

LABORATORY DATA CONSULTANTS, INC.

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

July 29, 2014

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

4072220

Fraction

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

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)	
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:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (07/18/14)	PAM-1D (07/18/14)			
Hexavalent chromium	0.142	0.159	11 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (07/21/14)	PAM-1D (07/21/14)			
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
 SDG #: 4072220
 Laboratory: Eastern Research Group

VALIDATION COMPLETENESS WORKSHEET
 Level IV

Date: 7/25/14
 Page: 1 of 1
 Reviewer: SD
 2nd Reviewer: OL

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
I.	Technical holding times	A	Sampling dates: 7/18/14 - 7/21/14
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Blanks	A	
V.	Matrix Spike/Matrix Spike Duplicates	N	Not Req.
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD = (3,4) (12,13)
XI.	Field blanks	ND	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: Airs

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 List)

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? <u>85-115</u>	/			
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.	/			
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 $\leq \text{CRDL}$ ($\leq 2X \text{ CRDL}$ for soil) was used for samples that were $\leq 5X$ the CRDL, including when only one of the duplicate sample values were $< 5X$ the CRDL.	/			
V. Laboratory control samples				
Was an LCS analyzed 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 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# 32256A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 30
2nd Reviewer: ca

Inorganics: Method See Cover

Analyte	Concentration (µg/m3)		RPD (≤20)	Qual. Parent Only
	3	4		
Hexavalent Chromium	0.142	0.159	11	

Analyte	Concentration (µg/m3)		RPD (≤20)	Qual. Parent Only
	12	13		
Hexavalent Chromium	0.0515	0.0548	6	

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LDC #: 321566

Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
 Reviewer: SD
 2nd Reviewer: _____

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C_{r+6} 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:

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

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

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	C _{r+6}	s1	0.05	0.0000154	0.99993	0.99936	y
		s2	0.10	0.0000386			
		s3	0.20	0.0000741			
		s4	0.50	0.0001968			
		s5	1.00	0.0003834			
		s6	2.00	0.0007839			
ICV 10:32 Calibration verification	C _{r+6}	$\frac{\text{Found}}{0.4934}$	$\frac{\text{True}}{.5000 \text{ ng/ml}}$		98.7%R	98.7%R	y
CCV 11:31 Calibration verification	C _{r+6}	0.4978	.5000 ng/ml		99.6%R	99.5%R	y
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.

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See above

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

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

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
<u>LCS</u> <u>11:01</u>	Laboratory control sample	<u>Cr⁺⁶</u>	<u>1.0507mg/ml</u>	<u>1.00ug/ml</u>	<u>106%R</u>	<u>106%R</u>	<u>Y</u>
<u>N</u>	Matrix spike sample		(SSR-SR)				
<u>Dup</u> <u>12:08</u>	Duplicate sample	<u>Cr⁺⁶</u>	<u>0.0142ug/m³</u>	<u>0.0159ug/m³</u>	<u>11.3%RPD</u>	<u>11.2%RPD</u>	<u>Y</u>

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.

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- 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?

Compound (analyte) results for Cr⁺⁶ (u) reported with a positive detect were recalculated and verified using the following equation:

Concentration =
$$\frac{[(Area - C_0) / C_1] = ng/ml}{Area = 0.0000111 mAU \cdot min \quad C_0 = -3.17E-6 \quad C_1 = 0.0003925}$$

Recalculation:
$$\frac{[0.0000111 mAU \cdot min - (-3.17E-6)]}{0.0003925} = 0.0364 ng/ml$$

$$\frac{(ng/ml)(VF)}{m^3} = ng/m^3 \quad \frac{(0.0364 ng/ml)(10ml)}{20.75 m^3} = 0.0175 m$$

$$VR = 10ml \quad m^3 = 20.75$$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0188	0.0188	Y
	2		0.0142	0.0141	
	3		0.0159	0.0159	
	4		0.0175	0.0175	
	5		0.0185	0.0184	
	6		0.0207	0.0206	
	7		0.0184	0.0184	
	8		ND	ND	
	9		ND	ND	
	10		0.0314	0.0314	
	11		0.0250	0.0251	
	12		0.0515	0.0515	
	13		0.0548	0.0548	
	14		0.0383	0.0383	
	15		0.0394	0.0393	
	16		0.0404	0.0405	
	17		ND	ND	
	18		ND	ND	

Note: _____



CERTIFICATE OF ANALYSIS

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

SUBMITTED: 07/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4072220-01

Sampled: 07/18/14 16:03

Matrix: Air

Sample Volume: 20.95 m³

Received: 07/22/14 12:08

Comments: Start Time 7/17/14 16:46

Analysis Date: 07/23/14 13:18

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0188		0.0036

CE7/ra/ku



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FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE: 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 m ³	Received: 07/22/14 12:08
Comments: Start Time 7/17/14 17:17		Analysis Date: 07/23/14 13:28

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0142		0.0036

08/12/14

Eastern Research Group

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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: 07/22/14

ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

FAX: (410) 266-8912

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: 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

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

Analysis Date: 07/23/14 11:58

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0159		0.0036

02-7/23/14



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FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4072220-04

Sampled: 07/18/14 18:01

Matrix: Air

Sample Volume: 20.75 m³

Received: 07/22/14 12:08

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

Analysis Date: 07/23/14 12:18

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0175		0.0036

02779/14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4072220-05

Sampled: 07/18/14 17:28

Matrix: Air

Sample Volume: 20.7 m³

Received: 07/22/14 12:08

Comments: Start Time 7/17/14 18:28

Analysis Date: 07/23/14 13:57

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0185		0.0036

CE-7/29/14

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4072220-06

Sampled: 07/18/14 17:11

Matrix: Air

Sample Volume: 20.7 m³

Received: 07/22/14 12:08

Comments: Start Time 7/17/14 18:11

Analysis Date: 07/23/14 14:07

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0207		0.0036

027/29/14

Eastern Research Group

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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: 07/22/14

ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

FAX: (410) 266-8912

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4072220-07

Sampled: 07/18/14 16:51

Matrix: Air

Sample Volume: 20.7 m³

Received: 07/22/14 12:08

Comments: Start Time 7/17/14 17:51

Analysis Date: 07/23/14 14:17

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0184		0.0036

027/29/14



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FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4072220-08

Sampled: 07/18/14 00:00

Matrix: Air

Sample Volume: 20.7 m³

Received: 07/22/14 12:08

Comments:

Analysis Date: 07/23/14 14:27

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

027/29/14



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc
75 Valley Stream Parkway, Suite 400
Malvern, PA 19355

FILE #: 3926.00
REPORTED: 07/25/14 10:37
SUBMITTED: 07/22/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

PHONE: (443) 803-8495 FAX: (410) 266-8912

Description: PAM-31	Lab ID: 4072220-09	Sampled: 07/18/14 00:00
Matrix: Air	Sample Volume: 20.7 m ³	Received: 07/22/14 12:08
Comments:		Analysis Date: 07/23/14 14:37

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

02/22/14



CERTIFICATE OF ANALYSIS

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4072220-10

Sampled: 07/21/14 15:20

Matrix: Air

Sample Volume: 20.83 m³

Received: 07/22/14 12:08

Comments: Start Time 7/20/14 16:12

Analysis Date: 07/23/14 14:47

Hexavalent Chromium

Analyte	CAS Number	Results	Flag	MDL
		ng/m ³ Air		ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0314		0.0036

08/27/2014



CERTIFICATE OF ANALYSIS

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

SUBMITTED: 07/22/14

AQS SITE

CODE:

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

Comments: Start Time 7/20/14 16:40

Analysis Date: 07/23/14 14:57

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0250		0.0036

07/29/14



CERTIFICATE OF ANALYSIS

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

SUBMITTED: 07/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4072220-12

Sampled: 07/21/14 17:12

Matrix: Air

Sample Volume: 20.76 m³

Received: 07/22/14 12:08

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

Analysis Date: 07/23/14 12:38

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0515		0.0036

0672941

Eastern Research Group

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4072220-13	Sampled: 07/21/14 17:18
Matrix: Air	Sample Volume: 20.78 m ³	Received: 07/22/14 12:08
Comments: Col 2 Start Time 7/20/14 18:12		Analysis Date: 07/23/14 12:57

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0548		0.0036

027291



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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: 07/22/14

ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

FAX: (410) 266-8912

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4072220-14

Sampled: 07/21/14 16:56

Matrix: Air

Sample Volume: 20.86 m³

Received: 07/22/14 12:08

Comments: Start Time 7/20/14 17:45

Analysis Date: 07/23/14 15:07

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0383		0.0036

02-7/29/14

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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

FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4072220-15	Sampled: 07/21/14 16:27
Matrix: Air	Sample Volume: 20.7 m ³	Received: 07/22/14 12:08
Comments: Start Time 7/20/14 17:27		Analysis Date: 07/23/14 15:16

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0394		0.0036

027/29/14



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75 Valley Stream Parkway, Suite 400
Malvern, PA 19355

FILE #: 3926.00
REPORTED: 07/25/14 10:37
SUBMITTED: 07/22/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

PHONE: (443) 803-8495 FAX: (410) 266-8912

Description: PAM-4	Lab ID: 4072220-16	Sampled: 07/21/14 16:09
Matrix: Air	Sample Volume: 20.7 m ³	Received: 07/22/14 12:08
Comments: Start Time 7/20/14 17:09		Analysis Date: 07/23/14 15:26

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0404		0.0036

027/29/14



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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

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4072220-17

Sampled: 07/21/14 00:00

Matrix: Air

Sample Volume: 20.86 m³

Received: 07/22/14 12:08

Comments:

Analysis Date: 07/23/14 15:56

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

CE 7/29/14



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FILE #: 3926.00

REPORTED: 07/25/14 10:37

SUBMITTED: 07/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4072220-18

Sampled: 07/21/14 00:00

Matrix: Air

Sample Volume: 20.7 m³

Received: 07/22/14 12:08

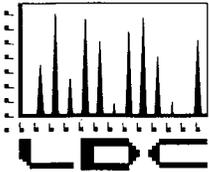
Comments:

Analysis Date: 07/23/14 16:06

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

07/29/14



LABORATORY DATA CONSULTANTS, INC.

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

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

July 29, 2014

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:

<u>SDG</u>	<u>Fraction</u>
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

**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:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1	PAM-1D			
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

Date: 7/22/14

SDG #: 4072332

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: [Signature]

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
I.	Technical holding times	A	Sampling dates: 7/22/14
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Blanks	A	
V.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VI.	Duplicates	A	Dup.
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD=(3,4)
XI.	Field blanks	ND	7=FB 8=TB

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: A179

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: _____

Method: Inorganics (EPA Method Soilover)

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? <u>85-115</u>	/			
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 ^{airs} 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 analyzed 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 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# 32264A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [Signature]
2nd Reviewer: [Signature]

Inorganics: Method See Cover

Analyte	Concentration (ug/m3)		RPD (≤20)	Qual. Parent Only
	3	4		
Hexavalent Chromium	0.0422	0.0425	1	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32264A6.wpd

LDC #: 32264A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
 Reviewer: SD
 2nd Reviewer: 9

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 7/24/14

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

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

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

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.05	0.000014	0.99999	0.99999	Y
		s2	0.10	0.0000351			
		s3	0.20	0.0000761			
		s4	0.50	0.0001977			
		s5	1.00	0.0004046			
		s6	2.00	0.0008229			
ICV 10:19 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5138ng/ml	<u>True</u> .5000ng/ml		102.8%R	102.8%R	Y
CCV 13:20 Calibration verification	Cr ⁺⁶	0.5533	.5000ng/ml		110.7%R	110.7%R	
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.



