

LABORATORY DATA CONSULTANTS, INC.

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

August 12, 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 8, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32402:

SDG

4080515

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: August 1 through August 4, 2014
LDC Report Date: August 11, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4080515

Sample Identification

OAM 1 (08/01/14)	PAM-1 (08/04/14)DUP
OAM 2 (08/01/14)	PAM-1D (08/04/14)DUP
PAM-1 (08/01/14)	
PAM-1D (08/01/14)	
PAM-2 (08/01/14)	
PAM-3 (08/01/14)	
PAM-4 (08/01/14)	
PAM-21 (08/01/14)	
PAM-31 (08/01/14)	
OAM 1 (08/04/14)	
OAM 2 (08/04/14)	
PAM-1 (08/04/14)	
PAM-1D (08/04/14)	
PAM-2 (08/04/14)	
PAM-3 (08/04/14)	
PAM-4 (08/04/14)	
PAM-21 (08/04/14)	
PAM-31 (08/04/14)	
PAM-1 (08/01/14)DUP	
PAM-1D (08/01/14)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 (08/01/14) and PAM-31 (08/04/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (08/01/14) and PAM-21 (08/04/14) 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 (08/01/14) and PAM-1D (08/01/14) and samples PAM-1 (08/04/14) and PAM-1D (08/04/14) 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 (08/01/14)	PAM-1D (08/01/14)			
Hexavalent chromium	0.0844	0.0861	2 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (08/04/14)	PAM-1D (08/04/14)			
Hexavalent chromium	0.0351	0.0300	16 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4080515**

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
4080515**

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 4080515**

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

LDC #: 32402A6

VALIDATION COMPLETENESS WORKSHEET

Date: 8/11/14

SDG #: 4080515

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: SO

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: 08/01 - 04/14
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) (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 (08/01/14)	11	OAM 2 (08/04/14)	21	PAM-1 (08/04/14)DUP	31	
2	OAM 2 (08/01/14)	12	PAM-1 (08/04/14)	22	PAM-1D (08/04/14)DUP	32	
3	PAM-1 (08/01/14)	13	PAM-1D (08/04/14)	23		33	
4	PAM-1D (08/01/14)	14	PAM-2 (08/04/14)	24		34	
5	PAM-2 (08/01/14)	15	PAM-3 (08/04/14)	25		35	
6	PAM-3 (08/01/14)	16	PAM-4 (08/04/14)	26		36	
7	PAM-4 (08/01/14)	17	PAM-21 (08/04/14)	27		37	
8	PAM-21 (08/01/14)	18	PAM-31 (08/04/14)	28		38	
9	PAM-31 (08/01/14)	19	PAM-1 (08/01/14)DUP	29		39	
10	OAM 1 (08/04/14)	20	PAM-1D (08/01/14)DUP	30		40	

Notes: Date appended to ID to differentiate between samples

Method: Inorganics (EPA Method See lower)

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 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 $\leq 2X$ 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?			/	

Airs

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# 32402A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qualifiers
	3	4		
Hexavalent Chromium	0.0844	0.0861	2	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qualifiers
	12	13		
Hexavalent Chromium	0.0351	0.0300	16	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32402A6.wpd

LDC #: 32402AV

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 08/06/14

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	0.0000209	0.99998	0.99998	y
		s2	0.10	0.0000437			
		s3	0.20	0.0000874			
		s4	0.50	0.0002041			
		s5	1.00	0.0004104			
		s6	2.00	0.0008175			
ICV 10:56 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5047 ng/ml	<u>True</u> 0.500 ng/ml		100.9%R	100.9%R	↓
CCV 14:20 Calibration verification	Cr ⁺⁶	0.531 ng/ml	0.500 ng/ml		106.2%R	106.2%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 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	
LCS	Laboratory control sample	Cr ⁺⁶	1.1056 ng/ml	1.00 ng/ml	111%R	111%R	y
N	Matrix spike sample		(SSR-SR)				
Dup	Duplicate sample	Cr ⁺⁶	0.0844 ng/m ³	0.0844 ng/m ³	0%RPD	0.0556%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.

*Rounding

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 (5) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{[(Area - L_0)]}{C_1}$

Recalculation: $\frac{(0.0000538 - 2.57E-06)}{0.0004074} = 0.1257 \text{ ng/ml}$

Area = 0.0000538

L₀ = 2.57E-6

C₁ = 0.0004074

$\frac{(\text{ng/ml})(\text{ul})}{\text{m}^3} = \text{ng/m}^3$
 $\text{ul} = 10 \text{ ml}$ $\text{m}^3 = 21.14$

$\frac{(0.1257 \text{ ng/ml})(10 \text{ ml})}{21.14 \text{ m}^3} = 0.0595 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	Cr ⁺⁶	0.0299	0.0299	Y	
	2		0.0326	0.0326		
	3		0.0844	0.0844		
	4		0.0861	0.0861		
	5		0.0595	0.0595		
	6		0.0368	0.0368		
	7		0.122	0.121		
	8		ND	ND		
	9		ND	ND		
	10		0.0145	0.0145		
	11		0.0213	0.0214		
	12		0.0351	0.0351		
	13		0.0300	0.0300		
	14		0.0373	0.0374		
	15		0.0251	0.0252		
	16		0.0275	0.0275		
	17		ND	ND		
	18		ND	ND		Y

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: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4080515-01

Sampled: 08/01/14 16:36

Matrix: Air

Sample Volume: 21.31 m³

Received: 08/05/14 10:51

Comments: Start Time 7/31/14 16:55

Analysis Date: 08/06/14 14:00

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0299

0.0036

AUG 11 2014

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4080515-02

Sampled: 08/01/14 17:02

Matrix: Air

Sample Volume: 21.08 m³

Received: 08/05/14 10:51

Comments: Start Time 7/31/14 17:38

Analysis Date: 08/06/14 14:10

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	0.0326		0.0036

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Initials: *CR*

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4080515-03

Sampled: 08/01/14 19:07

Matrix: Air

Sample Volume: 21.33 m³

Received: 08/05/14 10:51

Comments: Col 1 Start Time 7/31/14 19:24

Analysis Date: 08/06/14 12:40

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	0.0844		0.0036

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4080515-04

Sampled: 08/01/14 19:12

Matrix: Air

Sample Volume: 21.44 m³

Received: 08/05/14 10:51

Comments: Col 2 Start Time 7/31/14 19:23

Analysis Date: 08/06/14 13:00

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	0.0861		0.0036

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4080515-05

Sampled: 08/01/14 18:38

Matrix: Air

Sample Volume: 21.14 m³

Received: 08/05/14 10:51

Comments: Start Time 7/31/14 19:08

Analysis Date: 08/06/14 14:40

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	0.0595		0.0036

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4080515-06

Sampled: 08/01/14 18:17

Matrix: Air

Sample Volume: 21.16 m³

Received: 08/05/14 10:51

Comments: Start Time 7/31/14 18:46

Analysis Date: 08/06/14 14:50

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	0.0368		0.0036

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4080515-07	Sampled: 08/01/14 17:42
Matrix: Air	Sample Volume: 20.98 m ³	Received: 08/05/14 10:51
Comments: Start Time 7/31/14 18:23		Analysis Date: 08/06/14 14:59

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	0.122		0.0036

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4080515-08

Sampled: 08/01/14 00:00

Matrix: Air

Sample Volume: 21.14 m³

Received: 08/05/14 10:51

Comments:

