Inc

FILE #: 3926.00

75 Valley Stream Parkway, Suite 400

REPORTED:

07/25/14 10:37

Malvern, PA 19355

SUBMITTED:

m³

07/22/14

ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

SITE CODE:

Honeywell Hex Chrome Study

Description:

OAM 2

Lab ID:

4072220-02

Sampled: 07/18/14 16:17

Matrix:

Air

Sample Volume:

20.68

Received: 07/22/14 12:08

Comments:

Start Time 7/17/14 17:17

Analysis Date: 07/23/14 13:28

Hexavalent Chromium

Results

MDL

Hexavalent Chromium

<u>ng/m³ Air</u>

<u>Flag</u>

ng/m³ Air

Analyte

CAS Number 1854-02-99

FAX: (410) 266-8912

0.0142

0.0036

Malu



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

Col 1 Start Time 7/17/14 18:52

FILE #: 3926.00

REPORTED:

07/25/14 10:37 07/22/14

SUBMITTED:

AQS SITE

CODE:

Honeywell Hex Chrome Study

Description:

Comments:

PAM-1

Lab ID:

4072220-03

Sampled: 07/18/14 17:59

Matrix:

Air

Sample Volume:

20.8

m³

Received: 07/22/14 12:08

Analysis Date: 07/23/14 11:58

Hexavalent Chromium

Results

MDL

Hexavalent Chromium

CAS Number

ng/m³ Air

<u>Flag</u>

<u>ng/m³ Air</u>

Analyte

1854-02-99

0.0159

0.0036

onvally



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

07/25/14 10:37 REPORTED:

07/22/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-1D

Lab ID:

Sample Volume:

4072220-04

Sampled: 07/18/14 18:01

Matrix: Comments:

Col 2 Start Time 7/17/14 18:58

m³

Received: 07/22/14 12:08

Analysis Date: 07/23/14 12:18

Hexavalent Chromium

20.75

Results

<u>MDL</u>

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0175



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-2

Lab ID:

Sample Volume:

4072220-05

m³

<u>Flag</u>

Sampled: 07/18/14 17:28

Received: 07/22/14 12:08 Analysis Date: 07/23/14 13:57

Comments:

Start Time 7/17/14 18:28

Hexavalent Chromium

Results ng/m³ Air

20.7

<u>MDL</u>

ng/m³ Air

Hexavalent Chromium

<u>Analyte</u>

CAS Number 1854-02-99

0.0185

0.0036

cervally



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Matrix:

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/25/14 10:37 07/22/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-3

Lab ID:

Sample Volume:

4072220-06

m³

Sampled: 07/18/14 17:11

Received: 07/22/14 12:08 Analysis Date: 07/23/14 14:07

Comments:

Start Time 7/17/14 18:11

Hexavalent Chromium

Results

ng/m³ Air

20.7

<u>Flaq</u>

MDL

Hexavalent Chromium

Analyte

CAS Number 1854-02-99

0.0207

ng/m³ Air 0.0036

orthaller



Environmental Resources Management, Inc.

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Matrix:

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-4

Lab ID:

Sample Volume:

4072220-07

m³

Sampled: 07/18/14 16:51

Received: 07/22/14 12:08 Analysis Date: 07/23/14 14:17

Comments:

Start Time 7/17/14 17:51

Hexavalent Chromium

Results

ng/m³ Air

20.7

MDL

Analyte Hexavalent Chromium

CAS Number 1854-02-99

0.0184

<u>Flag</u>

ng/m³ Air 0.0036

arvalle



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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Matrix:

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/25/14 10:37 07/22/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-21

Lab ID:

Sample Volume:

4072220-08

m³

Sampled: 07/18/14 00:00

Received: 07/22/14 12:08 Analysis Date: 07/23/14 14:27

Comments:

Hexavalent Chromium

20.7

Results

MDL

Analyte Hexavalent Chromium **CAS Number**

1854-02-99

ng/m³ Air

<u>Flag</u>

ng/m³ Air 0.0036

Malu



Environmental Resources Management, Inc

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Malvern, PA 19355

Description:

Comments:

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

Air

PAM-31

FAX: (410) 266-8912

Lab ID:

4072220-09

Sample Volume:

20.7

m³

FILE #: 3926.00

SUBMITTED:

AQS SITE SITE CODE:

REPORTED: 07/25/14 10:37

Honeywell Hex Chrome Study

Sampled: 07/18/14 00:00

Received: 07/22/14 12:08

Analysis Date: 07/23/14 14:37

Hexavalent Chromium

Results

MDL

07/22/14

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air ND

<u>Flag</u>

ng/m³ Air 0.0036

male



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Matrix:

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/25/14 10:37 07/22/14

SUBMITTED:

AQS SITE

SODE:

Honeywell Hex Chrome Study

Description:

OAM 1

Air

Lab ID:

Sample Volume:

4072220-10

m³

Sampled: 07/21/14 15:20 Received: 07/22/14 12:08

Analysis Date: 07/23/14 14:47

Comments:

Start Time 7/20/14 16:12

Hexavalent Chromium

Results

ng/m³ Air

20.83

<u>Flag</u>

MDL.

Hexavalent Chromium

Analyte

CAS Number 1854-02-99

0.0314

ng/m³ Air 0.0036

Malu



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FILE #: 3926.00

75 Valley Stream Parkway, Suite 400

REPORTED:

07/25/14 10:37

Malvern, PA 19355

SUBMITTED:

07/22/14

ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

FAX: (410) 266-8912

SITE CODE:

Honeywell Hex Chrome Study

Description:

OAM 2

Lab ID:

4072220-11

Sampled: 07/21/14 15:40

Matrix:

Air

Sample Volume:

20.7 m³

Received: 07/22/14 12:08 Analysis Date: 07/23/14 14:57

Comments:

Start Time 7/20/14 16:40

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0250



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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Matrix: Comments:

FAX: (410) 266-8912

Col 1 Start Time 7/20/14 18:08

FILE #: 3926.00

07/25/14 10:37 REPORTED:

SUBMITTED:

07/22/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-1

Lab ID:

Sample Volume:

4072220-12

20.76

m³

Sampled: 07/21/14 17:12 Received: 07/22/14 12:08

Analysis Date: 07/23/14 12:38

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium **CAS Number**

1854-02-99

<u>ng/m³ Air</u> 0.0515

Flag

ng/m³ Air



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Malvern, PA 19355 ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/25/14 10:37

07/22/14

SUBMITTED: **AQS SITE**

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-1D

Lab ID:

Sample Volume:

4072220-13

Sampled: 07/21/14 17:18 Received: 07/22/14 12:08

Analysis Date: 07/23/14 12:57

Matrix: Comments:

Col 2 Start Time 7/20/14 18:12

Hexavalent Chromium

20.78

Results

MDL

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium 1854-02-99 0.0548



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

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Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/25/14 10:37 07/22/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

Comments:

PAM-2

Start Time 7/20/14 17:45

Air

Lab ID:

Sample Volume:

4072220-14

m³

Sampled: 07/21/14 16:56

Received: 07/22/14 12:08 Analysis Date: 07/23/14 15:07

Hexavalent Chromium

20.86

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

<u>ng/m³ Air</u>

Hexavalent Chromium

1854-02-99

0.0383



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PHONE: (443) 803-8495

Matrix:

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-3

Lab ID:

Sample Volume:

4072220-15

m³

Sampled: 07/21/14 16:27

Received: 07/22/14 12:08 Analysis Date: 07/23/14 15:16

Comments:

Start Time 7/20/14 17:27

Hexavalent Chromium

20.7

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0394

<u>Flag</u>

ng/m³ Air 0.0036

orhally



Environmental Resources Management, Inc

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FILE #: 3926.00

REPORTED:

07/25/14 10:37 07/22/14

SUBMITTED:

AQS SITE

SODE:

Honeywell Hex Chrome Study

Description:

PAM-4

Air

Lab ID:

4072220-16

m³

Sampled: 07/21/14 16:09 Received: 07/22/14 12:08

Analysis Date: 07/23/14 15:26

Matrix: Comments:

Start Time 7/20/14 17:09

Hexavalent Chromium

20.7

Results

MDL

Analyte

CAS Number

ng/m³ Air

Sample Volume:

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0404



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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/25/14 10:37 07/22/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

Matrix:

PAM-21

Lab ID:

Sample Volume:

4072220-17

20.86

m³

Sampled: 07/21/14 00:00

Received: 07/22/14 12:08 Analysis Date: 07/23/14 15:56

Comments:

Hexavalent Chromium

Results

ng/m³ Air

MDL

ng/m3 Air

Hexavalent Chromium

Analyte

CAS Number 1854-02-99

ND

<u>Flag</u>



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

Description:

Comments:

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Matrix:

Air

PAM-31

FAX: (410) 266-8912

Lab ID:

4072220-18 Sample Volume:

20.7

m³

FILE #: 3926.00

REPORTED:

SUBMITTED:

AQS SITE SITE CODE:

Honeywell Hex Chrome Study

Sampled: 07/21/14 00:00

Received: 07/22/14 12:08

Analysis Date: 07/23/14 16:06

Hexavalent Chromium

Results

MDL

07/25/14 10:37

07/22/14

Analyte

CAS Number

ng/m³ Air

ng/m³ Air

0.0036

Hexavalent Chromium

1854-02-99

ND

<u>Flag</u>



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

ERM July 29, 2014

5761 N. Church Street Glen Rock, PA 17327 ATTN: Mr. Jeff Boggs

SUBJECT: Harbor Point, MD, Hexavalent Chromium Monitoring, Data Validation

Dear Mr. Boggs,

Enclosed is the final validation report for the fraction listed below. This SDG was received on July 28, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32264:

SDG Fraction

4072332 Hexavalent Chromium

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland, March 2014
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Project Manager/Chemist

62 pages-SF 3 DAY TAT Attachment 1 LDC #32264 (ERM - Morrisville, NC / Harbor Point, MD, Hexavalent Chromium Monitoring) Level IV (3) DATE Cr(VI) DATE DC SDG# REC'D DUE (D7614) Matrix: Air/Water/Soil 07/28/14 | 07/31/14 | 8 | 0 4072332 0 0 0 0 0 0 0 0 0 0 0 0 0 T/CR Γotal

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring

Collection Date: July 22, 2014

LDC Report Date: July 28, 2014

Matrix: Air

Parameters: Hexavalent Chromium

Validation Level: EPA Level IV

Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 4072332

Sample Identification

OAM 1

OAM 2

PAM-1

PAM-1D

PAM-3

PAM-4

PAM-21

PAM-31

PAM-1DUP

PAM-1DDUP

Introduction

This data review covers 10 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per ASTM D7614 for Hexavalent Chromium.

This review follows the Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland (March 2014) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the method blanks.

Sample PAM-31 was identified as a trip blank. No hexavalent chromium was found.