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Environmental Resources Management, Inc

FILE #: 3926.00

75 Valley Stream Parkway, Suite 400

REPORTED: 07/28/14 11:57

Malvern, PA 19355

SUBMITTED: 07/23/14

ATTN: Mr. Jeff Boggs

AQS SITE CODE:

PHONE: (443) 803-8495 FAX: (410) 266-8912

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4072332-01	Sampled: 07/22/14 15:18
Matrix: Air	Sample Volume: 21.51 m ³	Received: 07/23/14 11:55
Comments: Start Time 7/21/14 15:24		Analysis Date: 07/24/14 12:21

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0527		0.0036

Handwritten signature



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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: OAM 2	Lab ID: 4072332-02	Sampled: 07/22/14 15:44
Matrix: Air	Sample Volume: 21.62 m ³	Received: 07/23/14 11:55
Comments: Start Time 7/21/14 15:42		Analysis Date: 07/24/14 12:31

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0458		0.0036

cert/29/14

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Malvern, PA 19355

SUBMITTED: 07/23/14

ATTN: Mr. Jeff Boggs

AQS SITE CODE:

PHONE: (443) 803-8495 FAX: (410) 266-8912

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4072332-03	Sampled: 07/22/14 17:49
Matrix: Air	Sample Volume: 22.05 m ³	Received: 07/23/14 11:55
Comments: Col 1 Start Time 7/21/14 17:19		Analysis Date: 07/24/14 11:41

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0422		0.0036

027/29/14

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Malvern, PA 19355

SUBMITTED: 07/23/14

ATTN: Mr. Jeff Boggs

AQS SITE CODE:

PHONE: (443) 803-8495 FAX: (410) 266-8912

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D **Lab ID:** 4072332-04 **Sampled:** 07/22/14 17:55

Matrix: Air **Sample Volume:** 22.08 m³ **Received:** 07/23/14 11:55

Comments: Col 2 Start Time 7/21/14 17:23 **Analysis Date:** 07/24/14 12:01

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0425		0.0036

08/29/14



CERTIFICATE OF ANALYSIS

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Malvern, PA 19355

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FILE #: 3926.00

REPORTED: 07/28/14 11:57

SUBMITTED: 07/23/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4072332-05	Sampled: 07/22/14 17:08
Matrix: Air	Sample Volume: 22.14 m ³	Received: 07/23/14 11:55
Comments: Start Time 7/21/14 16:32		Analysis Date: 07/24/14 12:41

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0465		0.0036

027/29/14

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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:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4072332-06	Sampled: 07/22/14 16:53
Matrix: Air	Sample Volume: 22.18 m ³	Received: 07/23/14 11:55
Comments: Start Time 7/21/14 16:14		Analysis Date: 07/24/14 12:51

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.224		0.0036

027/20/14



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

FILE #: 3926.00

75 Valley Stream Parkway, Suite 400

REPORTED: 07/28/14 11:57

Malvern, PA 19355

SUBMITTED: 07/23/14

ATTN: Mr. Jeff Boggs

AQS SITE CODE:

PHONE: (443) 803-8495

FAX: (410) 266-8912

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4072332-07

Sampled: 07/22/14 00:00

Matrix: Air

Sample Volume: 22.14 m³

Received: 07/23/14 11:55

Comments:

Analysis Date: 07/24/14 13:01

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>	
		<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>	
Hexavalent Chromium	1854-02-99	ND	U	0.0036	

02-27/29/14



CERTIFICATE OF ANALYSIS

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: PAM-31

Lab ID: 4072332-08

Sampled: 07/22/14 00:00

Matrix: Air

Sample Volume: 22.14 m³

Received: 07/23/14 11:55

Comments:

Analysis Date: 07/24/14 13:11

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

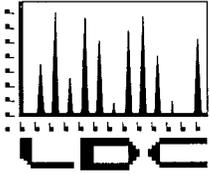
1854-02-99

ND

U

0.0036

02-29/14



LABORATORY DATA CONSULTANTS, INC.

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

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

July 31, 2014

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:

<u>SDG</u>	<u>Fraction</u>
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

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:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (07/23/14)	PAM-1D (07/23/14)			
Hexavalent chromium	0.0911	0.0979	7 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (07/24/14)	PAM-1D (07/24/14)			
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
 Laboratory: Eastern Research Group

VALIDATION COMPLETENESS WORKSHEET
 Level IV

Date: 7/31/14
 Page: 1 of 1
 Reviewer: JD
 2nd Reviewer: CR

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
I.	Technical holding times	A	Sampling dates: 7/23-24/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCSID
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD = (3,4) (12,13)
XI	Field blanks	ND	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: Airs

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 Sealover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. Calibration				
Were all instruments calibrated daily, each set-up time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the proper number of standards used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial calibration correlation coefficients > 0.995?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial and continuing calibration verification %Rs within the 90-110% <u>85-115</u> QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were titrant checks performed as required? (Level IV only)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were balance checks performed as required? (Level IV only)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
III. Blanks				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	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.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

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: 1 of 1

Reviewer: JO

2nd Reviewer: or

Inorganics: Method See Cover

Analyte	Concentration ($\mu\text{g}/\text{m}^3$)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0911	0.0979	7	

Analyte	Concentration ($\mu\text{g}/\text{m}^3$)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0384	0.0325	17	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32292A6.wpd

LDC #: 3229246

**Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1
 Reviewer: JD
 2nd Reviewer: Q

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 7/28/14

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

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

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

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.50	0.000021	0.99988	0.99988	Y
		s2	0.10	0.0000413			
		s3	0.20	0.0000872			
		s4	0.50	0.0002191			
		s5	1.00	0.0004193			
		s6	2.00	0.00086			
ICV 11:13 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.4983ng/ml	<u>True</u> 0.5ng/ml		99.7%R	99.7%R	Y
CCV 12:12 Calibration verification	Cr ⁺⁶	0.50ng/ml	0.5ng/ml		101.8%R	101.9%R	Y
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.