Analysis Date: 08/06/14 15:09

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

AUG 11 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4080515-09

Sampled: 08/01/14 00:00

Matrix: Air

Sample Volume: 21.16 m³

Received: 08/05/14 10:51

Comments:

Analysis Date: 08/06/14 15:19

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

AUG 11 2014

Initials: *ER*

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4080515-10

Sampled: 08/04/14 16:28

Matrix: Air

Sample Volume: 21.32 m³

Received: 08/05/14 10:51

Comments: Start Time 8/3/14 16:46

Analysis Date: 08/06/14 15:29

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	0.0145		0.0036

AUG 11 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: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4080515-11

Sampled: 08/04/14 16:41

Matrix: Air

Sample Volume: 20.94 m³

Received: 08/05/14 10:51

Comments: Start Time 8/3/14 17:25

Analysis Date: 08/06/14 15:39

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0213

0.0036

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4080515-12

Sampled: 08/04/14 18:13

Matrix: Air

Sample Volume: 20.7 m³

Received: 08/05/14 10:51

Comments: Col 1 Start Time 8/3/14 19:13

Analysis Date: 08/06/14 13:19

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	0.0351		0.0036

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Initials: *ER*

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4080515-13

Sampled: 08/04/14 18:16

Matrix: Air

Sample Volume: 20.7 m³

Received: 08/05/14 10:51

Comments: Col 2 Start Time 8/3/14 19:16

Analysis Date: 08/06/14 13:39

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	0.0300		0.0036

AUG 11 2014

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4080515-14

Sampled: 08/04/14 17:44

Matrix: Air

Sample Volume: 20.71 m³

Received: 08/05/14 10:51

Comments: Start Time 8/3/14 18:43

Analysis Date: 08/06/14 15:49

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	0.0373		0.0036

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Malvern, PA 19355

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4080515-15

Sampled: 08/04/14 17:23

Matrix: Air

Sample Volume: 20.7 m³

Received: 08/05/14 10:51

Comments: Start Time 8/3/14 18:23

Analysis Date: 08/06/14 15:59

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	0.0251		0.0036

AUG 11 2014

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4080515-16

Sampled: 08/04/14 17:10

Matrix: Air

Sample Volume: 20.82 m³

Received: 08/05/14 10:51

Comments: Start Time 8/3/14 18:02

Analysis Date: 08/06/14 16:09

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0275		0.0036

AUG 11 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4080515-17

Sampled: 08/04/14 00:00

Matrix: Air

Sample Volume: 20.71 m³

Received: 08/05/14 10:51

Comments:

Analysis Date: 08/06/14 16:39

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

AUG 11 2014

Initials: *CR*

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ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 08/08/14 12:57

SUBMITTED: 08/05/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4080515-18	Sampled: 08/04/14 00:00
Matrix: Air	Sample Volume: 20.7 m ³	Received: 08/05/14 10:51
Comments:		Analysis Date: 08/06/14 16:48

Hexavalent Chromium

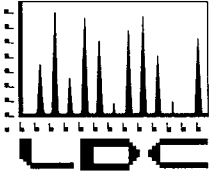
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

AUG 11 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 13, 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 11, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32410:

SDG

4080619

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

Level IV

LDC #32410 (ERM - Morrisville, NC / Harbor Point, MD, Hexavalent Chromium Monitoring)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cr(VI) (D7614)																																	
				A	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S				
A	4080619	08/11/14	08/14/14	9	0																																
Total				9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, and DUPs

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring
Collection Date: August 5, 2014
LDC Report Date: August 11, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4080619

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 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	0.0445	0.0441	1 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4080619**

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
4080619**

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 4080619**

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

LDC #: 32410A6
 SDG #: 4080619
 Laboratory: Eastern Research Group

VALIDATION COMPLETENESS WORKSHEET
 Level IV

Date: 8/11/14
 Page: 1 of 1
 Reviewer: SO
 2nd Reviewer: ra

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: <u>08/05/14</u>
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	<u>Not Required</u>
VI.	Duplicates	A	<u>DUP</u>
VII.	Laboratory control samples	A	<u>LLSD</u>
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	<u>(3,4) = FD</u>
XI.	Field blanks	ND	<u>FB=8 TB=9</u>

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	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 lower)

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 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?			/	

AG

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# 32410A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0445	0.0441	1	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32410A6.wpd

LDC #: 32410AL

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 8/7/14

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	0.0000147	0.99989	0.99989	y
		s2	0.10	0.0000379			
		s3	0.20	0.0000789			
		s4	0.50	0.0001933			
		s5	1.00	0.0003885			
		s6	2.00	0.0008013			
IW 10:20 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5182	<u>True</u> 0.500 ng/ml		103.6%R	103.6%R	↓
CCV 11:20 Calibration verification	Cr ⁺⁶	0.5319 ng/ml	0.500 ng/ml		106.4%R	106.4%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.

LDC #: 32410AB

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: SO
2nd Reviewer: g

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>LLS</u> <u>10:56</u>	Laboratory control sample	<u>Cr⁺⁶</u>	<u>1.1099 ng/ml</u>	<u>1.00 ng/ml</u>	<u>111%R</u>	<u>111%R</u>	<u>y</u>
<u>N</u>	Matrix spike sample		(SSR-SR)				
<u>Dup.</u> <u>11:58</u>	Duplicate sample	<u>Cr⁺⁶</u>	<u>0.04832 ng/m³</u>	<u>0.04445 ng/m³</u>	<u>8.34%RPD</u>	<u>8.26%RPD</u>	<u>y</u>

Comments: _____

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 (-) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $[(area - C_0) / C_1] \times V^A = 10ml$ Recalculation: $[(0.0000316 - (-5.01E-06)) / 0.000412] = 0.09125$

area = 0.0000316
 C₀ = -5.01E-06
 C₁ = 0.000412

$\frac{(ng/ml)(\mu l)}{m^3} \quad m^3 = 21.85$
 ng/ml = 0.09125

$\frac{(0.09125 ng/ml)(10ml)}{21.85 m^3} = 0.0418 ng/m^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0310	0.0310	Y
	2	↓	0.0254	0.0254	↓
	3		0.0445	0.0445	
	4		0.0441	0.0441	
	5		0.0332	0.0332	
	6		0.0317	0.0316	
	7		0.0418	0.0418	
	8		ND	ND	
	9		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: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4080619-01	Sampled: 08/05/14 16:32
Matrix: Air	Sample Volume: 21.59 m ³	Received: 08/06/14 11:29
Comments: Start Time 8/4/14 16:33		Analysis Date: 08/07/14 12:28

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	0.0310		0.0036

AUG 13 2014

Initials: **GR**

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4080619-02	Sampled: 08/05/14 16:54
Matrix: Air	Sample Volume: 21.72 m ³	Received: 08/06/14 11:29
Comments: Start Time 8/4/14 16:46		Analysis Date: 08/07/14 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	0.0254		0.0036

AUG 13 2014

Initials: *CR*

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: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4080619-03	Sampled: 08/05/14 18:37
Matrix: Air	Sample Volume: 21.93 m ³	Received: 08/06/14 11:29
Comments: Col 1 Start Time 8/4/14 18:15		Analysis Date: 08/07/14 11:48

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	0.0445		0.0036

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FILE #: 3926.00

REPORTED: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4080619-04	Sampled: 08/05/14 18:43
Matrix: Air	Sample Volume: 21.96 m ³	Received: 08/06/14 11:29
Comments: Col 2 Start Time 8/4/14 18:19		Analysis Date: 08/07/14 12:08