Sample PAM-21 was identified as a field blank. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analysis was not required by the method.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples PAM-1 and PAM-1D were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

	Concentrati	on (ng/m³)				
Analyte	PAM-1	PAM-1D	RPD (Limits)	Flags	A or P	
Hexavalent chromium	0.0422	0.0425	1 (≤20)	-	-	

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Data Qualification Summary - SDG 4072332

No Sample Data Qualified Due to QA/QC Exceedences in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 4072332

No Sample Data Qualified Due to Laboratory Blank Contamination in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Field Blank Data Qualification Summary - SDG 4072332

No Sample Data Qualified Due to Field Blank Contamination in this SDG

LDC #: 32264A6

VALIDATION COMPLETENESS WORKSHEET

Level IV

SDG #: 4072332 Laboratory: Eastern Research Group Page: _\of__\
Reviewer: _\SO_\
2nd Reviewer: _\O

METHOD: Hexavalent Chromium (ASTM D7614)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	Α	Sampling dates: 7/22/14
	Initial calibration	À	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VI.	Duplicates	A	Due.
VII.	Laboratory control samples	A	LUSÍO
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD=(3.4)
Χı	Field blanks	NO	7=FB 8=TB

Note: A = Acceptable

N = Not provided/applicable

ND = No compounds detected

R = Rinsate

D = Duplicate

TB = Trip blank

SW = See worksheet FB = Field blank

EB = Equipment blank

Validated Samples:

1	OAM 1	11	21	31
2	OAM 2	12	22	32
3	PAM-1	13	23	33
4	PAM-1D	14	24	34
5	PAM-3	15	25	35
6	PAM-4	16	26	36
7	PAM-21	17	27	37
8	PAM-31	18	28	38
9	PAM-1DUP	19	29	39
10	PAM-1DDUP	20	30	40

Notes:	 	

Page: f of Z Reviewer: SO 2nd Reviewer:

Method: Inorganics (EPA Method Solver)

Metrod, morganics (El 77 Metrod 2000)	7			
Validation Area .	Yes	No	NA	Findings/Comments
I. Technical holding times	·		, <u> </u>	
All technical holding times were met.	_			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?				
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90 110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			_	
Were balance checks performed as required? (Level IV only)			_	
III. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spike/Matrix spike duplicates and Duplicates	···	·····	······	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			Due
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.	/			
V. Laboratory control samples			<u> </u>	
Was an LCS anaylzed for this SDG?	/			
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?				
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

ALC:

	Page:_ZofZ
	Reviewer: SS
2nd	Reviewer:

Validation Area	Yes	No	NA	Findings/Comments			
VII. Sample Result Verification							
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	~						
Were detection limits < RL?	_						
VIII. Overall assessment of data							
Overall assessment of data was found to be acceptable.							
IX. Field duplicates							
Field duplicate pairs were identified in this SDG.	/						
Target analytes were detected in the field duplicates.	/						
X. Field blanks							
Field blanks were identified in this SDG.							
Target analytes were detected in the field blanks.		. /					

LDC#<u>32264A6</u>

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:	<u> \</u> of <u>_ \</u>
Reviewer:	5
2nd Reviewer:	a

Inorganics: Method See Cover

	Concentra			
Analyte	3		RPD (≤20)	Qual. Parent Only
Hexavalent Chromium	0.0422	0.0425	1	

 $\verb|\LDCFILESERVER|\Validation|\FIELD DUPLICATES|\FD_inorganic|\32264A6.wpd|$

LDC #: 32264A6

Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of
Reviewer: 50
2nd Reviewer: 9

Method: Inorganics, Metho	od <u>See Cover</u>	
The correlation coefficient (r) fo	r the calibration of <u></u>	was recalculated.Calibration date: 7/24/14
An initial or continuing calibration	on verification percent	recovery (%R) was recalculated for each type of analysis using the following formula:
%R = <u>Found X 100</u>	Where,	Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True		True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	r or r ²	r or r ²	(Y/N)
Initial calibration		s1	0.05	0.000014			
		s2	0.10	0.0000351	0.99999	0.99999	
	طد بر	s3	0.20	0.0000761]	-	Ч
	Cr	s4	0.50	0.0001977	<u> </u>		
		s5	1.00	0.0004046			1
		s6	2.00	0.0008229			
ICU 101.19	0 110	Found	True				
Calibration verification	Crab	1 m/po8812.0	,5000nglml	-	102.8%P	102.8%	\
CW 13:20	A .1a						/
Calibration verification	Crab	0.2233	. 5000reglu)		110.7%	110.7%R	9
Calibration verification							

comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within
0.0% of the recalculated results

LDC #: 32264A6

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page:of
Reviewer: > 9
2nd Reviewer: 7

METHOD: Inorganics, Method Section
Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = Found \times 100$ True

Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation

Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$

Where,

S =

Original sample concentration

(S+D)/2

D =

Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS 10:49	Laboratory control sample	Crto	1.097 ng/m)	1.00 ng/m/	110%2	110% E	5
2	Matrix spike sample		(SSR-SR)				
Dup 11:51	Duplicate sample	Crabo	6.04559h	0.0422 19/	7.52%RaD	7.25/890	5)

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LUU #. JUTU INY

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: of Neviewer: So

METH	HOD: Inorganics, Meth	od See Cove	•	•	
Pteas Y N Y N Y N	N/A Have results N/A Are results	low for all questions answered "N". Not apps been reported and calculated correctly? within the calibrated range of the instrumer ction limits below the CRQL?	·	re identified as "N/	'A".
Comp	ound (analyte) results		rep	orted with a positi	ve detect were
		ng the following equation:	1 ^{FU} AW <i>PBPI</i> 00C	4in - 7,56E-	06)
Ave	USP1000.0 = 2	nin toam	414000.0		= 0.553
کی در ج	= 7.56E-06	uf-10ml (ng/ml)(uf) = ng/m3		22.18	
·		W. S. W.		22.18	= 0.224 ng
#	Sample ID	Analyte	Reported Concentration (\(\sum_{\subset}^{\suppless}^{\suppless} \))	Calculated Concentration (Na) ²)	Acceptable (Y/N)
	. 1	Cr +10	0.0527	0.0527	4
	2		0.0458	0-0458	
	3		0.0422	0.0422	
	4		0.0425	0.0426	
	2		0.0465	0.0465	
	· · · 6		0-224	0.724	
	7	·	NO 04	20	
	8	4	NO	ND	V
		 			
		·			
		<u> </u>			
Note:					
		 .			



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

OAM 1

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/28/14 11:57

SITE CODE:

SUBMITTED:

07/23/14

AQS SITE CODE:

Start Time 7/21/14 15:24

Lab ID:

4072332-01

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

Hexavalent Chromium

Sample Volume:

21.51

m³

Sampled: 07/22/14 15:18 Received: 07/23/14 11:55

Analysis Date: 07/24/14 12:21

Hexavalent Chromium

<u>Results</u> ng/m³ Air <u>MDL</u>

Analyte

CAS Number 1854-02-99

0.0527

Flag

ng/m³ Air 0.0036

onpalu



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/28/14 11:57

SUBMITTED:

07/23/14

AQS SITE CODE:

OAM 2

Start Time 7/21/14 15:42

4072332-02

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

Air

Lab ID:

Sample Volume:

21.62

m³

Sampled: 07/22/14 15:44 Received: 07/23/14 11:55

Analysis Date: 07/24/14 12:31

Hexavalent Chromium

Results ng/m³ Air <u>MDL</u>

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

0.0458

Flag

ng/m³ Air

0.0036

centralin



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Col 1 Start Time 7/21/14 17:19

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: SUBMITTED:

07/28/14 11:57 07/23/14

AQS SITE CODE:

SITE CODE:

<u>Flag</u>

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-1

Lab ID:

Sample Volume:

4072332-03

22.05

m³

Sampled: 07/22/14 17:49 Received: 07/23/14 11:55

Analysis Date: 07/24/14 11:41

Hexavalent Chromium

Results ng/m³ Air

MDL ng/m³ Air

Analyte Hexavalent Chromium CAS Number 1854-02-99

0.0422

0.0036

01/29/14



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: SUBMITTED: 07/28/14 11:57 07/23/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Air

Lab ID:

Sample Volume:

4072332-04

22.08 m³ Sampled: 07/22/14 17:55

Received: 07/23/14 11:55 Analysis Date: 07/24/14 12:01

Matrix: Comments:

Col 2 Start Time 7/21/14 17:23

Hexavalent Chromium

Results <u>ng/m³ Air</u>

MDL ng/m³ Air

Hexavalent Chromium

Analyte

CAS Number 1854-02-99

0.0425

Flag

0.0036

027/29/14



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/28/14 11:57 SUBMITTED:

07/23/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-3

Start Time 7/21/14 16:32

Lab ID:

Sample Volume:

4072332-05

m³

Sampled: 07/22/14 17:08

Received: 07/23/14 11:55 Analysis Date: 07/24/14 12:41

Hexavalent Chromium

22.14

Resuits ng/m³ Air <u>MDL</u>

Analyte

CAS Number

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0465

0.0036

ortraller



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/28/14 11:57

SITE CODE:

SUBMITTED:

07/23/14

AQS SITE CODE:

PAM-4

4072332-06

Honeywell Hex Chrome Study

Analysis Date: 07/24/14 12:51

Description: Matrix:

Lab ID:

Sample Volume:

22.18 m³ Sampled: 07/22/14 16:53

Received: 07/23/14 11:55

Comments:

Start Time 7/21/14 16:14

Hexavalent Chromium

Results ng/m³ Air

<u>Flag</u>

<u>MDL</u>

Hexavalent Chromium

Analyte

CAS Number 1854-02-99

0.224

ng/m³ Air 0.0036

antaler



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/28/14 11:57

SUBMITTED:

07/23/14

AQS SITE CODE:

PAM-21

Lab ID:

4072332-07

Sample Volume:

m³

<u>Flag</u>

SITE CODE:

Honeywell Hex Chrome Study

Sampled: 07/22/14 00:00

Received: 07/23/14 11:55 Analysis Date: 07/24/14 13:01

Comments:

Matrix:

Description:

Hexavalent Chromium

Results ng/m³ Air

ND

MDL ng/m³ Air

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

22.14

0.0036



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/28/14 11:57

SUBMITTED:

07/23/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-31

Lab ID:

Sample Volume:

4072332-08

22.14

 m^3

Sampled: 07/22/14 00:00 Received: 07/23/14 11:55

Analysis Date: 07/24/14 13:11

Hexavalent Chromium

Results ng/m³ Air <u>MDL</u>

Hexavalent Chromium

Analyte

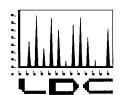
CAS Number 1854-02-99

ND

<u>Flag</u>

ng/m3 Air 0.0036

01/29/14



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

ERM July 31, 2014

5761 N. Church Street Glen Rock, PA 17327 ATTN: Mr. Jeff Boggs

SUBJECT: Harbor Point, MD, Hexavalent Chromium Monitoring, Data Validation

Dear Mr. Boggs,

Enclosed is the final validation report for the fraction listed below. This SDG was received on July 30, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32292:

SDG Fraction

4072519 Hexavalent Chromium

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland, March 2014
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Project Manager/Chemist

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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring

Collection Date: July 23 through July 24, 2014

LDC Report Date: July 31, 2014

Matrix: Air

Parameters: Hexavalent Chromium

Validation Level: EPA Level IV

Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 4072519

Sample Identification

OAM 1 (07/23/14) PAM-1 (07/24/14)DUP OAM 2 (07/23/14) PAM-1D (07/24/14)DUP

PAM-1 (07/23/14)

PAM-1D (07/23/14)

PAM-2 (07/23/14) PAM-3 (07/23/14)

PAM-4 (07/23/14)

PAM-21 (07/23/14)

PAM-31 (07/23/14)

OAM 1 (07/24/14)

OAM 2 (07/24/14)

PAM-1 (07/24/14)

PAM-1D (07/24/14)

PAM-2 (07/24/14)

PAM-3 (07/24/14)

PAM-4 (07/24/14)

PAM-21 (07/24/14)

PAM-31 (07/24/14)

PAM-1 (07/23/14) DUP

PAM-1D (07/23/14)DUP

The date was appended to the sample ID to differentiate between samples.