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Cover

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

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

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
<u>LCS</u> <u>11:42</u>	Laboratory control sample	<u>Cr⁺⁶</u>	<u>1.045 ng/ml</u>	<u>1.00 ng/ml</u>	<u>105%R</u>	<u>105%R</u>	<u>y</u>
<u>N</u>	Matrix spike sample		(SSR-SR)				
<u>Dup.</u>	Duplicate sample	<u>Cr⁺⁶</u>	<u>0.0897 ng/m³</u>	<u>0.0911 ng/m³</u>	<u>1.55%RPD</u>	<u>1.56%RPD</u>	<u>y</u>

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.

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- 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?

Compound (analyte) results for Cr⁺⁶ (3) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{(Area - C_0)}{C_1} = \text{ng/ml}$ $\frac{V_f(10\text{ml})}{m^3 = 22.03}$ Recalculation: $\frac{[0.000856\text{MAU} \cdot \text{min} - (-4.13E-07)]}{(0.2006\text{ng/ml})(10\text{ml})} / 0.0004287 =$
 $\frac{(0.2006\text{ng/ml})(10\text{ml})}{22.03\text{m}^3} = 0.0911\text{ng/m}^3$

Area = 0.000856MAU*min
 C₀ = -4.13E-07
 C₁ = 0.0004287

$\frac{(\text{ng/ml})(\text{ul})}{\text{m}^3} = \text{ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.111	0.111	Y
	2		0.0202	0.0202	
	3		0.0911	0.0911	
	4		0.0979	0.0979	
	5		0.0774	0.0744	
	6		0.0365	0.0365	
	7		0.128	0.128	
	8		ND	ND	
	9		ND	ND	
	10		0.0204	0.0205	
	11		0.0229	0.0229	
	12		0.0384	0.0384	
	13		0.0325	0.0325	
	14		0.0614	0.0614	
	15		0.0272	0.0272	
	16		0.0290	0.0290 0.0290	
	17		ND	ND	
	18		ND	ND	

Note: _____



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

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ATTN: Mr. Jeff Boggs

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

Lab ID: 4072519-01

Sampled: 07/23/14 16:13

Matrix: Air

Sample Volume: 22.24 m³

Received: 07/25/14 11:35

Comments: Start Time 7/22/14 15:30

Analysis Date: 07/28/14 15:00

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.111		0.0036

JUL 31 2014

Initials: *ER*

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.



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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: OAM 2

Lab ID: 4072519-02

Sampled: 07/23/14 16:29

Matrix: Air

Sample Volume: 22.17 m³

Received: 07/25/14 11:35

Comments: Start Time 7/22/14 15:51

Analysis Date: 07/28/14 15:10

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0202		0.0036

JUL 31 2014

Initials: *ER*

Eastern Research Group

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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-1	Lab ID: 4072519-03	Sampled: 07/23/14 18:23
Matrix: Air	Sample Volume: 22.03 m ³	Received: 07/25/14 11:35
Comments: Col 1 Start Time 7/22/14 17:55		Analysis Date: 07/28/14 12:42

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0911		0.0036

JUL 31 2014

Initials: ER

Eastern Research Group

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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

Lab ID: 4072519-04

Sampled: 07/23/14 18:30

Matrix: Air

Sample Volume: 22.07 m³

Received: 07/25/14 11:35

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

Analysis Date: 07/28/14 13:01

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0979		0.0036

JUL 31 2014

Initials: ER

Eastern Research Group

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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: PAM-2	Lab ID: 4072519-05	Sampled: 07/23/14 18:04
Matrix: Air	Sample Volume: 22.03 m ³	Received: 07/25/14 11:35
Comments: Start Time 7/22/14 17:35		Analysis Date: 07/28/14 15:20

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0774		0.0036

JUL 31 2014

Initials: *CR*

Eastern Research Group

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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-3

Lab ID: 4072519-06

Sampled: 07/23/14 17:41

Matrix: Air

Sample Volume: 22 m³

Received: 07/25/14 11:35

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

Analysis Date: 07/28/14 15:30

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0365		0.0036

JUL 31 2014

Initials: *CR*

Eastern Research Group

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ATTN: Mr. Jeff Boggs

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: PAM-4

Lab ID: 4072519-07

Sampled: 07/23/14 17:24

Matrix: Air

Sample Volume: 21.95 m³

Received: 07/25/14 11:35

Comments: Start Time 7/22/14 17:00

Analysis Date: 07/28/14 15:40

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.128		0.0036

JUL 31 2014

Initials: ER

Eastern Research Group

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CERTIFICATE OF ANALYSIS

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

SUBMITTED: 07/25/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4072519-08

Sampled: 07/23/14 00:00

Matrix: Air

Sample Volume: 22.03 m³

Received: 07/25/14 11:35

Comments:

Analysis Date: 07/28/14 15:50

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

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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-31

Lab ID: 4072519-09

Sampled: 07/23/14 00:00

Matrix: Air

Sample Volume: 22 m³

Received: 07/25/14 11:35

Comments:

Analysis Date: 07/28/14 16:00

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

JUL 31 2014

Initials: *ER*

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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: OAM 1

Lab ID: 4072519-10

Sampled: 07/24/14 16:40

Matrix: Air

Sample Volume: 21.91 m³

Received: 07/25/14 11:35

Comments: Start Time 7/23/14 16:19

Analysis Date: 07/28/14 17:39

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0204		0.0036

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Initials: *CR*

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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 2

Lab ID: 4072519-11

Sampled: 07/24/14 17:02

Matrix: Air

Sample Volume: 21.96 m³

Received: 07/25/14 11:35

Comments: Start Time 7/23/14 16:37

Analysis Date: 07/28/14 16:19

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0229

0.0036

JUL 31 2014

Initials: *CR*

Eastern Research Group

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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: PAM-1

Lab ID: 4072519-12

Sampled: 07/24/14 18:29

Matrix: Air

Sample Volume: 21.6 m³

Received: 07/25/14 11:35

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

Analysis Date: 07/28/14 14:19

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0384		0.0036

JUL 31 2014

Initials: *CR*

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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: PAM-1D	Lab ID: 4072519-13	Sampled: 07/24/14 18:35
Matrix: Air	Sample Volume: 21.59 m ³	Received: 07/25/14 11:35
Comments: Col 2 Start Time 7/23/14 18:36		Analysis Date: 07/28/14 13:56