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	0.0441		0.0036

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4080619-05

Sampled: 08/05/14 18:15

Matrix: Air

Sample Volume: 21.99 m³

Received: 08/06/14 11:29

Comments: Start Time 8/4/14 17:50

Analysis Date: 08/07/14 12:48

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0332

0.0036

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FILE #: 3926.00

REPORTED: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4080619-06	Sampled: 08/05/14 17:54
Matrix: Air	Sample Volume: 21.99 m ³	Received: 08/06/14 11:29
Comments: Start Time 8/4/14 17:28		Analysis Date: 08/07/14 12:58

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	0.0317		0.0036

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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: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4080619-07	Sampled: 08/05/14 17:30
Matrix: Air	Sample Volume: 21.85 m ³	Received: 08/06/14 11:29
Comments: Start Time 8/4/14 17:14		Analysis Date: 08/07/14 13:08

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	0.0418		0.0036

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Initials: *ER*

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Environmental Resources Management, Inc

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ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4080619-08

Sampled: 08/05/14 00:00

Matrix: Air

Sample Volume: 21.99 m³

Received: 08/06/14 11:29

Comments:

Analysis Date: 08/07/14 13:18

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: 08/11/14 10:12

SUBMITTED: 08/06/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4080619-09

Sampled: 08/05/14 00:00

Matrix: Air

Sample Volume: 21.99 m³

Received: 08/06/14 11:29

Comments:

Analysis Date: 08/07/14 13:48

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

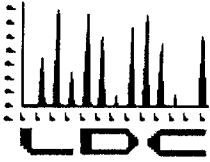
0.0036

AUG 13 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 19, 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 15, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32467:

<u>SDG</u>	<u>Fraction</u>
4081223	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: August 8 through August 11, 2014
LDC Report Date: August 19, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4081223

Sample Identification

OAM 1 (08/08/14)
OAM 2 (08/08/14)
PAM-1 (08/08/14)
PAM-1D (08/08/14)
PAM-2 (08/08/14)
PAM-3 (08/08/14)
PAM-4 (08/08/14)
PAM-21 (08/08/14)
PAM-31 (08/08/14)
OAM 1 (08/11/14)
OAM 2 (08/11/14)
PAM-1 (08/11/14)
PAM-1D (08/11/14)
PAM-2 (08/11/14)
PAM-3 (08/11/14)
PAM-4 (08/11/14)
PAM-21 (08/11/14)
PAM-31 (08/11/14)
PAM-1 (08/08/14)DUP
PAM-1D (08/08/14)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 initial, continuing and preparation blanks.

Samples PAM-31 (08/08/14) and PAM-31 (08/11/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (08/08/14) and PAM-21 (08/11/14) were identified as field blanks. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) 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 (08/08/14) and PAM-1D (08/08/14) and samples PAM-1 (08/11/14) and PAM-1D (08/11/14) 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 (08/08/14)	PAM-1D (08/08/14)			
Hexavalent chromium	0.0143	0.0140	2 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (08/11/14)	PAM-1D (08/11/14)			
Hexavalent chromium	0.0269	0.0232	15 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4081223**

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
4081223**

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 4081223**

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

LDC #: 32467A6

VALIDATION COMPLETENESS WORKSHEET

Date: 8/18/14

SDG #: 4081223

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: JO

2nd Reviewer: AL

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: 8/2/14 ^a 8/8-8/11/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	NR
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	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: A, 5, 9

1	OAM 1 (08/08/14)	11	OAM 2 (08/11/14)	21	PAM-1 (08/11/14)DUP	31	
2	OAM 2 (08/08/14)	12	PAM-1 (08/11/14)	22	PAM-1D (08/11/14)DUP	32	
3	PAM-1 (08/08/14)	13	PAM-1D (08/11/14)	23		33	
4	PAM-1D (08/08/14)	14	PAM-2 (08/11/14)	24		34	
5	PAM-2 (08/08/14)	15	PAM-3 (08/11/14)	25		35	
6	PAM-3 (08/08/14)	16	PAM-4 (08/11/14)	26		36	
7	PAM-4 (08/08/14)	17	PAM-21 (08/11/14)	27		37	
8	PAM-21 (08/08/14)	18	PAM-31 (08/11/14)	28		38	
9	PAM-31 (08/08/14)	19	PAM-1 (08/08/14)DUP	29		39	
10	OAM 1 (08/11/14)	20	PAM-1D (08/08/14)DUP	30		40	

Notes: Data appended to differentiate between samples

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>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 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?			/	

HRS

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# 32467A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0143	0.0140	2	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0269	0.0232	15	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32467A6.wpd

LDC #: 32467A6

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

Page: 1 of 1

Reviewer: SO

2nd Reviewer: G

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 8/13/14

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. (mg/L)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.1	0.0000163	0.99999	0.99999	Y
		s2	0.1	0.0000392			
		s3	0.2	0.0000777			
		s4	0.5	0.0001967			
		s5	1	0.0003938			
		s6	2	0.0007851			
ICV 10:33 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5073 ng/ml	<u>True</u> 0.5 ng/ml		101.5%R	101.4%R	
CCV 11:33 Calibration verification	Cr ⁺⁶	0.5515 ng/ml	0.5 ng/ml		110.3%R	110.3%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 Lower

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 11:03	Laboratory control sample	Cr+6	1.0016 ng/ml	1.00 ng/ml	110%R	110%R	Y
N	Matrix spike sample		(SSR-SR)				
DUP 12:02	Duplicate sample	Cr+6	0.0167	0.0143	15.5%RPD	14.9%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 (16) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{[Area - (Co)]}{C1}$ Recalculation: $\frac{[(0.000029) - (-1.03E-06)]}{0.0003935} = 0.0763 \text{ ng/ml}$

$Area = 0.000029$
 $Co = -1.03E-06$
 $C1 = 0.0003935$

$\text{ng/m}^3 = \frac{(\text{ng/ml})(Vf)}{Vf}$
 $Vf = 10 \text{ ml}$ $m^3 = 22.15$

$\frac{(0.0763 \text{ ng/ml})(10 \text{ ml})}{22.15} \approx 0.0345 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	Cr ⁺⁶	0.0089	0.0089	Y	
	2		0.0107	0.0107		
	3		0.0143	0.0143		
	4		0.0140	0.0141		
	5		0.0088	0.0088		
	6		0.0204	0.0203		
	7		0.0178	0.0178		
	8		ND	ND		
	9		ND	ND		
	10		0.0139	0.0139		
	11		0.0195	0.0195		
	12		0.0269	0.0269		
	13		0.0232	0.0232		
	14		0.0216	0.0216		
	15		0.0172	0.0172		
	16		0.0344	0.0345		
	17		ND	ND		
	18		ND	ND		Y

Note: _____



CERTIFICATE OF ANALYSIS

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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: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4081223-01	Sampled: 08/08/14 16:15
Matrix: Air	Sample Volume: 21.46 m ³	Received: 08/12/14 11:02
Comments: Start Time 8/7/14 16:25		Analysis Date: 08/13/14 14:02

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	0.0089		0.0036

AUG 19 2014

Initials: *CR*

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4081223-02

Sampled: 08/08/14 16:22

Matrix: Air

Sample Volume: 21.37 m³

Received: 08/12/14 11:02

Comments: Start Time 8/7/14 16:38

Analysis Date: 08/13/14 14:12

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	0.0107		0.0036

AUG 19 2014

Initials: *CR*

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: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4081223-03

Sampled: 08/08/14 17:11

Matrix: Air

Sample Volume: 21.19 m³

Received: 08/12/14 11:02

Comments: Col 1 Start Time 8/7/14 17:38

Analysis Date: 08/13/14 11:53

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	0.0143		0.0036

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FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4081223-04