Introduction

This data review covers 22 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per ASTM D7614 for Hexavalent Chromium.

This review follows the Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland (March 2014) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the method blanks.

Samples PAM-31 (07/23/14) and PAM-31 (07/24/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (07/23/14) and PAM-21 (07/24/14) were identified as field blanks. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analysis was not required by the method.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples PAM-1 (07/23/14) and PAM-1D (07/23/14) and PAM-1 (07/24/14) and PAM-1D (07/24/14) were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

	Concentrat	ion (ng/m³)			
Analyte	PAM-1 (07/23/14)	PAM-1D (07/23/14)	RPD (Limits)	Flags	A or P
Hexavalent chromium	0.0911	0.0979	7 (≤20)	-	-

	Concentrat	ion (ng/m³)			
Analyte	PAM-1 (07/24/14)	PAM-1D (07/24/14)	RPD (Limits)	Flags	A or P
Hexavalent chromium	0.0384	0.0325	17 (≤20)	-	-

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Data Qualification Summary - SDG 4072519

No Sample Data Qualified Due to QA/QC Exceedences in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 4072519

No Sample Data Qualified Due to Laboratory Blank Contamination in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Field Blank Data Qualification Summary - SDG 4072519

No Sample Data Qualified Due to Field Blank Contamination in this SDG

LDC #: 32292A6 SDG #: 4072519

VALIDATION COMPLETENESS WORKSHEET

Level IV

Laboratory: Eastern Research Group

Reviewer: 5 2nd Reviewer: 02

METHOD: Hexavalent Chromium (ASTM D7614)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 7/23 - 24 / 14
ll ll	Initial calibration	A	
111.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS10
VIII.	Sample result verification	Á	
IX.	Overall assessment of data	Ä	
X.	Field duplicates	5W	FD=(3,4) (12,13)
xı	Field blanks	ND	FB= 8 2 17 TB= 9 2 18

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	OAM 1 (07/23/14)	11	OAM 2 (07/24/14)	21	PAM-1 (07/24/14)DUP	31	
2	OAM 2 (07/23/14)	12	PAM-1 (07/24/14)	22	PAM-1D (07/24/14)DUP	32	
3	PAM-1 (07/23/14)	13	PAM-1D (07/24/14)	23		33	
4	PAM-1D (07/23/14)	14	PAM-2 (07/24/14)	24		34	
5	PAM-2 (07/23/14)	15	PAM-3 (07/24/14)	25		35	
6	PAM-3 (07/23/14)	16	PAM-4 (07/24/14)	26		36	
7	PAM-4 (07/23/14)	17	PAM-21 (07/24/14)	27		37	
8	PAM-21 (07/23/14)	18	PAM-31 (07/24/14)	28		38	
9	PAM-31 (07/23/14)	19	PAM-1 (07/23/14)DUP	29		39	
10	OAM 1 (07/24/14)	20	PAM-1D (07/23/14)DUP	30		40	

Notes:	 		

Method: Inorganics (EPA Method Section)

Wethod, morganics (EFA Wethod Section)	T			
Validation Area .	Yes	No	NA	Findings/Comments
I. Technical holding times	,	,	,	
All technical holding times were met.				
Cooler temperature criteria was met.	1			
II. Calibration		<i></i> _		
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?				
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110 % QC limits?	/			
Were titrant checks performed as required? (Level IV only)			_	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks	, -			
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			DUP
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.	/			
V. Laboratory control samples		·		
Was an LCS anayized for this SDG?	/			
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control	· · · · · · · · · · · · · · · · · · ·			
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?				

VALIDATION FINDINGS CHECKLIST

Page: ZofZ Reviewer: SO 2nd Reviewer: C

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification	·			
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?	/			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	(
X. Field blanks				
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.		./		

LDC#_32292A6__

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page: _of_ Reviewer: _____ 2nd Reviewer: ______

Inorganics: Method See Cover

	Concentra			
Analyte	3	4	RPD (≤20)	Qual.
Hexavalent Chromium	0.0911	0.0979	7	

	Concentra			
Analyte	12	13	RPD (≤20)	Qual.
Hexavalent Chromium	0.0384	0.0325	17	

 $\verb|\LDCFILESERVER|\Validation|\FIELD DUPLICATES|\FD_inorganic|\32292A6.wpd|$

LDC #: 3229246

Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page:(_ of
Reviewer: 30
2nd Reviewer:

Method: Inorganics, Method <u>Se</u>	e Cover	
The correlation coefficient (r) for the calib	ration of <u></u>	was recalculated.Calibration date: 1/28/14
An initial or continuing calibration verifica	ation percent re	covery (%R) was recalculated for each type of analysis using the following formula:
%R = <u>Found X 100</u>	Where,	Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	r or r ²	r or r ²	(Y/N)
Initial calibration		s1	0.50	0.000021			
		s2	0.10	0.0000413	0.99988	0.99988	
		s3	0.20	0.0000872			
	طلعب	s4	0.50	0.0002191			5
		s5	1.00	0.0004193			_
		s6	2.00	0.00086			
エン いいろ Calibration verification	Crtb	5000d 0.4983mg/ml	True 0.5 ng/ml		99.7.6R	917%E	3)
CCO \2:\2 Calibration verification	Cv+6	0.509ug/n/	0.Sng/ml		1018%P	101,9%2	5)
Calibration verification							

Comments: Refer to Calibration \	Verification findings worksheet for	list of qualifications and associate	ed samples when reported r	esults do not agree within
10.0% of the recalculated results				

LDC #: 32292126

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: <u>l</u> of <u>l</u>	
Reviewer:	
2nd Reviewer:	

		1	r -
METHOD: Inorganics,	Method	See	Cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100 True

Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$

Where.

S =

Original sample concentration

(S+D)/2

D =

Duplicate sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R / RPD	%R / RPD	Acceptable (Y/N)
ies 11:42	Laboratory control sample	Crth	1.045 ng/m)	1.00 mg/m)	105%R	105%P	y
N	Matrix spike sample		(SSR-SR)				
Dup.	Duplicate sample	Cr +10	0.0897 ng/m³	0.0911/ng/m3	1.55% RPD	1.56%R9D	5)

Comr	nents: Refer to appropriate	e worksheet for list of qu	ialifications and asso	ociated samples when	reported results do no	ot agree within 10.0% of the	recalculated results.
	•	7-4					
						_	
			··· ·				

LDC #: 32292146

C= 0.0004287

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page:_	<u></u> of \
Reviewer:	OR
2nd reviewer. ⁻	(1/

METHOD: Inorganics, Method See Cover	
Please see qualifications below for all questions answered "N". Not applicable Y N N/A Have results been reported and calculated correctly? Y N N/A Are results within the calibrated range of the instruments? Y/N N/A Are all detection limits below the CRQL?	e questions are identified as "N/A".
Y/N N/A Are all detection limits below the CRQL?	
Compound (analyte) results for	reported with a positive detect were
recalculated and verified using the following equation:	,
	\Box

Aren-0.0000256mAv*min (rg/ml)(vf)
Co=413E-07

W=10m/Recalculation: (0.0000856mA0*Min-(-4.13=01)] /0.0004287 = m3 = 22.03 (0.2006 rg/m) (10m) (0.0004287 = 0.0911 rg/m) (2.0004287 = 0.0911 rg/m)

#	Sample ID	Analyte	Reported Concentration (vs.\w ²)	Calculated Concentration (พฤเพ ²)	Acceptable (Y/N)
	1	Crip	0.111	0.111	3
	2		0.0202	0.0202	\
	3		0.0911	1190.0	
	4		0.0979	0.0979	
	2		0.0774	0.0744	
	6		0.0365	0.0365	
	7		0.128	0.128	
	8		ND	20	
	9		NO	NO 04	
	lo		0.0204	0.0205	
	11		0.0229	0.025	
	12		4850.0	4850.0	
	13		0.0325	0.0325	
	14		0.0614	0.0614	
	12		0.0272	0.0272	
	16		0-0290	0.0140	
	17		<i>DD</i>	m2	
	18	4	PD	ND	4
					· · · · · · · · · · · · · · · · · · ·

Note:		



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/31/14 11:38

SUBMITTED: 07/25/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

OAM 1

Air

Lab ID:

Sample Volume:

4072519-01

22.24 m³ Sampled: 07/23/14 16:13

Received: 07/25/14 11:35 Analysis Date: 07/28/14 15:00

Comments:

Start Time 7/22/14 15:30

Hexavalent Chromium

Results

0.111

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air

<u>Flag</u>

ng/m³ Air

0.0036

JUL 3 1 2014

Initials: CR



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/31/14 11:38

07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

OAM 2

Air

Lab ID:

Sample Volume:

4072519-02

22.17

m³

Sampled: 07/23/14 16:29 Received: 07/25/14 11:35

Analysis Date: 07/28/14 15:10

Comments:

Start Time 7/22/14 15:51

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0202

Flag

ng/m³ Air

0.0036

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Page 4 of 22



Environmental Resources Management, Inc

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Malvern, PA 19355

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PHONE: (443) 803-8495

FAX: (410) 266-8912

Col 1 Start Time 7/22/14 17:55

FILE #: 3926.00

REPORTED: 07/31/14 11:38

07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

Comments:

PAM-1

Lab ID:

4072519-03

Sampled: 07/23/14 18:23

Matrix:

Air

Sample Volume:

22.03

m³

Received: 07/25/14 11:35

Analysis Date: 07/28/14 12:42

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0911

0.0036

JUL 3 1 2014

Initials: CR



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

Col 2 Start Time 7/22/14 17:59

FILE #: 3926.00

REPORTED:

07/31/14 11:38 07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

Comments:

PAM-1D

Lab ID:

4072519-04

m³

Sampled: 07/23/14 18:30

Matrix:

Air

Sample Volume:

22.07

Received: 07/25/14 11:35

Analysis Date: 07/28/14 13:01

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0979

0.0036

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Page 6 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

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Description:

Comments:

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

PAM-2

Air

FAX: (410) 266-8912

4072519-05

Sample Volume:

Lab ID:

m³

SUBMITTED:

SITE CODE:

AQS SITE CODE:

FILE #: 3926.00

REPORTED: 07/31/14 11:38

Honeywell Hex Chrome Study

Sampled: 07/23/14 18:04 Received: 07/25/14 11:35

Analysis Date: 07/28/14 15:20

Hexavalent Chromium

22.03

Results ng/m³ Air <u>MDL</u>

07/25/14

Analyte CAS Number Hexavalent Chromium

Start Time 7/22/14 17:35

1854-02-99

0.0774

<u>Flag</u>

ng/m³ Air

0.0036

JUL 3 1 2014



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

Description:

Comments:

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

Air

PAM-3

FAX: (410) 266-8912

Start Time 7/22/14 17:14

Lab ID:

Sample Volume:

4072519-06

m³

FILE #: 3926.00

SUBMITTED:

SITE CODE:

AQS SITE CODE:

REPORTED: 07/31/14 11:38

Honeywell Hex Chrome Study

Sampled: 07/23/14 17:41

Received: 07/25/14 11:35 Analysis Date: 07/28/14 15:30

Hexavalent Chromium

Results

<u>MDL</u>

07/25/14

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0365

<u>Flaq</u>

ng/m³ Air

0.0036

JUL 3 1 2014

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

REPORTED: 07/31/14 11:38 07/25/14

SUBMITTED:

FILE #: 3926.00

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-4 Air

Lab ID:

Sample Volume:

4072519-07

m³

Sampled: 07/23/14 17:24 Received: 07/25/14 11:35

Analysis Date: 07/28/14 15:40

Comments:

Start Time 7/22/14 17:00

Hexavalent Chromium

21.95

Results

MDL

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.128

0.0036

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 07/31/14 11:38

07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

Comments:

PAM-21

Lab ID:

4072519-08

Sampled: 07/23/14 00:00

Matrix:

Air

Sample Volume:

m³

Received: 07/25/14 11:35

Analysis Date: 07/28/14 15:50

Hexavalent Chromium

22.03

Results

MDL

Analyte Hexavalent Chromium

<u>Flaq</u>

ng/m³ Air

ng/m³ Air **CAS Number**

1854-02-99

ND

0.0036

JUL 3 1 2014

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Page 10 of 22



Environmental Resources Management, Inc

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/31/14 11:38

SUBMITTED: 07/25/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

PAM-31

Lab ID:

Sample Volume:

4072519-09

22

m³

Sampled: 07/23/14 00:00

Received: 07/25/14 11:35 Analysis Date: 07/28/14 16:00

Comments:

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air ND

<u>Flag</u>

ng/m³ Air 0.0036

JUL 3 1 2014

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Environmental Resources Management, Inc

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/31/14 11:38 07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

OAM 1

Lab ID:

Sample Volume:

4072519-10

m³

Sampled: 07/24/14 16:40 Received: 07/25/14 11:35

Analysis Date: 07/28/14 17:39

Comments:

Start Time 7/23/14 16:19

Hexavalent Chromium

21.91

Results

Flag

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0204

<u>ng/m³ Air</u> 0.0036

JUL 3 1 2014



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

Description: Matrix:

Comments:

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Δir

OAM 2

Start Time 7/23/14 16:37

FAX: (410) 266-8912

Lab ID:

4072519-11

Sample Volume:

21.96

m³

FILE #: 3926.00

REPORTED:

SUBMITTED:

SITE CODE:

AQS SITE CODE:

Honeywell Hex Chrome Study

Sampled: 07/24/14 17:02 Received: 07/25/14 11:35

Analysis Date: 07/28/14 16:19

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0229

Flag

ng/m³ Air

07/31/14 11:38

07/25/14

0.0036

JUL 3 1 2014

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Page 13 of 22



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ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/31/14 11:38 07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-1 Air

Lab ID:

Sample Volume:

4072519-12

m³

Sampled: 07/24/14 18:29

Received: 07/25/14 11:35 Analysis Date: 07/28/14 14:19

Comments:

Col 1 Start Time 7/23/14 18:29

Hexavalent Chromium

21.6

Results ng/m³ Air MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

0.0384

<u>Flag</u>

ng/m³ Air

0.0036

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Page 14 of 22



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FILE #: 3926.00

REPORTED:

07/31/14 11:38

SUBMITTED:

07/25/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-1D

Air

Lab ID:

Sample Volume:

4072519-13

Sampled: 07/24/14 18:35 Received: 07/25/14 11:35

Analysis Date: 07/28/14 13:56

Matrix: Comments:

Col 2 Start Time 7/23/14 18:36

Hexavalent Chromium

21.59

Results

0.0325

<u>MDL</u>

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air

<u>Flag</u>

ng/m³ Air

0.0036

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Matrix:

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/31/14 11:38 07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-2

Lab ID:

Sample Volume:

4072519-14

m³

Sampled: 07/24/14 18:08

Received: 07/25/14 11:35 Analysis Date: 07/28/14 16:29

Comments:

Start Time 7/23/14 18:11

Hexavalent Chromium

21.55

Results

MDL

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0614

0.0036

JUL 3 1 2014



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/31/14 11:38

07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-3

Air

Lab ID:

Sample Volume:

4072519-15

m³

Sampled: 07/24/14 17:49 Received: 07/25/14 11:35

Analysis Date: 07/28/14 16:59

Comments:

Start Time 7/23/14 17:47

Hexavalent Chromium

21.64

Results

<u>MDL</u>

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0272

0.0036

JUL 3 1 2014



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/31/14 11:38

07/25/14 SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-4

Air

Lab ID:

Sample Volume:

4072519-16

m³

Sampled: 07/24/14 17:32

Received: 07/25/14 11:35 Analysis Date: 07/28/14 17:09

Matrix: Comments:

Start Time 7/23/14 17:31

Hexavalent Chromium

21.62

Results

<u>MDL</u>

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0290

0.0036

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Page 18 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/31/14 11:38

07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

PAM-21

Lab ID:

Sample Volume:

4072519-17

m³

Sampled: 07/24/14 00:00

Received: 07/25/14 11:35 Analysis Date: 07/28/14 17:19

Comments:

Hexavalent Chromium

21.55

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air ND

<u>Flag</u>

ng/m³ Air

0.0036

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Page 19 of 22



Environmental Resources Management, Inc

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/31/14 11:38 07/25/14

SUBMITTED:

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-31

Air

Lab ID:

Sample Volume:

4072519-18

m³

Sampled: 07/24/14 00:00

Received: 07/25/14 11:35 Analysis Date: 07/28/14 17:29

Matrix: Comments:

Hexavalent Chromium

21.64

Results

CAS Number

ng/m³ Air

<u>Flaq</u>

MDL ng/m³ Air

Hexavalent Chromium

Analyte

1854-02-99

0.0036

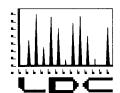
JUL 3 1 2014

Initials: CR

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Page 20 of 22



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

ERM August 4, 2014

5761 N. Church Street Glen Rock, PA 17327 ATTN: Mr. Jeff Boggs

SUBJECT: Harbor Point, MD, Hexavalent Chromium Monitoring, Data Validation

Dear Mr. Boggs,

Enclosed is the final validation report for the fraction listed below. This SDG was received on August 1, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32324:

SDG Fraction

4072918

Hexavalent Chromium

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland, March 2014
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Christina Rink

Sincerely,

Project Manager/Chemist

(74 pages-SF	3 DAY					· .									chn												<u> </u>											
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LDC	SDG#	DATE REC'D	(3) DATE DUE	Cri (D7	(VI) 614)																		_																
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Total	T/CR			9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring

Collection Date: July 25, 2014

LDC Report Date: August 4, 2014

Matrix: Air

Parameters: Hexavalent Chromium

Validation Level: EPA Level IV

Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 4072918

Sample Identification

OAM 1

OAM 2

PAM-1

PAM-1D

PAM-2

PAM-3

PAM-4

PAM-21

PAM-31

PAM-1DUP

PAM-1DDUP

Introduction

This data review covers 11 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per ASTM D7614 for Hexavalent Chromium.

This review follows the Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland (March 2014) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the method blanks.

Sample PAM-31 was identified as a trip blank. No hexavalent chromium was found.

Sample PAM-21 was identified as a field blank. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analysis was not required by the method.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples PAM-1 and PAM-1D were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

	Concentrati	on (ng/m³)	222		
Analyte	PAM-1	PAM-1D	RPD (Limits)	Flags	A or P
Hexavalent chromium	0.0347	0.0293	17 (≤20)	-	-

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Data Qualification Summary - SDG 4072918

No Sample Data Qualified Due to QA/QC Exceedences in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 4072918

No Sample Data Qualified Due to Laboratory Blank Contamination in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Field Blank Data Qualification Summary - SDG 4072918

No Sample Data Qualified Due to Field Blank Contamination in this SDG

LDC #: 32324A6

VALIDATION COMPLETENESS WORKSHEET

Level IV

SDG #: 4072918 Laboratory: Eastern Research Group Page: of \
Reviewer: \(\sum_{\text{2}} \)
2nd Reviewer: \(\sum_{\text{2}} \)

METHOD: Hexavalent Chromium (ASTM D7614)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 7/25/14
11	Initial calibration	A	
111.	Calibration verification	H	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Nonrequired
VI.	Duplicates	A	OQ C
VII.	Laboratory control samples	A	LOSO
VIII.	Sample result verification	A	•
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(3,4)
xı_	Field blanks	NO	FB=8 TB=9

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

PAM-1DUP

1	OAM 1	11	PAM-1DDUP	21	31	
2	OAM 2	12		22	32	
3	PAM-1	13		23	 33	
4	PAM-1D	14		24	34	
5	PAM-2	15		25	35	
6	PAM-3	16		26	36	
7	PAM-4	17		27	37	
8	PAM-21	18		28	38	
9	PAM-31	19		29	39	

Notes:		•

20

Page: _ of \alpha Reviewer: _ CA 2nd Reviewer: _ SM

Method: Inorganics (EPA Method Second)

Wethod:Inorganics (EPA Method Secore)				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	·			
All technical holding times were met.				
Cooler temperature criteria was met.				
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?	Ĺ,			
Were all initial calibration correlation coefficients > 0.995?				
Were all initial and continuing calibration verification %Rs within the 9を110% QC limits?				
Were titrant checks performed as required? (Level IV only)				
Were balance checks performed as required? (Level IV only)				
III. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks ∨alidation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				Dponly
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.				
V. Laboratory control samples				
Was an LCS anaytzed for this SDG?	\			
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?				
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				

DC#: 32324AC

VALIDATION FINDINGS CHECKLIST

Page: O of Reviewer: VI

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	_			
Were detection limits < RL?	/			
VIII. Overall assessment of data	,			
Overall assessment of data was found to be acceptable.				·
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		,		
Target analytes were detected in the field duplicates.				
X. Field blanks				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.		/		

LDC#<u>32324A6</u>

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:_	of 1
Reviewer:_	a
2nd Reviewer:	50

Inorganics: Method See Cover

	Concentrat	Concentration (ng/m3)						
Analyte	3	4	RPD (≤20)	Qual.				
Hexavalent Chromium	0.0347	0.0293	17					

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32324A6.wpd

I DC #•	32324Ab
LDC #:	

Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: \ of	, 1
Reviewer:	
2nd Reviewer:_	Sh

iviethod: inorganics, MethodS	ee Cover									
The correlation coefficient (r) for the calif	oration of <u>C</u>	was recalculated.Calibration date: 7/36/19								
An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:										
%R = <u>Found X 100</u>	Where,	Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution								
True		True = concentration of each analyte in the ICV or CCV source								

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	r or r ²	r or r²	(Y/N)
Initial calibration		s1	0.1	0.0000193			
		s2	0.1	0.0000425	0.99989	0.99989	
	Cot	s3	0.2	0.0000817			Y
		s4	0.5	0.0002096			,
		s5	1	0.0004135			
		s6	2	0.0008529			
Calibration verification		ŒU	Tive (19/m2)	Forderglmi) 0,5007	100		
Calibration verification		Cul	0,5	0.5095	102	_	
Calibration verification							

Comments: Refer to Calibration Verification findings worksh	heet for list of qualifications and ass	sociated samples when reported	results do not agree withi
10.0% of the recalculated results			

LDC #: 3 2324#

VALIDATION FINDINGS WORKSHEET <u>Level IV Recalculation Worksheet</u>

Page: of	
Reviewer: 93	
2nd Reviewer: Soc	_

wie inob: morganics	s, Method		
Percent recoveries (%	%R) for a labo	ratory control sam	ole and a matrix spike sample were recalculated using the following formula:
%R = <u>Found</u> x 100 True	Where,	. Found =	concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{|S-D|} \times 100$ (S+D)/2

Where,

S =

Original sample concentration

D =

580 CO 201

Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LES	Laboratory control sample	Q6+	1,06°3/mL	1.00 19/mL	106	106	7
N	Matrix spike sample		(SSR-SR)			•	
10	Duplicate sample	003°	0,03709/23	0.034719/2	6,42	6,24	9

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported result	s do not agree within 10.0% of the recalculated results.