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0325		0.0036

JUL 31 2014

Initials: *ER*

Eastern Research Group

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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: 07/31/14 11:38

SUBMITTED: 07/25/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4072519-14	Sampled: 07/24/14 18:08
Matrix: Air	Sample Volume: 21.55 m ³	Received: 07/25/14 11:35
Comments: Start Time 7/23/14 18:11		Analysis Date: 07/28/14 16:29

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0614		0.0036

JUL 31 2014

Initials: *CR*

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ATTN: Mr. Jeff Boggs

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: PAM-3

Lab ID: 4072519-15

Sampled: 07/24/14 17:49

Matrix: Air

Sample Volume: 21.64 m³

Received: 07/25/14 11:35

Comments: Start Time 7/23/14 17:47

Analysis Date: 07/28/14 16:59

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0272		0.0036

JUL 31 2014

Initials: *ER*

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ATTN: Mr. Jeff Boggs

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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: PAM-4

Lab ID: 4072519-16

Sampled: 07/24/14 17:32

Matrix: Air

Sample Volume: 21.62 m³

Received: 07/25/14 11:35

Comments: Start Time 7/23/14 17:31

Analysis Date: 07/28/14 17:09

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0290		0.0036

JUL 31 2014

Initials: ER

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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-21

Lab ID: 4072519-17

Sampled: 07/24/14 00:00

Matrix: Air

Sample Volume: 21.55 m³

Received: 07/25/14 11:35

Comments:

Analysis Date: 07/28/14 17:19

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

JUL 31 2014

Initials: *ER*

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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-31	Lab ID: 4072519-18	Sampled: 07/24/14 00:00
Matrix: Air	Sample Volume: 21.64 m ³	Received: 07/25/14 11:35
Comments:		Analysis Date: 07/28/14 17:29

Hexavalent Chromium

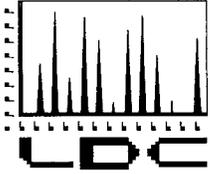
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

JUL 31 2014

Initials: **ER**

Eastern Research Group

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LABORATORY DATA CONSULTANTS, INC.

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

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

August 4, 2014

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:

<u>SDG</u>	<u>Fraction</u>
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.

Sincerely,

Christina Rink
Project Manager/Chemist

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:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1	PAM-1D			
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

Date: 8/4/14

SDG #: 4072918

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: DL

2nd Reviewer: SM

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
I.	Technical holding times	A	Sampling dates: 7/25/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not required
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(3,4)
XI	Field blanks	ND	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:

air

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	
10	PAM-1DUP	20		30		40	

Notes: _____

Method: Inorganics (EPA Method see cover)

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? <u>95-115</u>	/			
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 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 analyzed 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 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# 32324A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [Signature]
2nd Reviewer: [Signature]

Inorganics: Method See Cover

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

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

LDC #: 32324A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
 Reviewer: a
 2nd Reviewer: sm

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Qst was recalculated. Calibration date: 7/30/14

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

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

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

Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Q st	s1	0.1	0.0000193	0.99989	0.99989	Y
		s2	0.1	0.0000425			
		s3	0.2	0.0000817			
		s4	0.5	0.0002096			
		s5	1	0.0004135			
		s6	2	0.0008529			
Calibration verification	↓	ICV	<u>True (ng/mL)</u> 0.5	<u>Found (ng/mL)</u> 0.5007	100	—	↓
Calibration verification	↓	CCV	0.5	0.5095	102	—	Y
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.

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method see cover

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

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

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
<u>LES</u>	Laboratory control sample	<u>Cr⁶⁺</u>	<u>1.06 mg/mL</u>	<u>1.00 mg/mL</u>	<u>106</u>	<u>106</u>	<u>Y</u>
<u>N</u>	Matrix spike sample		(SSR-SR)				
<u>10</u>	Duplicate sample	<u>Cr⁶⁺ Cr⁶⁺</u>	<u>0.0370 mg/m³</u>	<u>0.0347 mg/m³</u>	<u>6.42</u>	<u>6.24</u>	<u>Y</u>

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.



CERTIFICATE OF ANALYSIS

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

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4072918-01	Sampled: 07/25/14 16:39
Matrix: Air	Sample Volume: 21.51 m ³	Received: 07/29/14 11:30
Comments: Start Time 7/24/14 16:45		Analysis Date: 07/30/14 13:27

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0107		0.0036

AUG 04 2014

Initials: *ER*

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CERTIFICATE OF ANALYSIS

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

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4072918-02

Sampled: 07/25/14 16:57

Matrix: Air

Sample Volume: 21.48 m³

Received: 07/29/14 11:30

Comments: Start Time 7/24/14 17:05

Analysis Date: 07/30/14 13:36

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.0110	E	0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4072918-03	Sampled: 07/25/14 18:24
Matrix: Air	Sample Volume: 21.45 m ³	Received: 07/29/14 11:30
Comments: Col 1 Start Time 7/24/14 18:34		Analysis Date: 07/30/14 14:56

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0347		0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4072918-04	Sampled: 07/25/14 18:26
Matrix: Air	Sample Volume: 21.4 m ³	Received: 07/29/14 11:30
Comments: Col 2 Start Time 7/24/14 18:39		Analysis Date: 07/30/14 15:16

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0293		0.0036

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REPORTED: 08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4072918-05

Sampled: 07/25/14 18:01

Matrix: Air

Sample Volume: 21.44 m³

Received: 07/29/14 11:30

Comments: Start Time 7/24/14 18:12

Analysis Date: 07/30/14 13:46

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0176		0.0036

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PHONE: (443) 803-8495 FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4072918-06	Sampled: 07/25/14 17:47
Matrix: Air	Sample Volume: 21.46 m ³	Received: 07/29/14 11:30
Comments: Start Time 7/24/14 17:56		Analysis Date: 07/30/14 13:56