Sampled: 08/08/14 17:12

Matrix: Air

Sample Volume: 21.17 m³

Received: 08/12/14 11:02

Comments: Col 2 Start Time 8/7/14 17:41

Analysis Date: 08/13/14 12:12

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	0.0140		0.0036

AUG 19 2014

Initials: *CR*

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

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-2	Lab ID: 4081223-05	Sampled: 08/08/14 17:01
Matrix: Air	Sample Volume: 21.25 m ³	Received: 08/12/14 11:02
Comments: Start Time 8/7/14 17:25		Analysis Date: 08/13/14 14:22

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	0.0088		0.0036

AUG 19 2014

Initials: *CR*

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4081223-06

Sampled: 08/08/14 16:54

Matrix: Air

Sample Volume: 21.27 m³

Received: 08/12/14 11:02

Comments: Start Time 8/7/14 17:16

Analysis Date: 08/13/14 14:32

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	0.0204		0.0036

AUG 19 2014

Initials: *CR*

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4081223-07

Sampled: 08/08/14 16:45

Matrix: Air

Sample Volume: 21.3 m³

Received: 08/12/14 11:02

Comments: Start Time 8/7/14 17:05

Analysis Date: 08/13/14 14:42

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	0.0178		0.0036

AUG 19 2014

Initials: *CR*

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: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4081223-08

Sampled: 08/08/14 00:00

Matrix: Air

Sample Volume: 21.25 m³

Received: 08/12/14 11:02

Comments:

Analysis Date: 08/13/14 14:52

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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Initials: *CR*

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Environmental Resources Management, Inc

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4081223-09

Sampled: 08/08/14 00:00

Matrix: Air

Sample Volume: 21.27 m³

Received: 08/12/14 11:02

Comments:

Analysis Date: 08/13/14 15:02

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	ND	U	0.0036

AUG 19 2014

Initials: *ER*

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4081223-10	Sampled: 08/11/14 16:22
Matrix: Air	Sample Volume: 21.7 m ³	Received: 08/12/14 11:02
Comments: Start Time 8/10/14 16:15		Analysis Date: 08/13/14 15:12

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	0.0139		0.0036

AUG 19 2014

Initials: *ER*

Eastern Research Group

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4081223-11

Sampled: 08/11/14 16:49

Matrix: Air

Sample Volume: 21.95 m³

Received: 08/12/14 11:02

Comments: Start Time 8/10/14 16:24

Analysis Date: 08/13/14 15:22

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0195

0.0036

AUG 19 2014

Initials: *CR*

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4081223-12

Sampled: 08/11/14 18:11

Matrix: Air

Sample Volume: 22.27 m³

Received: 08/12/14 11:02

Comments: Col 1 Start Time 8/10/14 17:26

Analysis Date: 08/13/14 12:32

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0269		0.0036

AUG 19 2014

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4081223-13

Sampled: 08/11/14 18:11

Matrix: Air

Sample Volume: 22.27 m³

Received: 08/12/14 11:02

Comments: Col 2 Start Time 8/10/14 17:26

Analysis Date: 08/13/14 12:52

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0232

0.0036

AUG 19 2014

Initials: *ER*

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4081223-14

Sampled: 08/11/14 17:53

Matrix: Air

Sample Volume: 22.18 m³

Received: 08/12/14 11:02

Comments: Start Time 8/10/14 17:14

Analysis Date: 08/13/14 15:32

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0216		0.0036

AUG 19 2014

Initials: *CR*

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4081223-15

Sampled: 08/11/14 17:38

Matrix: Air

Sample Volume: 22.08 m³

Received: 08/12/14 11:02

Comments: Start Time 8/10/14 17:06

Analysis Date: 08/13/14 16:01

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	0.0172		0.0036

AUG 19 2014

Initials: *CR*

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4081223-16

Sampled: 08/11/14 17:26

Matrix: Air

Sample Volume: 22.15 m³

Received: 08/12/14 11:02

Comments: Start Time 8/10/14 16:49

Analysis Date: 08/13/14 16:11

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	0.0344		0.0036

AUG 19 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: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4081223-17

Sampled: 08/11/14 00:00

Matrix: Air

Sample Volume: 22.18 m³

Received: 08/12/14 11:02

Comments:

Analysis Date: 08/13/14 16:21

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

AUG 19 2014

Initials: *ER*

Eastern Research Group

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 08/15/14 11:41

SUBMITTED: 08/12/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4081223-18

Sampled: 08/11/14 00:00

Matrix: Air

Sample Volume: 22.08 m³

Received: 08/12/14 11:02

Comments:

Analysis Date: 08/13/14 16:31

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

AUG 19 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 26, 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 22, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

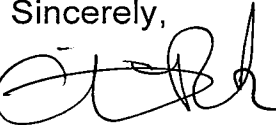
LDC Project #32521:

<u>SDG</u>	<u>Fraction</u>
4081934	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

Level IV

LDC #32521 (ERM - Morrisville, NC / Harbor Point, MD, Hexavalent Chromium Monitoring)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cr(VI) (D7614)																																				
				A	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S							
Matrix: Air/Water/Soil				A	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S							
A	4081934	08/22/14	08/27/14	17	0																																			
Total	T/CR			17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, and DUPs 32521ST.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring
Collection Date: August 15 through August 18, 2014
LDC Report Date: August 25, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4081934

Sample Identification

OAM 1 (08/15/14)
OAM 2 (08/15/14)
PAM-1 (08/15/14)
PAM-2 (08/15/14)
PAM-3 (08/15/14)
PAM-4 (08/15/14)
PAM-21 (08/15/14)
PAM-31 (08/15/14)
OAM 1 (08/18/14)
OAM 2 (08/18/14)
PAM-1 (08/18/14)
PAM-1D (08/18/14)
PAM-2 (08/18/14)
PAM-3 (08/18/14)
PAM-4 (08/18/14)
PAM-21 (08/18/14)
PAM-31 (08/18/14)
PAM-1 (08/15/14)DUP
PAM-1 (08/18/14)DUP
PAM-1D (08/18/14)DUP

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

Introduction

This data review covers 20 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 (08/15/14) and PAM-31 (08/18/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (08/15/14) and PAM-21 (08/18/14) 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 (08/18/14) and PAM-1D (08/18/14) 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 (08/18/14)	PAM-1D (08/18/14)			
Hexavalent chromium	0.0355	0.0363	2 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4081934**

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
4081934**

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 4081934**

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

LDC #: 32521A6

VALIDATION COMPLETENESS WORKSHEET

Date: 8/25/14

SDG #: 4081934

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: JO

2nd Reviewer: AL

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: 8/15/14 ~ 8/18/14
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	LCSD
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD = (11, 12)
XI	Field blanks	ND	FB = 7, 16 TB = 8, 17

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:

A19

1	OAM 1 (08/15/14)	11	PAM-1 (08/18/14)	21	31
2	OAM 2 (08/15/14)	12	PAM-1D (08/18/14)	22	32
3	PAM-1 (08/15/14)	13	PAM-2 (08/18/14)	23	33
4	PAM-2 (08/15/14)	14	PAM-3 (08/18/14)	24	34
5	PAM-3 (08/15/14)	15	PAM-4 (08/18/14)	25	35
6	PAM-4 (08/15/14)	16	PAM-21 (08/18/14)	26	36
7	PAM-21 (08/15/14)	17	PAM-31 (08/18/14)	27	37
8	PAM-31 (08/15/14)	18	PAM-1 (08/15/14)DUP	28	38
9	OAM 1 (08/18/14)	19	PAM-1 (08/18/14)DUP	29	39
10	OAM 2 (08/18/14)	20	PAM-1D (08/18/14)DUP	30	40