LDC#: 32374A6

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page:_	of(
Reviewer:_	02
nd reviewer:	SV

METH	IOD: Inorganics, Metho	od_Selcov	er_				
/Y N	N/A Are results w	ow for all questions been reported and vithin the calibrated tion limits below th	d calculated I range of th	correctly? e instrument	·	e identified as "N/	A".
Comp recalc	ound (analyte) results f ulated and verified usin	for ig the following eq	<u> </u>		repo	orted with a positi	ve detect were
Concen	tration = 5,000476x -0,0	000342	Recalculatio	n: 0,000 0,000	0.0000342 426	x 10m L 21.51m3	=0,01077
#	Sample ID		Analyte		Reported Concentration (NC) _m 3)	Calculated Concentration	Acceptable (Y/N)
	1		*	Q6+	0.0107	0,8107	Y
	<u>a</u>				0.0110	00111	
	<u> </u>				0.0347	00311	
	5				0.0176	0,0175	
	7				0,0171	0.0171	
			·				
				:			
			·	· · · · · ·	! 		
Note:_							



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Matrix:

FAX: (410) 266-8912

Start Time 7/24/14 16:45

FILE #: 3926.00

REPORTED:

08/01/14 13:11 07/29/14

SUBMITTED:

AQS SITE

SUPECODE:

Honeywell Hex Chrome Study

Description:

Comments:

OAM 1

Lab ID:

Sample Volume:

4072918-01

21.51

 m^3

Sampled: 07/25/14 16:39 Received: 07/29/14 11:30

Analysis Date: 07/30/14 13:27

Hexavalent Chromium

Results

MDL

<u>Analyte</u> **Hexavalent Chromium** **CAS Number** 1854-02-99

ng/m³ Air 0.0107

<u>Flag</u>

ng/m³ Air

0.0036

AUG 0 4 2014



Environmental Resources Management, Inc.

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

Comments:

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

OAM 2

Lab ID:

4072918-02

21.48

m³

Sampled: 07/25/14 16:57 Received: 07/29/14 11:30

Analysis Date: 07/30/14 13:36

Start Time 7/24/14 17:05

Hexavalent Chromium Results

Sample Volume:

ng/m³ Air

Flag

MDL ng/m³ Air

Hexavalent Chromium

Analyte

CAS Number 1854-02-99

0.0110

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 4 of 13



Environmental Resources Management, Inc.

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

Col 1 Start Time 7/24/14 18:34

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

SITE CODE:

m³

Honeywell Hex Chrome Study

Description: Matrix:

PAM-1

Lab ID:

Sample Volume:

4072918-03

21.45

Sampled: 07/25/14 18:24

Received: 07/29/14 11:30

Analysis Date: 07/30/14 14:56

Hexavalent Chromium

Results

ng/m³ Air

<u>Flag</u>

<u>MDL</u>

Hexavalent Chromium

Analyte

Comments:

CAS Number 1854-02-99

0.0347

ng/m3 Air

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 5 of 13



Environmental Resources Management, Inc.

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 13:11

07/29/14 SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

PAM-1D

Lab ID:

4072918-04

m³

Flag

Sampled: 07/25/14 18:26

Received: 07/29/14 11:30 Analysis Date: 07/30/14 15:16

Comments:

Col 2 Start Time 7/24/14 18:39

Hexavalent Chromium

21.4

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

Sample Volume:

ng/m³ Air 0.0293

ng/m³ Air

0.0036

AUG 0 4 2014



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

Comments:

PHONE: (443) 803-8495

Start Time 7/24/14 18:12

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

07/29/14

08/01/14 13:11

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2 Lab ID:

Sample Volume:

4072918-05

m³

Sampled: 07/25/14 18:01

Analysis Date: 07/30/14 13:46

Received: 07/29/14 11:30

Hexavalent Chromium

21.44

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0176

<u>Flag</u>

ng/m³ Air

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 7 of 13



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

Hexavalent Chromium

PAM-3 Air

Lab ID:

Sample Volume:

4072918-06

Sampled: 07/25/14 17:47 Received: 07/29/14 11:30

Start Time 7/24/14 17:56

m³

Analysis Date: 07/30/14 13:56

Hexavalent Chromium

Results

CAS Number

ng/m³ Air

21.46

MDL ng/m³ Air

Analyte

1854-02-99

ND

<u>Flag</u>

0.0036

AUG 0 4 2014



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

Description:

Comments:

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 13:11

SUBMITTED:

07/29/14

AQS SITE

Lab ID: 4072918-07 SITE CODE:

Honeywell Hex Chrome Study

Start Time 7/24/14 17:37

PAM-4 Air

Sample Volume:

21.48

m³

Sampled: 07/25/14 17:30 Received: 07/29/14 11:30

Analysis Date: 07/30/14 14:06

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0171

<u>Flag</u>

ng/m³ Air

0.0036

AUG 0 4 2014



Environmental Resources Management, Inc

PAM-21

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

Description:

Comments:

Matrix:

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

08/01/14 13:11 REPORTED:

07/29/14 SUBMITTED:

AQS SITE

SITE CODE:

m³

Honeywell Hex Chrome Study

4072918-08 21.44

Sampled: 07/25/14 00:00 Received: 07/29/14 11:30

Analysis Date: 07/30/14 14:16

Hexavalent Chromium

Results

MDL

Analyte CAS Number Hexavalent Chromium

1854-02-99

Lab ID:

Sample Volume:

ng/m³ Air ND

<u>Flag</u>

ng/m³ Air

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 10 of 13



Environmental Resources Management, Inc.

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

08/01/14 13:11 REPORTED:

SUBMITTED: 07/29/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-31

Lab ID:

Sample Volume:

4072918-09

21.46

m³

Sampled: 07/25/14 00:00 Received: 07/29/14 11:30

Analysis Date: 07/30/14 14:46

Hexavalent Chromium

<u>Results</u>

ng/m³ Air

Flag

<u>MDL</u> ng/m³ Air

Hexavalent Chromium

Analyte

CAS Number 1854-02-99

ND

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Page 11 of 13



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

ERM August 4, 2014

5761 N. Church Street Glen Rock, PA 17327 ATTN: Mr. Jeff Boggs

SUBJECT: Harbor Point, MD, Hexavalent Chromium Monitoring, Data Validation

Dear Mr. Boggs,

Enclosed is the final validation report for the fraction listed below. This SDG was received on August 1, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32330:

SDG Fraction

4073035 Hexavalent Chromium

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland, March 2014
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Project Manager/Chemist

	102 pages-SF	3 DAY	TAT DC #32	221) /F	D#	<i>A</i>	Mai			ام	NC	7 1	10-	Alla	chm	en	4 8	ر ا	-11-				٠ ،	۔ خاط			N#		40	in c			11.6	6,144		-	
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring

Collection Date: July 28 through July 29, 2014

LDC Report Date: August 4, 2014

Matrix: Air

Parameters: Hexavalent Chromium

Validation Level: EPA Level IV

Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 4073035

Sample Identification

OAM 1 (07/28/14) PAM-1 (07/29/14)DUP OAM 2 (07/28/14) PAM-1D (07/29/14)DUP

PAM-1 (07/28/14) PAM-1D (07/28/14)

PAM-2 (07/28/14)

PAM-3 (07/28/14)

PAM-4 (07/28/14)

PAM-21 (07/28/14)

PAM-31 (07/28/14)

OAM 1 (07/29/14)

OAM 2 (07/29/14) PAM-1 (07/29/14)

PAM-1D (07/29/14)

PAM-2 (07/29/14)

PAM-3 (07/29/14)

PAM-4 (07/29/14)

PAM-21 (07/29/14)

PAM-31 (07/29/14)

PAM-1 (07/28/14)DUP

PAM-1D (07/28/14)DUP

The date was appended to the sample ID to differentiate between samples.

Introduction

This data review covers 22 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per ASTM D7614 for Hexavalent Chromium.

This review follows the Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland (March 2014) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the method blanks.

Samples PAM-31 (07/28/14) and PAM-31 (07/29/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (07/28/14) and PAM-21 (07/29/14) were identified as field blanks. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analysis was not required by the method.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples PAM-1 (07/28/14) and PAM-1D (07/28/14) and samples PAM-1 (07/29/14) and PAM-1D (07/29/14) were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

	Concentrat	ion (ng/m³)			
Analyte	PAM-1 (07/28/14)	PAM-1D (07/28/14)	RPD (Limits)	Flags	A or P
Hexavalent chromium	0.118	0.102	15 (≤20)	-	-

	Concentrati	ion (ng/m³)			
Analyte	PAM-1 (07/29/14)	PAM-1D (07/29/14)	RPD (Limits)	Flags	A or P
Hexavalent chromium	0.0338	0.0350	3 (≤20)	-	-

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Data Qualification Summary - SDG 4073035

No Sample Data Qualified Due to QA/QC Exceedences in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 4073035

No Sample Data Qualified Due to Laboratory Blank Contamination in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Field Blank Data Qualification Summary - SDG 4073035

No Sample Data Qualified Due to Field Blank Contamination in this SDG

LDC #: 32330A6

VALIDATION COMPLETENESS WORKSHEET

Level IV

SDG	#:	407303	5

Laboratory: Eastern Research Group

Page: l of Reviewer: St

METHOD: Hexavalent Chromium (ASTM D7614)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 7/28-29/14
- 11	Initial calibration	A	
111.	Calibration verification	A	
IV	Blanks	IA	
V	Matrix Spike/Matrix Spike Duplicates	$ \mathcal{N} $	Not required
VI.	Duplicates	A	,
VII.	Laboratory control samples	A	LES/0
VIII.	Sample result verification	A	19
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(3,4) (12,13)
ΧI	Field blanks	/ /()	FB=8,17 TB=9,18

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

ail

	_ ((:						
1	OAM 1 (07/28/14)	11	OAM 2 (07/29/14)	21	PAM-1 (07/29/14)DUP	31	
2	OAM 2 (07/28/14)	12	PAM-1 (07/29/14)	22	PAM-1D (07/29/14)DUP	32	
3	PAM-1 (07/28/14)	13	PAM-1D (07/29/14)	23		33	
4	PAM-1D (07/28/14)	14	PAM-2 (07/29/14)	24		34	
5	PAM-2 (07/28/14)	15	PAM-3 (07/29/14)	25		35	
6	PAM-3 (07/28/14)	16	PAM-4 (07/29/14)	26		36	
7	PAM-4 (07/28/14)	17	PAM-21 (07/29/14)	27		37	
8	PAM-21 (07/28/14)	18	PAM-31 (07/29/14)	28		38	
9	PAM-31 (07/28/14)	19	PAM-1 (07/28/14)DUP	29		39	
10	OAM 1 (07/29/14)	20	PAM-1D (07/28/14)DUP	30		40	

Notes: Pares appended to differentiate between samples: Text

VALIDATION FINDINGS CHECKLIST

Page: of A Reviewer: 2nd Reviewer: 7

	7			
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	,	,	,	
All technical holding times were met.				
Cooler temperature criteria was met.				
II. Calibration			,	
Were all instruments calibrated daily, each set-up time?		<u>, (</u>		
Were the proper number of standards used?				
Were all initial calibration correlation coefficients > 0.995?				
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?		<u> </u>		
Were titrant checks performed as required? (Level IV only)				<i></i>
Were balance checks performed as required? (Level IV only)				
III. Blanks				
Was a method blank associated with every sample in this SDG?				·
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		_		
IV. Matrix spike/Matrix spike duplicates and Duplicates	·			
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		_		Op only
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(< 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.				
V. Laboratory control samples				
Was an LCS anayized for this SDG?				
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?				
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				

LDC#: 32336A6

VALIDATION FINDINGS CHECKLIST

Page: or Pag

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were detection limits < RL?				
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
X. Field blanks				
Field blanks were identified in this SDG.		/	·	
Target analytes were detected in the field blanks.				