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4072918-07

Sampled: 07/25/14 17:30

Matrix: Air

Sample Volume: 21.48 m³

Received: 07/29/14 11:30

Comments: Start Time 7/24/14 17:37

Analysis Date: 07/30/14 14:06

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.0171		0.0036

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Initials: *CR*

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FILE #: 3926.00

REPORTED: 08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4072918-08	Sampled: 07/25/14 00:00
Matrix: Air	Sample Volume: 21.44 m ³	Received: 07/29/14 11:30
Comments:		Analysis Date: 07/30/14 14:16

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 13:11

SUBMITTED: 07/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4072918-09	Sampled: 07/25/14 00:00
Matrix: Air	Sample Volume: 21.46 m ³	Received: 07/29/14 11:30
Comments:		Analysis Date: 07/30/14 14:46

Hexavalent Chromium

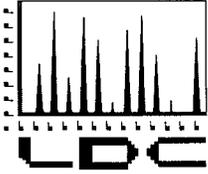
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	ND	U	0.0036

AUG 04 2014

Initials: ER

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LABORATORY DATA CONSULTANTS, INC.

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

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

August 4, 2014

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:

<u>SDG</u>	<u>Fraction</u>
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

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:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (07/28/14)	PAM-1D (07/28/14)			
Hexavalent chromium	0.118	0.102	15 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (07/29/14)	PAM-1D (07/29/14)			
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
 SDG #: 4073035
 Laboratory: Eastern Research Group

VALIDATION COMPLETENESS WORKSHEET
 Level IV

Date: 8/4/14
 Page: 1 of 1
 Reviewer: CE
 2nd Reviewer: SM

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
I.	Technical holding times	A	Sampling dates: 7/28-29/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not required
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LES/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(3,4) (12,13)
XI	Field blanks	ND	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: air

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: Dates appended to differentiate between samples: Text

Method: Inorganics (EPA Method 8000)

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% <u>85-115%</u> 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 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) $\leq 20\%$ 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 analyzed 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 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: 1 of 1
Reviewer: [Signature]
2nd Reviewer: [Signature]

Inorganics: Method See Cover

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

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

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LDC #: 32330A6

**Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cd was recalculated. Calibration date: 7/3/14

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

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

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

Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	<u>Cd</u>	s1	0.1	0.0000153	0.99990	0.99990	Y
		s2	0.1	0.0000392			
		s3	0.2	0.0000782			
		s4	0.5	0.0002033			
		s5	1	0.0004147			
		s6	2	0.0008558			
Calibration verification	↓	ICV	<u>True (ng/mL)</u> 0.5	<u>Found (ng/mL)</u> 0.4968	99	-	↓
Calibration verification	↓	CCV	↓	0.5236	105	-	↓
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.

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method Sealcover

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

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

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:

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

Where, S = Original sample concentration
 D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
<u>LCS</u>	Laboratory control sample	<u>Cr⁶⁺</u>	<u>1.06^{ng}/mL</u>	<u>1.00^{ng}/mL</u>	<u>106</u>	<u>106</u>	<u>Y</u>
<u>N</u>	Matrix spike sample		(SSR-SR)				
<u>19</u>	Duplicate sample	<u>Cr⁶⁺</u>	<u>0.112^{ng}/m³</u>	<u>0.118^{ng}/m³</u>	<u>5,22</u>	<u>5,23</u>	<u>Y</u>

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.

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- 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?

Compound (analyte) results for Cr⁶⁺ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $y = 0.00013x - 0.00000807$ Recalculation: $\frac{0.000049 + 0.0000807}{0.00013} \left(\frac{10\text{mL}}{21.5\text{m}^3} \right) = 0.01403 \text{ } \mu\text{g}/\text{m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁶⁺	0.0140	0.0140	Y
	2		0.0167	0.0167	Y
	3		0.118	0.118	Y
	4		0.102	0.102	Y
	5		0.0235	0.0235	Y
	6		0.0167	0.0167	Y
	7		0.104	0.104	Y
	10		0.0163	0.0163	Y
	11		0.0154	0.0154	Y
	12		0.0338	0.0337	Y
	13		0.0350	0.0350	Y
	14		0.0169	0.0168	Y
	15		0.0188	0.0188	Y
	16		0.231	0.231	Y

Note: _____



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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4073035-01

Sampled: 07/28/14 16:42

Matrix: Air

Sample Volume: 21.5 m³

Received: 07/30/14 11:31

Comments: Start Time 7/27/14 16:49

Analysis Date: 07/31/14 13:41

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0140

0.0036

AUG 04 2014

Initials: *ER*

Eastern Research Group

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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

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4073035-02	Sampled: 07/28/14 17:09
Matrix: Air	Sample Volume: 21.58 m ³	Received: 07/30/14 11:31
Comments: Start Time 7/27/14 17:10		Analysis Date: 07/31/14 13:51

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0167		0.0036

AUG 04 2014

Initials: ER

Eastern Research Group

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CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

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FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4073035-03

Sampled: 07/28/14 19:11

Matrix: Air

Sample Volume: 22.13 m³

Received: 07/30/14 11:31

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

Analysis Date: 07/31/14 12:20

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.118		0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4073035-04	Sampled: 07/28/14 19:29
Matrix: Air	Sample Volume: 22.36 m ³	Received: 07/30/14 11:31
Comments: Col 2 Start Time 7/27/14 18:38		Analysis Date: 07/31/14 12:40

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.102		0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4073035-05

Sampled: 07/28/14 18:43

Matrix: Air

Sample Volume: 21.95 m³

Received: 07/30/14 11:31

Comments: Start Time 7/27/14 18:20

Analysis Date: 07/31/14 14:21

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0235		0.0036

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4073035-06	Sampled: 07/28/14 18:20
Matrix: Air	Sample Volume: 21.81 m ³	Received: 07/30/14 11:31
Comments: Start Time 7/27/14 18:06		Analysis Date: 07/31/14 14:30