Notes: Dates appended to ID to differentiate between samples

Method: Inorganics (EPA Method See over)

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 <u>90-110%</u> QC limits? <u>85-115</u>	<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"/>	
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) $\leq 20\%$ for <u>water</u> and $\leq 35\%$ for soil samples? A control limit of $\leq \text{CRDL}$ ($\leq 2\text{X CRDL}$ for soil) was used for samples that were $\leq 5\text{X}$ the CRDL, including when only one of the duplicate sample values were $\leq 5\text{X}$ 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 FINDINGS CHECKLIST

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# 32521A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	11	12		
Hexavalent Chromium	0.0355	0.0363	2	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32521A6.wpd

LDC #: 3252146

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 8/20/14

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. (mg/L)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.1	0.000149	0.99986	0.99986	y
		s2	0.1	0.000037			
		s3	0.2	0.0000854			
		s4	0.5	0.0002009			
		s5	1	0.0004002			
		s6	2	0.0008252			
ICV 11:08 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5098	<u>True</u> 0.500ng/ml		102%R	102%R	↓
CCV 12:07 Calibration verification	Cr ⁺⁶	0.4897ng/ml	0.5ng/ml		98%R	98%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 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>11:38</u>	Laboratory control sample	<u>Cr⁺⁶</u>	<u>1.037 ng/ml</u>	<u>1.00 ng/ml</u>	<u>104%R</u>	<u>104%R</u>	<u>Y</u>
	Matrix spike sample		(SSR-SR)				
<u>Dup</u> <u>12:40</u>	Duplicate sample	<u>Cr⁺⁶</u>	<u>0.0804 ng/m³</u>	<u>0.0797 ng/m³</u>	<u>12.6%RPD</u>	<u>12.7%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 (1) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(area - C_0) / C_1 \times V$ Recalculation: $(0.0000034 - (-0.00000431)) / 0.00429 = 0.01867 \text{ ng/ml}$
 $m^3 = 21.23$
 $(0.01867 \text{ ng/ml}) \times (10 \text{ ml}) / 21.23 = 0.0088 \text{ ng/m}^3$

area = 0.0000034
 C₀ = -0.00000431
 C₁ = 0.0004129

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0087	0.0088	Y
	2		0.0087	0.0086	
	3		0.0797	0.0797	
	4		0.0105	0.0104	
	5		0.0080	0.0080	
	6		0.457	0.457	
	7		ND	ND	
	8		ND	ND	
	9		0.0095	0.0095	
	10		0.0152	0.0152	
	11		0.0355	0.0354	
	12		0.0363	0.0363	
	13		0.0110	0.0111	
	14		0.0101	0.0100	
	15		0.0780	0.0780	
	16		ND	ND	
	17		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: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4081934-01	Sampled: 08/15/14 16:18
Matrix: Air	Sample Volume: 21.31 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/14/14 16:37		Analysis Date: 08/20/14 13:35

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	0.0087		0.0036

AUG 25 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4081934-02	Sampled: 08/15/14 16:29
Matrix: Air	Sample Volume: 21.33 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/14/14 16:47		Analysis Date: 08/20/14 13:45

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	0.0087		0.0036

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4081934-03	Sampled: 08/15/14 17:30
Matrix: Air	Sample Volume: 21.27 m ³	Received: 08/19/14 14:24
Comments: Col 1 Start Time 8/14/14 17:52		Analysis Date: 08/20/14 12:30

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	0.0797		0.0036

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REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4081934-05	Sampled: 08/15/14 17:18
Matrix: Air	Sample Volume: 21.41 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/14/14 17:30		Analysis Date: 08/20/14 13:55

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	0.0105		0.0036

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REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4081934-06	Sampled: 08/15/14 17:10
Matrix: Air	Sample Volume: 21.4 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/14/14 17:23		Analysis Date: 08/20/14 14:05

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	0.0080		0.0036

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REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4081934-07	Sampled: 08/15/14 16:58
Matrix: Air	Sample Volume: 21.33 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/14/14 17:16		Analysis Date: 08/20/14 14:35

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	0.457		0.0036

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REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4081934-08

Sampled: 08/15/14 00:00

Matrix: Air

Sample Volume: 21.41 m³

Received: 08/19/14 14:24

Comments:

Analysis Date: 08/20/14 14:45

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

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REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4081934-09	Sampled: 08/15/14 00:00
Matrix: Air	Sample Volume: 21.4 m ³	Received: 08/19/14 14:24
Comments:		Analysis Date: 08/20/14 14:55

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

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4081934-10	Sampled: 08/18/14 16:22
Matrix: Air	Sample Volume: 21.26 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/17/14 16:45		Analysis Date: 08/20/14 15:04

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	0.0095		0.0036

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4081934-11	Sampled: 08/18/14 16:36
Matrix: Air	Sample Volume: 21.23 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/17/14 17:00		Analysis Date: 08/20/14 15:14

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	0.0152		0.0036

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4081934-12	Sampled: 08/18/14 17:50
Matrix: Air	Sample Volume: 21.29 m ³	Received: 08/19/14 14:24
Comments: Col 1 Start Time 8/17/14 18:11		Analysis Date: 08/20/14 12:50

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	0.0355		0.0036

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4081934-13	Sampled: 08/18/14 17:53
Matrix: Air	Sample Volume: 21.23 m ³	Received: 08/19/14 14:24
Comments: Col 2 Start Time 8/17/14 18:18		Analysis Date: 08/20/14 13:09

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	0.0363		0.0036

AUG 25 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4081934-14	Sampled: 08/18/14 17:28
Matrix: Air	Sample Volume: 21.25 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/17/14 17:52		Analysis Date: 08/20/14 15:24

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	0.0110		0.0036

AUG 25 2014

Initials: ER

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4081934-15	Sampled: 08/18/14 17:16
Matrix: Air	Sample Volume: 21.24 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/17/14 17:40		Analysis Date: 08/20/14 15:34

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	0.0101		0.0036

AUG 25 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4081934-16	Sampled: 08/18/14 17:05
Matrix: Air	Sample Volume: 21.23 m ³	Received: 08/19/14 14:24
Comments: Start Time 8/17/14 17:30		Analysis Date: 08/20/14 15:44

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	0.0280		0.0036

AUG 25 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: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4081934-17	Sampled: 08/18/14 00:00
Matrix: Air	Sample Volume: 21.25 m ³	Received: 08/19/14 14:24
Comments:		Analysis Date: 08/20/14 15:54

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	

AUG 25 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: 08/21/14 15:01

SUBMITTED: 08/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4081934-18	Sampled: 08/18/14 00:00
Matrix: Air	Sample Volume: 21.24 m ³	Received: 08/19/14 14:24
Comments:		Analysis Date: 08/20/14 16:04

Hexavalent Chromium

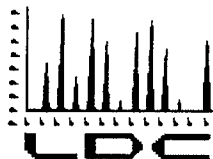
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	ND	U	0.0036

AUG 25 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

September 2, 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 28, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32566:

SDG

Fraction

4082017/4082115/4082711 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

Level IV

LDC #32566 (ERM - Morrisville, NC / Harbor Point, MD, Hexavalent Chromium Monitoring)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cr(VI) (D7614)		Matrix: Air/Water/Soil																															
				A	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S		
A	4082017/4082115/ 4082711	08/28/14	09/03/14	27	0																																
Total	A/CR			27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, and DUPs