LDC# 32330A6

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page: of Page: 2nd Reviewer: 2nd Reviewer:

Inorganics: Method See Cover

	Concentrat	tion (ng/m3)		
Analyte	3	4	RPD (≤20)	Qual.
Hexavalent Chromium	0.118	0.102	15	

	Concentra	tion (ng/m3)		
Analyte	12	13	RPD (≤20)	Qual.
Hexavalent Chromium	0.0338	0.0350	3	

\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32330A6.wpd

LDC #: 32336A6

Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

(- 1
Page:	of
Reviewer:_	9
nd Reviewe	er: 57

Method: Inorganics, Method <u>See Cover</u>	
The correlation coefficient (r) for the calibration of 67 was recalculated. Calibration date:	7/31/14

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found X 100</u>

Where,

Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

						Recalculated	Reported	Acceptable
Type of analysis	Ana	alyte	Standard	Conc. (ng/mL)	Area	r or r ²	r or r ²	(Y/N)
Initial calibration			s1	0.1	0.0000153			
			s2	0.1	0.0000392	0.99990	0.99990	
		54	s3	0.2	0.0000782			(
	C		s4	0.5	0.0002033			/
		ı	s5	1	0.0004147			
			s6	2	0.0008558			
Calibration verification			IOV	Tive(rg/m) 0.5	Ford(19/mL) 0,4968	99		
Calibration verification	\		COUL		0,5236	105		7
Calibration verification								

Comments: Refer to Calibration Verificati	ion findings worksheet for list of qualifica	ations and associated samples when	reported results do not agree within
10.0% of the recalculated results			

LDC#: 5233cAC

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

, ,
Page:of_/
Reviewer: 93
2nd Reviewer: Su

METHOD: Inorgani	ics, Method	rer_									
Percent recoveries	(%R) for a laboratory cor	ntrol sample and a	a matrix spike sample	were recalculated u	sing the following fo	rmula:					
%R = Found x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix so Found = SSR (spiked sample result) - SR (sample result). True = concentration of each analyte in the source.											
A sample and dupli	cate relative percent diffe	erence (RPD) was	recalculated using the	ne following formula:			Acceptable				
RPD = <u>[S-D]</u> x 10 (S+D)/2	0 Where, S = D =	•	inal sample concentr licate sample concen			·	:				
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD					
405	Laboratory control sample	Cot	1.06°3/mL	1.W9/mL	106	106	4				
N	Matrix spike sample		(SSR-SR)			,					
19	Duplicate sample	C(St	0.1123/23	0.118 %	5,22	5.23	9				
Comments: Refer t	o appropriate worksheet	for list of qualificat	ions and associated s	samples when reporte	ed results do not agre	ee within 10.0% of th	e recalculated results.				

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page: _	_of_\
Reviewer:	Q2_
2nd reviewer:	Sm

METH	IOD: Inorganics, Metho	d_Selcover_			
Y N N	N/A Have results N/A Are results w	ow for all questions answered "N". Not app been reported and calculated correctly? ithin the calibrated range of the instrumention limits below the CRQL?		e identified as "N/	A".
	ound (analyte) results fullated and verified using	org the following equation:	rep	orted with a positiv	ve detect were
Concen	tration =	Recalculation:		4.5.4	.40
G	=0,00013x-0,000	0,000004	9+0,0000807 20043	(10m2)=0	01403"3",,3
#	Sample ID	Analyte .	Reported Concentration (NG/m ²)	Calculated Concentration (なんかう)	Acceptable (Y/N)
		Q6+	0.0140	0-0140	(
	7		0.0167	00167	
	3		0.118	0118	
	4		0.102	0.102	
	5	· 	0.0235	0,0235	
	<u> </u>		0.0167	0.0167	
	7		0.104	0.104	
	10		0.0163	00163	
			0.0154	PEIQO	
	12		0.0338	0.0337	
	13		0.0350	0.0350	
	14		0.0169	0.0168	
	15		0.0188	0,0188	
	16		0.231	0.231	

Note:	



Environmental Resources Management, Inc

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

(440) 000-040

r.

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED:

07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix: OAM 1

Air

Lab ID:

Sample Volume:

4073035-01

m³

Sampled: 07/28/14 16:42 **Received:** 07/30/14 11:31

Analysis Date: 07/31/14 13:41

Comments:

Start Time 7/27/14 16:49

Hexavalent Chromium

Results ng/m³ Air

0.0140

<u>MDL</u>

<u>Analyte</u>

Hexavalent Chromium

1854-02-99

<u>Flag</u>

ng/m³ Air

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 3 of 22



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PHONE: (443) 803-8495

Start Time 7/27/14 17:10

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00

07/30/14 SUBMITTED:

AQS SITE

SODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

OAM 2 Air

Lab ID:

Sample Volume:

4073035-02

Sampled: 07/28/14 17:09

Received: 07/30/14 11:31 Analysis Date: 07/31/14 13:51

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium

CAS Number

ng/m³ Air

<u>Flaq</u>

ng/m³ Air

1854-02-99

0.0167

0.0036

AUG 0 4 2014

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Page 4 of 22



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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

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Col 1 Start Time 7/27/14 18:36

FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-1

Lab ID:

Sample Volume:

4073035-03

22.13

m³

Sampled: 07/28/14 19:11 Received: 07/30/14 11:31

Analysis Date: 07/31/14 12:20

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium **CAS Number**

<u>Flaq</u>

ng/m³ Air

0.0036

ng/m³ Air

1854-02-99

0.118

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FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

PAM-1D

Lab ID:

Sample Volume:

4073035-04

22.36 m³

Sampled: 07/28/14 19:29 Received: 07/30/14 11:31

Analysis Date: 07/31/14 12:40

Col 2 Start Time 7/27/14 18:38

Hexavalent Chromium

Results

Hexavalent Chromium

Analyte

Comments:

CAS Number 1854-02-99

ng/m³ Air 0.102

<u>Flag</u>

ng/m³ Air 0.0036

MDL

AUG 0 4 2014

Initials: CR

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Page 6 of 22



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FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED:

07/30/14

AQS SITE

SITE CODE:

21.95

Honeywell Hex Chrome Study

Description: Matrix:

PAM-2

Lab ID:

Sample Volume:

4073035-05

т³

<u>Flag</u>

Sampled: 07/28/14 18:43 Received: 07/30/14 11:31

Analysis Date: 07/31/14 14:21

Comments:

Start Time 7/27/14 18:20

Hexavalent Chromium

Results

MDL

<u>Analyte</u> **Hexavalent Chromium**

CAS Number 1854-02-99

ng/m³ Air 0.0235

<u>ng/m³ Air</u>

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 7 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

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Description:

Comments:

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

PAM-3

Air

Start Time 7/27/14 18:06

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00 07/30/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Sampled: 07/28/14 18:20 Received: 07/30/14 11:31

Sample Volume:

Lab ID:

21.81

m³

Analysis Date: 07/31/14 14:30

Hexavalent Chromium

4073035-06

Results

MDL

Analyte CAS Number Hexavalent Chromium

1854-02-99

ng/m³ Air 0.0167

Flag

ng/m³ Air 0.0036

AUG 0 4 2014

Initials: CR

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Page 8 of 22



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FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED:

07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

Comments:

Matrix:

PAM-4

Lab ID:

Sample Volume:

4073035-07

21.68

Sampled: 07/28/14 17:53

Received: 07/30/14 11:31

Analysis Date: 07/31/14 14:40

Start Time 7/27/14 17:48

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.104

<u>Flag</u>

ng/m³ Air

0.0036

AUG 0 4 2014

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00 07/30/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-21

Lab ID:

4073035-08

m³

Sampled: 07/28/14 00:00

Sample Volume:

Received: 07/30/14 11:31

Comments:

Analysis Date: 07/31/14 14:50

Hexavalent Chromium

21.95

Results

MDL

Analyte Hexavalent Chromium

CAS Number 1854-02-99

ng/m³ Air ND

<u>Flag</u>

ng/m³ Air

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Page 10 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-31

Lab ID:

Sample Volume:

4073035-09

21.81

<u>Flag</u>

Sampled: 07/28/14 00:00 Received: 07/30/14 11:31

Analysis Date: 07/31/14 15:00

Hexavalent Chromium

Results

MDL

<u>Analyte</u> Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air

ng/m³ Air 0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 11 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

Comments:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: SUBMITTED: 08/01/14 16:00

07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Air

OAM 1

Start Time 7/28/14 16:50

Lab ID:

Sample Volume:

4073035-10

m³

Sampled: 07/29/14 16:31 Received: 07/30/14 11:31

Analysis Date: 07/31/14 15:10

Hexavalent Chromium

21.31

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0163

<u>Flaq</u>

ng/m³ Air

0.0036

AUG 0 4 2014

initials: CR

Eastern Research Group

 $\label{thm:condition} \textit{The results in this report apply only to the samples analyzed in accordance with the}$ chain of custody document. This analytical report must be reproduced in its entirety.

Page 12 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

OAM 2

Lab ID:

Sample Volume:

4073035-11

m³

Sampled: 07/29/14 16:53

Received: 07/30/14 11:31 Analysis Date: 07/31/14 15:20

Comments: Start Time 7/28/14 17:22

Hexavalent Chromium

21.16

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0154

Flag

ng/m³ Air

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 13 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

SUBMITTED: 07/30/14

08/01/14 16:00

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-1

Lab ID:

Sample Volume:

4073035-12

 m^3

<u>Flaq</u>

Sampled: 07/29/14 18:37 Received: 07/30/14 11:31

Analysis Date: 07/31/14 13:00

Comments: Col 1 Start Time 7/28/14 19:29

Hexavalent Chromium

20.82

Results

MDL

Analyte Hexavalent Chromium CAS Number 1854-02-99

<u>ng/m³ Air</u>

0.0338

ng/m³ Air

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 14 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

Col 2 Start Time 7/28/14 19:34

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00 07/30/14

SUBMITTED:

AQS SITE

SHE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-1D

Air

Lab ID:

Sample Volume:

4073035-13

 $\,{\rm m}^3$

Sampled: 07/29/14 18:44 Received: 07/30/14 11:31

Analysis Date: 07/31/14 13:20

Hexavalent Chromium

20.84

Results

MDL

<u>Analyte</u> **Hexavalent Chromium**

CAS Number 1854-02-99

ng/m³ Air 0.0350

<u>Flaq</u>

<u>ng/m³ Air</u>

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

PAM-2

Lab ID:

Sample Volume:

4073035-14

20.96

Sampled: 07/29/14 18:11 Received: 07/30/14 11:31

Analysis Date: 07/31/14 15:30

Comments:

Start Time 7/28/14 18:54

Hexavalent Chromium

Results ng/m³ Air

<u>Flaq</u>

m³

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

0.0169

ng/m³ Air 0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 16 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: SUBMITTED: 08/01/14 16:00

07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

Matrix:

Comments:

PAM-3

Start Time 7/28/14 18:31

Air

Lab ID:

Sample Volume:

4073035-15

Sampled: 07/29/14 17:52 Received: 07/30/14 11:31

Analysis Date: 07/31/14 15:40

Hexavalent Chromium

21.02

Results

<u>MDL</u>

Analyte Hexavalent Chromium **CAS Number**

ng/m³ Air

<u>Flaq</u>

ng/m³ Air

1854-02-99

0.0188

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 17 of 22



Environmental Resources Management, Inc.