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0167		0.0036

AUG 04 2014

Initials: **CR**

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4073035-07

Sampled: 07/28/14 17:53

Matrix: Air

Sample Volume: 21.68 m³

Received: 07/30/14 11:31

Comments: Start Time 7/27/14 17:48

Analysis Date: 07/31/14 14:40

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.104		0.0036

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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

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4073035-08	Sampled: 07/28/14 00:00
Matrix: Air	Sample Volume: 21.95 m ³	Received: 07/30/14 11:31
Comments:		Analysis Date: 07/31/14 14:50

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

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Initials: ER

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4073035-09	Sampled: 07/28/14 00:00
Matrix: Air	Sample Volume: 21.81 m ³	Received: 07/30/14 11:31
Comments:		Analysis Date: 07/31/14 15:00

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	ND	U	0.0036

AUG 04 2014

Initials: *ER*

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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

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4073035-10	Sampled: 07/29/14 16:31
Matrix: Air	Sample Volume: 21.31 m ³	Received: 07/30/14 11:31
Comments: Start Time 7/28/14 16:50		Analysis Date: 07/31/14 15:10

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0163		0.0036

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ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4073035-11

Sampled: 07/29/14 16:53

Matrix: Air

Sample Volume: 21.16 m³

Received: 07/30/14 11:31

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

Analysis Date: 07/31/14 15:20

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0154		0.0036

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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

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4073035-12	Sampled: 07/29/14 18:37
Matrix: Air	Sample Volume: 20.82 m ³	Received: 07/30/14 11:31
Comments: Col 1 Start Time 7/28/14 19:29		Analysis Date: 07/31/14 13:00

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0338		0.0036

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4073035-13	Sampled: 07/29/14 18:44
Matrix: Air	Sample Volume: 20.84 m ³	Received: 07/30/14 11:31
Comments: Col 2 Start Time 7/28/14 19:34		Analysis Date: 07/31/14 13:20

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0350		0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4073035-14

Sampled: 07/29/14 18:11

Matrix: Air

Sample Volume: 20.96 m³

Received: 07/30/14 11:31

Comments: Start Time 7/28/14 18:54

Analysis Date: 07/31/14 15:30

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0169		0.0036

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ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4073035-15	Sampled: 07/29/14 17:52
Matrix: Air	Sample Volume: 21.02 m ³	Received: 07/30/14 11:31
Comments: Start Time 7/28/14 18:31		Analysis Date: 07/31/14 15:40

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0188		0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4073035-16	Sampled: 07/29/14 17:28
Matrix: Air	Sample Volume: 21.11 m ³	Received: 07/30/14 11:31
Comments: Start Time 7/28/14 18:00		Analysis Date: 07/31/14 15:50

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.231		0.0036

AUG 04 2014

Initials: ER



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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

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4073035-17	Sampled: 07/29/14 00:00
Matrix: Air	Sample Volume: 20.96 m ³	Received: 07/30/14 11:31
Comments:		Analysis Date: 07/31/14 16:19

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

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FILE #: 3926.00

REPORTED: 08/01/14 16:00

SUBMITTED: 07/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4073035-18

Sampled: 07/29/14 00:00

Matrix: Air

Sample Volume: 21.02 m³

Received: 07/30/14 11:31

Comments:

Analysis Date: 07/31/14 16:29

Hexavalent Chromium

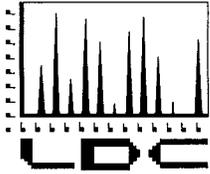
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

AUG 04 2014

Initials: *CR*

Eastern Research Group

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LABORATORY DATA CONSULTANTS, INC.

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

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

August 6, 2014

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:

<u>SDG</u>	<u>Fraction</u>
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.

Sincerely,

Christina Rink
Project Manager/Chemist

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:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (07/30/14)	PAM-1D (07/30/14)			
Hexavalent chromium	0.0230	0.0121	62 (≤20)	NQ	-

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

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (07/31/14)	PAM-1D (07/31/14)			
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

Date: 8/6/14

SDG #: 4073112/4080113

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: CR

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
I.	Technical holding times	A	Sampling dates: 7/30 - 31/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	A	Dup LCS ID
VII.	Laboratory control samples	A	
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD = (3, 4) (12, 13)
XI.	Field blanks	ND	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: Airs

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	
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: Dates appended to differentiate samples

Method: Inorganics (EPA Method See Copy)

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% <u>85-115</u> 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 only
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 <u>85-125</u> QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	NA		/	
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters <u>waters</u> 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 analyzed 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 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# 32358A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: SD
2nd Reviewer: al

Inorganics: Method See Cover

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

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

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

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

LDC #: 3238A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
 Reviewer: SD
 2nd Reviewer: Q

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ 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:

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

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

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	<u>Cr⁺⁶</u>	s1	0.50	0.0000227	0.99992	0.99992	y
		s2	0.10	0.0000446			
		s3	0.20	0.0000815			
		s4	0.50	0.0002052			
		s5	1.00	0.0004025			
		s6	2.00	0.0008217			
<u>ICV 11:19</u> Calibration verification	<u>Cr⁺⁶</u>	<u>Found</u> 0.5263ng/ml	<u>True</u> 0.5ng/ml		105.3%R	105.3%R	↓
<u>CCV 12:18</u> Calibration verification	<u>Cr⁺⁶</u>	0.5133ng/ml	0.5ng/ml		102.7%R	102.7%R	↓
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.

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Case

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

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

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS 11:48	Laboratory control sample	Cr ⁺⁶	1.09 ug/ml	1.00 ug/ml	109%R	109%R	Y
N	Matrix spike sample		(SSR-SR)				
Dup 12:54	Duplicate sample	Cr ⁺⁶	0.0176 mg/m ³	0.0203 mg/m ³	14.2%RPD	14.1%RPD	Y

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.

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- 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?