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring
Collection Date: August 19 through August 21, 2014
LDC Report Date: August 29, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4082017/4082115/4082711

Sample Identification

OAM 1 (8/19/14)	PAM-1 (8/21/14)
OAM 1 (8/19/14)	PAM-1D (8/21/14)
PAM-1 (8/19/14)	PAM-2 (8/21/14)
PAM-1D (8/19/14)	PAM-3 (8/21/14)
PAM-2 (8/19/14)	PAM-4 (8/21/14)
PAM-3 (8/19/14)	PAM-21 (8/21/14)
PAM-4 (8/19/14)	PAM-31 (8/21/14)
PAM-21 (8/19/14)	PAM-1 (8/19/14)DUP
PAM-31 (8/19/14)	PAM-1D (8/19/14)DUP
OAM 1 (8/20/14)	PAM-1 (8/20/14)DUP
OAM 2 (8/20/14)	PAM-1D (8/20/14)DUP
PAM-1 (8/20/14)	PAM-1 (8/21/14)DUP
PAM-1D (8/20/14)	PAM-1D (8/21/14)DUP
PAM-2 (8/20/14)	
PAM-3 (8/20/14)	
PAM-4 (8/20/14)	
PAM-21 (8/20/14)	
PAM-31 (8/20/14)	
OAM 1 (8/21/14)	
OAM 2 (8/21/14)	

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

Introduction

This data review covers 33 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 (8/19/14), PAM-31 (8/20/14), and PAM-31 (8/21/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (8/19/14), PAM-21 (8/20/14), and PAM-21 (8/21/14) 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 (8/19/14) and PAM-1D (8/19/14), samples PAM-1 (8/20/14) and PAM-1D (8/20/14), and PAM-1 (8/21/14) and PAM-1D (8/21/14) 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 (8/19/14)	PAM-1D (8/19/14)			
Hexavalent chromium	0.0381	0.0448	16 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (8/20/14)	and PAM-1D (8/20/14)			
Hexavalent chromium	0.0688	0.0672	2 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (8/21/14)	PAM-1D (8/21/14)			
Hexavalent chromium	0.0728	0.0691	5 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG
4082017/4082115/4082711**

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
4082017/4082115/4082711**

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
4082017/4082115/4082711**

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

LDC #: 32566A6

VALIDATION COMPLETENESS WORKSHEET

Date: 8/28/14

SDG #: 4082017/4082115/4082711

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

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: 8/19-21/14
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	LCSD
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD = (3,4) (12,13) (21,22)
XI	Field blanks	ND	FB = 8, 17, 26 TB = 9, 18, 27

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: Aves

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

Notes: ID appended to differentiate between samples

Method: Inorganics (EPA Method See Lower)

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 <u>90-110%</u> 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.			/	
<u>AW</u> Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for <u>waters</u> and $\leq 35\%$ for soil samples? A control limit of $\leq \text{CRDL}$ ($\leq 2\text{X CRDL}$ for soil) was used for samples that were $\leq 5\text{X}$ the CRDL, including when only one of the duplicate sample values were $\leq 5\text{X}$ 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?			/	

LDC #: 32566A6

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: SN
 2nd Reviewer: OL

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# 32566A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0381	0.0448	16	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0688	0.0672	2	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	21	22		
Hexavalent Chromium	0.0728	0.0691	5	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32566A6.wpd

LDC #: 32560A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 8/21/14

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. (mg/L)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.1	0.0000119	0.99960	0.99960	y
		s2	0.1	0.0000351			
		s3	0.2	0.0000783			
		s4	0.5	0.0002054			
		s5	1	0.0003999			
		s6	2	0.000855			
ICV 10:41 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.506 ng/ml	<u>True</u> 0.5 ng/ml		100.3%R	100.4%R	y*
CCV 11:41 Calibration verification	Cr ⁺⁶	0.514 ng/ml	0.5 ng/ml		102.8%R	102.7%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. * Rowdberg

LDC #: 32566A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method See Lab

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 11:11	Laboratory control sample	Cr ⁺⁶	1.055 ng/ml	1 ng/ml	106%R	106%R	Y
N	Matrix spike sample		(SSR-SR)				
Dup 12:36	Duplicate sample	Cr ⁺⁶	0.0412 ng/m ³	0.0381 ng/m ³	7.82%RPD	7.94%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 lower

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 (13) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(\text{area} - C_0) / C_1 \times V_f \times 10 \text{ ml}$ Recalculation: $(0.0000589 - (-1.56E-06)) / 0.0004227 = 0.143 \text{ ng/ml}$

area = 0.0000589
 $C_0 = -1.56E-06$
 $C_1 = 0.0004227$

$\frac{(\text{ng/l})(\text{ml})}{\text{m}^3} = \text{ng/m}^3$
 $\text{m}^3 = 21.28$

$\frac{(0.143 \text{ ng/ml})(10)}{21.28} = 0.0672 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0272	0.0271	Y
	2		0.0275	0.0274	
	3		0.0381	0.0381	
	4		0.0448	0.0448	
	5		0.0299	0.0298	
	6		ND	ND	
	7		0.0270	0.0269	
	8		ND	ND	
	9		ND	ND	
	10		0.0616	0.0616	
	11		0.0262	0.0263	
	12		0.0688	0.0688	
	13		0.0672	0.0672	
	14		0.0527	0.0527	
	15		0.0675	0.0675	
	16		0.0514	0.0514	
	17		ND	ND	
	18		ND	ND	
	19		0.0214	0.0214	
	20		0.0270	0.0270	Y

Note: _____

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 (21) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(\text{Area} - C_0) / C_1$ Recalculation: $(0.0000656 - (-1.56E-06)) / 0.0004227 = 0.159 \text{ ng/ml}$

$m = 0.0000656$ $V_f = 10 \text{ ml}$
 $C_0 = -1.56E-06$ $m^3 = 21.81$
 $C_1 = 0.0004227$ $(\text{ng/ml}) / (\text{ml}) = \text{ng/m}^3$

$(0.159 \text{ ng/ml}) (10 \text{ ml}) / 21.81 = 0.0728 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	21	Cr ⁺⁶	0.0728	0.0728	Y
	22	↓	0.0691	0.0691	↓
	23		0.0636	0.0636	
	24		0.0360	0.0360	
	25		0.0925	0.0925	
	26		ND	ND	
	27		ND	ND	

Note: _____



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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: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4082017-01

Sampled: 08/19/14 16:22

Matrix: Air

Sample Volume: 21.5 m³

Received: 08/20/14 11:50

Comments: Start Time 8/18/14 16:29

Analysis Date: 08/21/14 13:07

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	0.0272		0.0036

SEP 02 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/29/14 11:37

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4082017-02

Sampled: 08/19/14 16:48

Matrix: Air

Sample Volume: 21.69 m³

Received: 08/20/14 11:50

Comments: Start Time 8/18/14 16:41

Analysis Date: 08/21/14 13:17

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0275

0.0036

SEP 02 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082017-03

Sampled: 08/19/14 18:16

Matrix: Air

Sample Volume: 21.91 m³

Received: 08/20/14 11:50

Comments: Col 1 Start Time 8/18/14 17:55

Analysis Date: 08/21/14 12:26

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0381

0.0036

SEP 02 2014

Initials: *CR*

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: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4082017-04