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: SUBMITTED: 08/01/14 16:00 07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

PAM-4

Air

Lab ID:

Sample Volume:

4073035-16

 m^3

Sampled: 07/29/14 17:28

Received: 07/30/14 11:31 Analysis Date: 07/31/14 15:50

Comments:

Start Time 7/28/14 18:00

Hexavalent Chromium

21.11

Results

<u>MDL</u>

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.231

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 18 of 22



Environmental Resources Management, Inc.

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00 07/30/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID:

4073035-17

m³

Sampled: 07/29/14 00:00 Received: 07/30/14 11:31

Analysis Date: 07/31/14 16:19

Matrix: Comments:

Hexavalent Chromium

20.96

Results

ng/m³ Air

Sample Volume:

<u>Flag</u>

MDL ng/m³ Air

0.0036

Hexavalent Chromium

<u>Analyte</u>

CAS Number 1854-02-99

ND

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 19 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

Matrix:

PHONE: (443) 803-8495

Air

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/01/14 16:00

SUBMITTED:

07/30/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

Comments:

PAM-31

Lab ID:

Sample Volume:

4073035-18

21.02

m³

Sampled: 07/29/14 00:00 Received: 07/30/14 11:31

Analysis Date: 07/31/14 16:29

Hexavalent Chromium

Results

<u>MDL</u>

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

0.0036

AUG 0 4 2014

Initials: CR

Eastern Research Group

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Page 20 of 22



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

ERM August 6, 2014

5761 N. Church Street Glen Rock, PA 17327 ATTN: Mr. Jeff Boggs

SUBJECT: Harbor Point, MD, Hexavalent Chromium Monitoring, Data Validation

Dear Mr. Boggs,

Enclosed is the final validation report for the fraction listed below. This SDG was received on August 5, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32358:

SDG Fraction

4073112/4080113 Hexavalent Chromium

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland, March 2014
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Christina Rink

Sincerely,

Project Manager/Chemist

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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring

Collection Date: July 30 through July 31, 2014

LDC Report Date: August 6, 2014

Matrix: Air

Parameters: Hexavalent Chromium

Validation Level: EPA Level IV

Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 4073112/4080113

Sample Identification

OAM 1 (07/30/14) PAM-1 (07/31/14)DUP OAM 2 (07/30/14) PAM-1D (07/31/14)DUP

PAM-1 (07/30/14)

PAM-1D (07/30/14)

PAM-2 (07/30/14)

PAM-3 (07/30/14)

PAM-4 (07/30/14)

PAM-21 (07/30/14)

PAM-31 (07/30/14)

OAM 1 (07/31/14)

OAM 1 (07/31/14)

PAM-1 (07/31/14) PAM-1D (07/31/14)

PAM-2 (07/31/14)

PAM-3 (07/31/14)

PAM-4 (07/31/14)

PAM-21 (07/31/14) PAM-31 (07/31/14)

PAM-1 (07/30/14)DUP

PAM-1D (07/30/14)DUP

The date was appended to the sample ID to differentiate between samples.

Introduction

This data review covers 22 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per ASTM D7614 for Hexavalent Chromium.

This review follows the Air Monitoring Program Quality Assurance Project Plan, Area 1, Phase 1 Development, Version 1, Baltimore Works Site, Baltimore, Maryland (March 2014) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the method blanks.

Samples PAM-31 (07/30/14) and PAM-31 (07/31/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (07/30/14) and PAM-21 (07/31/14) were identified as field blanks. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analysis was not required by the method.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples PAM-1 (07/30/14) and PAM-1D (07/30/14) and samples PAM-1 (07/31/14) and PAM-1D (07/31/14) were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

Concentration		ion (ng/m³)	<u></u>			
Analyte	PAM-1 (07/30/14)	PAM-1D (07/30/14)	RPD (Limits)	Flags	A or P	
Hexavalent chromium	0.0230	0.0121	62 (≤20)	NQ	-	

NQ = One or both results were < 5x the reporting limit, therefore no data were qualified.

Concentration (ng/m		tion (ng/m³)			
Analyte	PAM-1 (07/31/14)	PAM-1D (07/31/14)	RPD (Limits)	Flags	A or P
Hexavalent chromium	0.0492	0.0517	5 (≤20)	-	_

Harbor Point, MD, Hexavalent Chromium Monitoring Hexavalent Chromium - Data Qualification Summary - SDG 4073112/4080113

No Sample Data Qualified Due to QA/QC Exceedences in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG
4073112/4080113

No Sample Data Qualified Due to Laboratory Blank Contamination in this SDG

Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Field Blank Data Qualification Summary - SDG
4073112/4080113

No Sample Data Qualified Due to Field Blank Contamination in this SDG

LDC #: 32358A6

VALIDATION COMPLETENESS WORKSHEET

SDG #: 4073112/4080113

Level IV

Reviewer: 35 2nd Reviewer:

Laboratory: Eastern Research Group

METHOD: Hexavalent Chromium (ASTM D7614)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area	<u></u>	Comments
J	Technical holding times	A	Sampling dates: 7/36 -31/14
11	Initial calibration	A	· ·
III.	Calibration verification	K	
IV	Blanks	Α	
	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	>	Due
VII.	Laboratory control samples	Α	LUSID
VIII.	Sample result verification	A	
IX.	Overall assessment of data	À	
X	Field duplicates	SW	KO= (3,4) (12,13)
L _X L	Field blanks	20	FB= 8, 17 TB= 9,18

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

Ding

	7 104)						
1	OAM 1 (07/30/14)	11	OAM 1 (07/31/14)	21	PAM-1 (07/31/14)DUP	31	
2	OAM 2 (07/30/14)	12	PAM-1 (07/31/14)	22	PAM-1D (07/31/14)DUP	32	<u></u>
3	PAM-1 (07/30/14)	13	PAM-1D (07/31/14)	23		33	
4	PAM-1D (07/30/14)	14_	PAM-2 (07/31/14)	24		34	
5	PAM-2 (07/30/14)	15	PAM-3 (07/31/14)	25		35	
6	PAM-3 (07/30/14)	16	PAM-4 (07/31/14)	26		36	
7	PAM-4 (07/30/14)	17	PAM-21 (07/31/14)	27		37	
8	PAM-21 (07/30/14)	18	PAM-31 (07/31/14)	28		38	
9	PAM-31 (07/30/14)	19	PAM-1 (07/30/14)DUP	29		39	
10	OAM 1 (07/31/14)	20	PAM-1D (07/30/14)DUP	30		40	

Notes:_	Rateo appended to differentiate samples	

Method:Inorganics (EPA Method See Core)	,		,	•
Validation Area .	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration	,			
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	(
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)	<u> </u>		/	
III. Blanks			_	
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				oponly
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	M		/	
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.	/			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			·
VI. Regional Quality Assurance and Quality Control	_			
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?	L		/	

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Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification		, —… —	,	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were detection limits < RL?				
VIII. Overall assessment of data	·	 		
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	/			
X. Field blanks				
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.		1		

LDC#<u>32358A6</u>__

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page:_	<u>\</u> of(_
Reviewer:	30
2nd Reviewer:	a

Inorganics: Method See Cover

	Concenti	ration (ng/m3)		Qualifiers
Analyte	3	4	RPD (≤20)	
Hexavalent Chromium	0.0230	0.0121	62	NQ*

	Concent	ration (ng/m3)		Qualifiers
Analyte	12	13	RPD (≤20)	
Hexavalent Chromium	0.0492	0.0517	5	

NQ = No Qualification because one or both results = <5X the MDL

\\LDCFILESERVER\\Validation\FIELD DUPLICATES\FD_inorganic\wettemp.WPD

LDC #: 323846

True

Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page:(of	
Reviewer: 50	
2nd Reviewer:	

Method: Inorganics, Method <u>Se</u>	e Cover				
The correlation coefficient (r) for the calibration of Community was recalculated.Calibration date: 8/4/14					
An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:					
%R = <u>Found X 100</u>	Where,	Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution			

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	r or r ²	r or r ²	(Y/N)
Initial calibration		s1	0.50	0.0000227			
		s2	0.10	0.0000446	0.99992	0.99992	
	ماد در	s3	0.20	0.0000815			
	طدي	s4	0.50	0.0002052			
		s5	1.00	0.0004025			\sim
		s6	2.00	0.0008217)
Zev Ilina	ماد ۸	Found	True				1
Calibration verification	Crabo	0.5263 m/m/	0.5 ng/m1		1053%8	105.3%R	
Cw 12118	Cc+6	-1-0 11	. \				
Calibration verification	CX	0.5133ng/ml	0.5 mg/ml		1027%	102.7%R	٦
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within
10.0% of the recalculated results

LDC #: 32358AL

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page:_	_of
Reviewer:_	30
2nd Reviewer:	0

METHOD: Inorganics, Method	_Seo_	Cove	
-			

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = \frac{Found}{True} \times 100$

Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{[S-D]} \times 100$

Where,

S =

Original sample concentration

(S+D)/2

D =

Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
Lc5 11:48	Laboratory control sample	Crto	1.09 ng/m	1.00mg/ml	109%P	109%R	7
2	Matrix spike sample		(SSR-SR)				
(2:54	Duplicate sample	Crito	0.0176ng/m3	0.0203ng/m³	14.2°% RPD	14.18/889	C

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.							