Compound (analyte) results for (5) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A_{\text{rec}} - C_0) / C_1$

Recalculation: $(0.000085 - 7.45E-07) / 0.0004088 = 0.01897 \text{ ng/m}^3$

$C_0 = 7.45E-07$

$C_1 = 0.0004088$

$A_{\text{rec}} = 0.000085$

$V_f = 10 \text{ ml}$

$M^3 = 21.46$

$\frac{(\text{ng/ml})(\text{ul})}{\text{m}^3} = \text{ng/m}^3$

$\frac{(0.01897 \text{ ng/ml})(10 \text{ ml})}{21.46 \text{ m}^3} = 0.0088 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	Cr ⁺⁶	0.0050	0.0049	Y	
	2	↓	0.0104	0.0105	↓	
	3		0.0203	0.0203		
	4		0.0121	0.0121		
	5		0.0088	0.0088		
	6		0.0054	0.0054		
	7		0.0856	0.0857		
	8		ND	ND		
	9		ND	ND		
	10		0.0184	0.0185		
	11		0.0198	0.0198		
	12		0.0492	0.0492		
	13		0.0517	0.0518		
	14		0.0360	0.0360		
	15		0.0225	0.0225		
	16		0.0514	0.0514		
	17		ND	ND		
	18		ND	ND		Y

Note: _____



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FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4073112-01

Sampled: 07/30/14 16:34

Matrix: Air

Sample Volume: 21.58 m³

Received: 07/31/14 11:21

Comments: Start Time 7/29/14 16:35

Analysis Date: 08/04/14 14:50

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0050

0.0036

AUG 06 2014

Initials: **GR**

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REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4073112-02	Sampled: 07/30/14 17:01
Matrix: Air	Sample Volume: 21.63 m ³	Received: 07/31/14 11:21
Comments: Start Time 7/29/14 16:58		Analysis Date: 08/04/14 15:00

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0104		0.0036

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REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4073112-03

Sampled: 07/30/14 18:29

Matrix: Air

Sample Volume: 21.42 m³

Received: 07/31/14 11:21

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

Analysis Date: 08/04/14 12:45

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0203		0.0036

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REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4073112-04

Sampled: 07/30/14 18:35

Matrix: Air

Sample Volume: 21.39 m³

Received: 07/31/14 11:21

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

Analysis Date: 08/04/14 14:04

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0121

0.0036

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REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4073112-05

Sampled: 07/30/14 18:07

Matrix: Air

Sample Volume: 21.46 m³

Received: 07/31/14 11:21

Comments: Start Time 7/29/14 18:16

Analysis Date: 08/04/14 15:10

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0088

0.0036

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REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4073112-06	Sampled: 07/30/14 17:51
Matrix: Air	Sample Volume: 21.5 m ³	Received: 07/31/14 11:21
Comments: Start Time 7/29/14 17:57		Analysis Date: 08/04/14 15:20

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0054		0.0036

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REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4073112-07

Sampled: 07/30/14 17:35

Matrix: Air

Sample Volume: 21.55 m³

Received: 07/31/14 11:21

Comments: Start Time 7/29/14 17:39

Analysis Date: 08/04/14 15:30

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0856		0.0036

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REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4073112-08

Sampled: 07/30/14 00:00

Matrix: Air

Sample Volume: 21.46 m³

Received: 07/31/14 11:21

Comments:

Analysis Date: 08/04/14 15:40

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	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

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4073112-09

Sampled: 07/30/14 00:00

Matrix: Air

Sample Volume: 21.5 m³

Received: 07/31/14 11:21

Comments:

Analysis Date: 08/04/14 15:50

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

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

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 4080113-01	Sampled: 07/31/14 16:44
Matrix: Air	Sample Volume: 21.65 m ³	Received: 08/01/14 10:43
Comments: Start Time 7/30/14 16:41		Analysis Date: 08/04/14 16:00

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0184		0.0036

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REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4080113-02

Sampled: 07/31/14 17:28

Matrix: Air

Sample Volume: 21.94 m³

Received: 08/01/14 10:43

Comments: Start Time 7/30/14 17:05

Analysis Date: 08/04/14 16:10

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0198		0.0036

AUG 06 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4080113-03

Sampled: 07/31/14 19:17

Matrix: Air

Sample Volume: 22.26 m³

Received: 08/01/14 10:43

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

Analysis Date: 08/04/14 13:24

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0492		0.0036

AUG 06 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4080113-04	Sampled: 07/31/14 19:17
Matrix: Air	Sample Volume: 22.19 m ³	Received: 08/01/14 10:43
Comments: Col 2 Start Time 7/30/14 18:38		Analysis Date: 08/04/14 13:44

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0517		0.0036

AUG 06 2014

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4080113-05

Sampled: 07/31/14 19:05

Matrix: Air

Sample Volume: 22.39 m³

Received: 08/01/14 10:43

Comments: Start Time 7/30/14 18:12

Analysis Date: 08/04/14 16:20

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0360		0.0036

AUG 06 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4080113-06

Sampled: 07/31/14 18:39

Matrix: Air

Sample Volume: 22.26 m³

Received: 08/01/14 10:43

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

Analysis Date: 08/04/14 16:49

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0225		0.0036

AUG 06 2014

Initials: *ER*

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.



CERTIFICATE OF ANALYSIS

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

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4080113-07

Sampled: 07/31/14 18:16

Matrix: Air

Sample Volume: 22.15 m³

Received: 08/01/14 10:43

Comments: Start Time 7/30/14 17:39

Analysis Date: 08/04/14 16:59

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0514		0.0036

AUG 06 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4080113-08

Sampled: 07/31/14 00:00

Matrix: Air

Sample Volume: 22.39 m³

Received: 08/01/14 10:43

Comments:

Analysis Date: 08/04/14 17:09

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

AUG 06 2014

Initials: ER

Eastern Research Group

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CERTIFICATE OF ANALYSIS

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FILE #: 3926.00

REPORTED: 08/05/14 14:22

SUBMITTED: 07/31/14 to 08/01/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4080113-09

Sampled: 07/31/14 00:00

Matrix: Air

Sample Volume: 22.26 m³

Received: 08/01/14 10:43

Comments:

Analysis Date: 08/04/14 17:19

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	ND	U	0.0036

AUG 06 2014

Initials: **CR**

Eastern Research Group

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