Sampled: 08/19/14 18:19

Matrix: Air

Sample Volume: 21.92 m³

Received: 08/20/14 11:50

Comments: Col 2 Start Time 8/18/14 17:58

Analysis Date: 08/21/14 12:45

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	0.0448		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4082017-05

Sampled: 08/19/14 18:01

Matrix: Air

Sample Volume: 22.03 m³

Received: 08/20/14 11:50

Comments: Start Time 8/18/14 17:33

Analysis Date: 08/21/14 13:27

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	0.0299		0.0036

SEP 02 2014

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4082017-06

Sampled: 08/19/14 17:45

Matrix: Air

Sample Volume: 21.92 m³

Received: 08/20/14 11:50

Comments: Start Time 8/18/14 17:23

Analysis Date: 08/21/14 13:37

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

SEP 02 2014

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4082017-07

Sampled: 08/19/14 17:23

Matrix: Air

Sample Volume: 21.8 m³

Received: 08/20/14 11:50

Comments: Start Time 8/18/14 17:10

Analysis Date: 08/21/14 13:46

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	0.0270		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4082017-08

Sampled: 08/19/14 00:00

Matrix: Air

Sample Volume: 22.03 m³

Received: 08/20/14 11:50

Comments:

Analysis Date: 08/21/14 13:56

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: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-31

Lab ID: 4082017-09

Sampled: 08/19/14 00:00

Matrix: Air

Sample Volume: 21.92 m³

Received: 08/20/14 11:50

Comments:

Analysis Date: 08/21/14 14:26

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: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4082115-01

Sampled: 08/20/14 16:00

Matrix: Air

Sample Volume: 21.08 m³

Received: 08/21/14 11:18

Comments: Start Time 8/19/14 16:34

Analysis Date: 08/25/14 13:48

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	0.0616		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4082115-02

Sampled: 08/20/14 16:21

Matrix: Air

Sample Volume: 21.05 m³

Received: 08/21/14 11:18

Comments: Start Time 8/19/14 16:57

Analysis Date: 08/25/14 13:58

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0262		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082115-03

Sampled: 08/20/14 18:00

Matrix: Air

Sample Volume: 21.32 m³

Received: 08/21/14 11:18

Comments: Col 1 Start Time 8/19/14 18:19

Analysis Date: 08/25/14 12:25

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	0.0688		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4082115-04

Sampled: 08/20/14 18:02

Matrix: Air

Sample Volume: 21.28 m³

Received: 08/21/14 11:18

Comments: Col 2 Start Time 8/19/14 18:24

Analysis Date: 08/25/14 12:45

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	Results ng/m ³ Air	Flag	MDL ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0672		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4082115-05

Sampled: 08/20/14 17:42

Matrix: Air

Sample Volume: 21.25 m³

Received: 08/21/14 11:18

Comments: Start Time 8/19/14 18:06

Analysis Date: 08/25/14 14:28

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	0.0527		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4082115-06

Sampled: 08/20/14 17:22

Matrix: Air

Sample Volume: 21.09 m³

Received: 08/21/14 11:18

Comments: Start Time 8/19/14 17:56

Analysis Date: 08/25/14 14:38

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	0.0675		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4082115-07

Sampled: 08/20/14 17:02

Matrix: Air

Sample Volume: 21.08 m³

Received: 08/21/14 11:18

Comments: Start Time 8/19/14 17:36

Analysis Date: 08/25/14 14:48

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

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4082115-08

Sampled: 08/20/14 00:00

Matrix: Air

Sample Volume: 21.25 m³

Received: 08/21/14 11:18

Comments:

Analysis Date: 08/25/14 14:57

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: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4082115-09

Sampled: 08/20/14 00:00

Matrix: Air

Sample Volume: 21.09 m³

Received: 08/21/14 11:18

Comments:

Analysis Date: 08/25/14 15:07

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

SEP 02 2014

Initials: ER

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4082711-01

Sampled: 08/21/14 16:12

Matrix: Air

Sample Volume: 21.63 m³

Received: 08/22/14 14:37

Comments: Start Time 8/20/14 16:10

Analysis Date: 08/25/14 15:17

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	0.0214		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4082711-02

Sampled: 08/21/14 16:32

Matrix: Air

Sample Volume: 21.61 m³

Received: 08/22/14 14:37

Comments: Start Time 8/20/14 16:31

Analysis Date: 08/25/14 15:27

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	0.0270		0.0036

SEP 02 2014

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082711-03

Sampled: 08/21/14 18:18

Matrix: Air

Sample Volume: 21.81 m³

Received: 08/22/14 14:37

Comments: Col 1 Start Time 8/20/14 18:04

Analysis Date: 08/25/14 13:05

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	0.0728		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4082711-04

Sampled: 08/21/14 18:23

Matrix: Air

Sample Volume: 21.86 m³

Received: 08/22/14 14:37

Comments: Col 2 Start Time 8/20/14 18:06

Analysis Date: 08/25/14 13:25

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	0.0691		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4082711-05

Sampled: 08/21/14 17:52

Matrix: Air

Sample Volume: 21.64 m³

Received: 08/22/14 14:37

Comments: Start Time 8/20/14 17:50

Analysis Date: 08/25/14 15:37

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	0.0636		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4082711-06	Sampled: 08/21/14 17:33
Matrix: Air	Sample Volume: 21.58 m ³	Received: 08/22/14 14:37
Comments: Start Time 8/20/14 17:35		Analysis Date: 08/25/14 15:47

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	0.0360		0.0036

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FILE #: 3926.00

REPORTED: 08/28/14 15:32

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4082711-07

Sampled: 08/21/14 17:16

Matrix: Air

Sample Volume: 21.68 m³

Received: 08/22/14 14:37

Comments: Start Time 8/20/14 17:11

Analysis Date: 08/25/14 15:57

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	0.0925		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:34

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4082711-08

Sampled: 08/21/14 00:00

Matrix: Air

Sample Volume: 21.64 m³

Received: 08/22/14 14:37

Comments:

Analysis Date: 08/25/14 16:27

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

SEP 02 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: 08/29/14 13:34

SUBMITTED: 08/20/14 to 08/22/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4082711-09

Sampled: 08/21/14 00:00

Matrix: Air

Sample Volume: 21.58 m³

Received: 08/22/14 14:37

Comments:

Analysis Date: 08/25/14 16:36

Hexavalent Chromium

Results

MDL

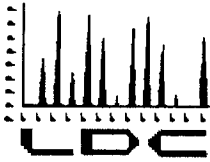
Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	ND	U	0.0036

SEP 02 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

September 3, 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 29, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32569:

SDG

4082746/4082759

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: August 22 through August 26, 2014
LDC Report Date: September 2, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4082746/4082759

Sample Identification

OAM 1 (08/22/14)	PAM-2 (08/25/14)
OAM 2 (08/22/14)	PAM-3 (08/25/14)
PAM-1 (08/22/14)	PAM-4 (08/25/14)
PAM-1D (08/22/14)	PAM-21 (08/25/14)
PAM-2 (08/22/14)	PAM-31 (08/25/14)
PAM-3 (08/22/14)	OAM 1 (08/26/14)
PAM-4 (08/22/14)	OAM 2 (08/26/14)
PAM-21 (08/22/14)	PAM-1 (08/26/14)
PAM-31 (08/22/14)	PAM-1D (08/26/14)
OAM 1 (08/23/14)	PAM-2 (08/26/14)
OAM 2 (08/23/14)	PAM-3 (08/26/14)
PAM-1 (08/23/14)	PAM-4 (08/26/14)
PAM-1D (08/23/14)	PAM-21 (08/26/14)
PAM-2 (08/23/14)	PAM-31 (08/26/14)
PAM-3 (08/23/14)	PAM-1 (08/22/14)DUP
PAM-4 (08/23/14)	PAM-1D (08/22/14)DUP
PAM-21 (08/23/14)	PAM-1 (08/23/14)DUP
PAM-31 (08/23/14)	PAM-1D (08/23/14)DUP
OAM 1 (08/25/14)	PAM-1 (08/25/14)DUP
OAM 2 (08/25/14)	PAM-1D (08/25/14)DUP
PAM-1 (08/25/14)	
PAM-1D (08/25/14)	