LDC #: 323 8 A

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page:_	[\] of
Reviewer:	30
2nd reviewer:	OL:

METHOD: Inorganics, Method See	Cover	
Please see qualifications below for all questions below for all questions. Y N N/A Y N N/A Are results within the calibration of the compound (analyte) results for recalculated and verified using the following of the compound (analyte).	and calculated correctly? Ited range of the instruments? Ithe CRQL?	reported with a positive detect were
Concentration = (Area- Co) /	Recalculation: (0-00085	-7.45E-07) 10.0004088 = 0.01897
Co=7.458-07 C1=0.0004588 (M/m)	(20)	$\frac{1)(10)}{46m^3} = 0.0088 \text{ res}/m^3$
Aren: 0.000085 W= 10m W= 21.40	= ng/m = Z1.	46 m ³

#	Sample ID	Analyte	Reported Concentration (\(\sigma_{\sigma}^{\sigma} \)	Calculated Concentration (\www.m ⁵)	Acceptable (Y/N)
	1	Cx+6	0.0050	0.0049	3
	2		0.0104	0.005)
	3		0.0203	0.0203	
	ય		0.0121	0.0121	
	5		8800.0	8800,0	
	6		4260.0	0.0054	
	Ţ		0.0856	C 280.0	
	8		NO	NO	
	م		とり	ND	
	lo Lo		P810.0	0.085	
			0.0198	0-0198	
	12		0.0492	8.0492	
	13		0.0517	0.058	
	14		0.0360	0.0360	
	18		0.0225	0.0225	
	16		4120.0	V120.0	
	17		NO	77	
	18	4	ND	20	, V

Note:			



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

OAM 1

Lab ID:

Sample Volume:

4073112-01

m³

Sampled: 07/30/14 16:34

Received: 07/31/14 11:21 Analysis Date: 08/04/14 14:50

Comments:

Start Time 7/29/14 16:35

Hexavalent Chromium

21.58

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0050

0.0036

AUG 0 6 2014

Initials: CR



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PHONE: (443) 803-8495

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FILE #: 3926.00

08/05/14 14:22 REPORTED:

SUBMITTED:

m³

07/31/14 to 08/01/14

AQS SITE

CODE:

Honeywell Hex Chrome Study

Description: Matrix:

OAM 2

Start Time 7/29/14 16:58

Lab ID:

Sample Volume:

4073112-02

21.63

Sampled: 07/30/14 17:01 Received: 07/31/14 11:21

Analysis Date: 08/04/14 15:00

Hexavalent Chromium

Results

MDL

Analyte

Comments:

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0104

0.0036

AUG 0 6 2014

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Page 4 of 22



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Malvern, PA 19355

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Comments:

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1 Matrix:

Col 1 Start Time 7/29/14 18:41

Lab ID:

Sample Volume:

4073112-03

m³

Sampled: 07/30/14 18:29 Received: 07/31/14 11:21

Analysis Date: 08/04/14 12:45

Hexavalent Chromium

21.42

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air

<u>Flaq</u>

ng/m³ Air

0.0203

0.0036

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Col 2 Start Time 7/29/14 18:49

FILE #: 3926.00

REPORTED:

08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM **Matrix:** Air

PAM-1D

Lab ID:

Sample Volume:

4073112-04

m³

Sampled: 07/30/14 18:35 Received: 07/31/14 11:21

Analysis Date: 08/04/14 14:04

Hexavalent Chromium

21.39

Results

MDL

<u>Analyte</u>

CAS Number

<u>ng/m³ Air</u>

Flag

ng/m³ Air

Hexavalent Chromium

Comments:

1854-02-99

0.0121

0.0036

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FILE #: 3926.00

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REPORTED: 08/05/14 14:22

Malvern, PA 19355

SUBMITTED:

07/31/14 to 08/01/14

ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

Comments:

FAX: (410) 266-8912

SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-2

Lab ID:

4073112-05

Sampled: 07/30/14 18:07

Matrix:

Air Start Time 7/29/14 18:16 Sample Volume:

m³

Received: 07/31/14 11:21

Analysis Date: 08/04/14 15:10

Hexavalent Chromium

21.46

Results

MDL

<u>Analyte</u>

CAS Number

<u>ng/m³ Air</u>

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0088

0.0036

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FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

PAM-3

Lab ID:

Sample Volume:

4073112-06

21.5 m³ Sampled: 07/30/14 17:51 Received: 07/31/14 11:21

Analysis Date: 08/04/14 15:20

Comments:

Start Time 7/29/14 17:57

Hexavalent Chromium

Results

<u>MDL</u>

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0054

0.0036

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Page 8 of 22



Environmental Resources Management, Inc

FILE #: 3926.00

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08/05/14 14:22 REPORTED:

Malvern, PA 19355

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07/31/14 to 08/01/14

ATTN: Mr. Jeff Boggs

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PHONE: (443) 803-8495

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SITE CODE:

Honeywell Hex Chrome Study

Description:

Comments:

PAM-4

Start Time 7/29/14 17:39

Lab ID:

4073112-07

Sampled: 07/30/14 17:35

Matrix:

Sample Volume:

21.55 m³ Received: 07/31/14 11:21

Analysis Date: 08/04/14 15:30

Hexavalent Chromium

Results

<u>MDL</u>

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0856

0.0036

AUG 0 6 2014

Initials: CR

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Page 9 of 22



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FILE #: 3926.00

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REPORTED:

08/05/14 14:22

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07/31/14 to 08/01/14

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AQS SITE

PHONE: (443) 803-8495

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SITE CODE:

Honeywell Hex Chrome Study

Description:

PAM-21

Lab ID:

4073112-08

Sampled: 07/30/14 00:00

Matrix:

Air

Sample Volume:

Received: 07/31/14 11:21

Comments:

21.46

m³

Analysis Date: 08/04/14 15:40

Hexavalent Chromium

Results

<u>MDL</u>

Analyte Hexavalent Chromium

<u>Flag</u>

ng/m³ Air

ng/m³ Air **CAS Number**

1854-02-99

ND

0.0036

AUG 0 6 2014

Initials: CR

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Page 10 of 22



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DEDOD

FILE #: 3926.00

REPORTED:

08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

21.5

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-31

Lab ID:

Sample Volume:

4073112-09

m³

Sampled: 07/30/14 00:00 **Received:** 07/31/14 11:21

Analysis Date: 08/04/14 15:50

Hexavalent Chromium

Results

MDL

<u>Analyte</u>

CAS Number

<u>ng/m³ Air</u>

Flag

<u>ng/m³ Air</u>

Hexavalent Chromium

1854-02-99

ND

U

0.0036

AUG 0 6 2014

Initials: CR

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Page 11 of 22



Environmental Resources Management, Inc

noma, recourses management,

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

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195 F/

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/05/14 14:22

07/31/14 to 08/01/14

SUBMITTED:

AQS SITE

CODE:

Honeywell Hex Chrome Study

Description:

Matrix:

OAM 1

Lab ID:

Sample Volume:

4080113-01

m³

Sampled: 07/31/14 16:44

Received: 08/01/14 10:43 **Analysis Date:** 08/04/14 16:00

Comments:

Start Time 7/30/14 16:41

Hexavalent Chromium

21.65

Results

MDL

<u>Analyte</u>

CAS Number

<u>ng/m³ Air</u>

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0184

0.0036

AUG 0 6 2014

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Page 12 of 22



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FILE #: 3926.00

REPORTED:

08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

OAM 2

Lab ID:

Sample Volume:

4080113-02

m³

Sampled: 07/31/14 17:28 Received: 08/01/14 10:43

Analysis Date: 08/04/14 16:10

Hexavalent Chromium

21.94

Results

MDL

Analyte

Comments:

CAS Number

ng/m³ Air

Flag

ng/m3 Air

Hexavalent Chromium 1854-02-99

Start Time 7/30/14 17:05

0.0198

0.0036

AUG 0 6 2014

Initials: CR

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Page 13 of 22



Environmental Resources Management, Inc

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110,000 010

FAX: (410) 266-8912

Col 1 Start Time 7/30/14 18:33

FILE #: 3926.00

REPORTED:

08/05/14 14:22

07/31/14 to 08/01/14

SUBMITTED:

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: PA

PAM-1

Lab ID:

Sample Volume:

4080113-03

m³

Sampled: 07/31/14 19:17 Received: 08/01/14 10:43

Analysis Date: 08/04/14 13:24

Hexavalent Chromium

22.26

Results

MDL

<u>Analyte</u>

CAS Number

ng/m³ Air

<u>Flag</u>

ng/m³ Air

Hexavalent Chromium

Comments:

1854-02-99

0.0492

0.0036

AUG 0 6 2014

Initials: CR

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Page 14 of 22



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FILE #: 3926.00

REPORTED:

08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-1D

Col 2 Start Time 7/30/14 18:38

Lab ID:

4080113-04

m³

Sampled: 07/31/14 19:17

Sample Volume:

22.19

Received: 08/01/14 10:43

Analysis Date: 08/04/14 13:44

Hexavalent Chromium

Results

MDL

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0517

Flag

ng/m³ Air

0.0036

AUG 0 6 2014

initials: CR

Eastern Research Group

The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Page 15 of 22



Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

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PHONE: (443) 803-8495

FAX: (410) 266-8912

Start Time 7/30/14 18:12

FILE #: 3926.00

REPORTED:

08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-2

Air

Lab ID:

4080113-05

22.39 m³ Sampled: 07/31/14 19:05 Received: 08/01/14 10:43

Analysis Date: 08/04/14 16:20

Hexavalent Chromium

Sample Volume:

Results

Analyte

CAS Number

ng/m³ Air

<u>Flag</u>

<u>MDL</u> ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0360

0.0036

AUG 0 6 2014

Initials: CR

Eastern Research Group

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Page 16 of 22



Environmental Resources Management, Inc

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•

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED:

07/31/14 to 08/01/14

AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description:

Matrix:

PAM-3

Lab ID:

Sample Volume:

4080113-06

m³

Sampled: 07/31/14 18:39 Received: 08/01/14 10:43

Analysis Date: 08/04/14 16:49

Comments: Start Time 7/30/14 17:54

Hexavalent Chromium

22.26

Results

MDL

<u>Analyte</u>

CAS Number

<u>ng/m³ Air</u>

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0225

0.0036

AUG 0 6 2014

initials: CR

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Page 17 of 22



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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED:

08/05/14 14:22

07/31/14 to 08/01/14

SUBMITTED: AQS SITE

SITE CODE:

Honeywell Hex Chrome Study

Description: Matrix:

Comments:

PAM-4 Air

Start Time 7/30/14 17:39

Lab ID:

Sample Volume:

4080113-07

22.15

m³

Sampled: 07/31/14 18:16 Received: 08/01/14 10:43

Analysis Date: 08/04/14 16:59

Hexavalent Chromium

Results

<u>MDL</u>

Analyte Hexavalent Chromium **CAS Number** 1854-02-99

ng/m³ Air 0.0514

<u>Flag</u>

ng/m³ Air

0.0036

AUG 0 6 2014

Initials: CR

Eastern Research Group

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Page 18 of 22



Environmental Resources Management, Inc

FILE #: 3926.00

75 Valley Stream Parkway, Suite 400

08/05/14 14:22 REPORTED:

Malvern, PA 19355

SUBMITTED:

07/31/14 to 08/01/14

ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

FAX: (410) 266-8912

SITE CODE:

Honeywell Hex Chrome Study

Description:

Comments:

PAM-21

Lab ID:

4080113-08

Sampled: 07/31/14 00:00

Matrix:

Air

Sample Volume:

22.39 ${\rm m}^{\rm 3}$ Received: 08/01/14 10:43

Analysis Date: 08/04/14 17:09

Hexavalent Chromium

Results

MDL

Hexavalent Chromium

CAS Number

ng/m3 Air

<u>Flag</u>

ng/m³ Air

Analyte

1854-02-99

ND

0.0036

AUG 0 6 2014

Initials: CR

Eastern Research Group

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FILE #: 3926.00

75 Valley Stream Parkway, Suite 400

08/05/14 14:22 REPORTED:

SUBMITTED:

07/31/14 to 08/01/14

Malvern, PA 19355 ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

Description:

Comments:

FAX: (410) 266-8912

SITE CODE:

PAM-31

Lab ID:

4080113-09

Honeywell Hex Chrome Study

Matrix:

Air

Sample Volume:

22.26 $\,m^3$ Sampled: 07/31/14 00:00 Received: 08/01/14 10:43

Analysis Date: 08/04/14 17:19

Hexavalent Chromium

Results

<u>MDL</u>

Hexavalent Chromium

CAS Number

ng/m³ Air

Flag

ng/m3 Air

Analyte

1854-02-99

ND

0.0036

AUG 0 6 2014

Initials: CR

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Page 20 of 22