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

Introduction

This data review covers 42 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 (08/22/14), PAM-31 (08/23/14), PAM-31 (08/25/14), and PAM-31 (08/26/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (08/22/14), PAM-21 (08/23/14), PAM-21 (08/25/14), and PAM-21 (08/26/14) 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 (08/22/14) and PAM-1D (08/22/14), samples PAM-1 (08/23/14) and PAM-1D (08/23/14), samples PAM-1 (08/25/14) and PAM-1D (08/25/14), and samples PAM-1 (08/26/14) and PAM-1D (08/26/14) 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 (08/22/14)	PAM-1D (08/22/14)			
Hexavalent chromium	0.0183	0.0207	12 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (08/23/14)	PAM-1D (08/23/14)			
Hexavalent chromium	0.0312	0.0355	13 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (08/25/14)	PAM-1D (08/25/14)			
Hexavalent chromium	0.0175	0.0182	4 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (08/26/14)	PAM-1D (08/26/14)			
Hexavalent chromium	0.0186	0.0221	17 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4082746/4082759**

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
4082746/4082759**

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
4082746/4082759**

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

LDC #: 32569A6

VALIDATION COMPLETENESS WORKSHEET

Date: 9/2/14

SDG #: 4082746/4082759

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: vk2nd Reviewer: ca**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: 8/22/14 8/23/14 and 8/25/14 - 8/26/14
II.	Initial calibration	A	
III.	Calibration verification	SWA	
IV.	Blanks	A	
V.	Matrix Spike/Matrix Spike Duplicates	N	es ^m 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), (12,13), (21,22), (30,31)
XI.	Field blanks	ND	FB = 8, 17, 26, 35 TB = 9, 18, 27, 36

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 (08/22/14)	12	PAM-1 (08/23/14)	23	PAM-2 (08/25/14)	34	PAM-4 (08/26/14)
2	OAM 2 (08/22/14)	13	PAM-1D (08/23/14)	24	PAM-3 (08/25/14)	35	PAM-21 (08/26/14)
3	PAM-1 (08/22/14)	14	PAM-2 (08/23/14)	25	PAM-4 (08/25/14)	36	PAM-31 (08/26/14)
4	PAM-1D (08/22/14)	15	PAM-3 (08/23/14)	26	PAM-21 (08/25/14)	37	PAM-1 (08/22/14)DUP
5	PAM-2 (08/22/14)	16	PAM-4 (08/23/14)	27	PAM-31 (08/25/14)	38	PAM-1D (08/22/14)DUP
6	PAM-3 (08/22/14)	17	PAM-21 (08/23/14)	28	OAM 1 (08/26/14)	39	PAM-1 (08/23/14)DUP
7	PAM-4 (08/22/14)	18	PAM-31 (08/23/14)	29	OAM 2 (08/26/14)	40	PAM-1D (08/23/14)DUP
8	PAM-21 (08/22/14)	19	OAM 1 (08/25/14)	30	PAM-1 (08/26/14)	41	PAM-1 (08/25/14)DUP
9	PAM-31 (08/22/14)	20	OAM 2 (08/25/14)	31	PAM-1D (08/26/14)	42	PAM-1D (08/25/14)DUP
10	OAM 1 (08/23/14)	21	PAM-1 (08/25/14)	32	PAM-2 (08/26/14)	43	
11	OAM 2 (08/23/14)	22	PAM-1D (08/25/14)	33	PAM-3 (08/26/14)	44	

Notes: Sees appended to cl. fferent. R between samples

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 ⁸⁵⁻¹¹⁵ 90-110% QC limits?	✓		ADEN	
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.	2/2/14 X	/		
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.		✓		

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Inorganics: Method See Cover

Analyte	Concentration (ng/m ³)		RPD (≤20)	Qual. (>5xMDL)
	3	4		
Hexavalent Chromium	0.0183	0.0207	12	

Analyte	Concentration (ng/m ³)		RPD (≤20)	Qual. (>5xMDL)
	12	13		
Hexavalent Chromium	0.0312	0.0355	13	

Analyte	Concentration (ng/m ³)		RPD (≤20)	Qual. (>5xMDL)
	21	22		
Hexavalent Chromium	0.0175	0.0182	4	

Analyte	Concentration (ng/m ³)		RPD (≤20)	Qual. (>5xMDL)
	30	31		
Hexavalent Chromium	0.0186	0.0221	17	

LDC #: 32569A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
 Reviewer: pk
 2nd Reviewer: g

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁶⁺ was recalculated. Calibration date: 8/27/14

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)	(mAU*min) Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Hexavalent Chromium	s1	0.05	0.0000149	0.99988	0.99988	Y
		s2	0.10	0.0000361			
		s3	0.20	0.0000783			
		s4	0.50	0.0002077			
		s5	1.00	0.0004036			
		s6	2.00	0.0008351			
Calibration verification	↓	CCV	0.5059 ng/mL	0.5 ng/mL	101.2	101.2	Y
Calibration verification	-	-	-	-	-	-	-
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	(ng/m ³) Found / S (units)	(ng/m ³) True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	Cr 6+	1.081 ng/ml	1.00 ng/ml	108	108	Y
-	Matrix spike sample	-	(SSR-SR) -	-	-	-	-
3/4	Duplicate sample	Cr 6+	0.0183	0.0207	12.31	12.41	Y KK 9/2/14

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 Hexavalent Chromium reported with a positive detect were recalculated and verified using the following equation:

Concentration =
$$\left[(\text{Area}) (\times \text{Coefficient}) + \text{Constant} \right] \left[\frac{\text{Final Volume}}{\text{Sample Volume}} \right]$$
 Recalculation:

$$\left[(0.000203 \text{ mAU} \cdot \text{min}) \left(\frac{10 \text{ ml}}{21.39 \text{ ml}} \right) + 0.004017 \right] \left(\frac{10 \text{ ml}}{21.39 \text{ ml}^3} \right) = 0.025219 \text{ ng/m}^3$$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr6+	0.0204	0.0205	Y
	2	Cr6+	0.0179	0.0180	
	3	Cr6+	0.0183	0.0183	
	4	Cr6+	0.0207	0.0207	
	5	Cr6+	0.0180	0.0181	
	6	Cr6+	0.0252	0.0254	
	7	Cr6+	0.0237	0.0238	
	10	Cr6+	0.0323	0.0323	
	11	Cr6+	0.0496	0.0497	
	12	Cr6+	0.0312	0.0312	
	13	Cr6+	0.0355	0.0355	
	14	Cr6+	0.0268	0.0269	
	15	Cr6+	0.0390	0.0392	
	16	Cr6+	0.0314	0.0315	
	19	Cr6+	0.0100	0.0100	
	20	Cr6+	0.0098	0.0098	
	21	Cr6+	0.0175	0.0175	
	22	Cr6+	0.0182	0.0183	
	23	Cr6+	0.203	0.203	
	24	Cr6+	0.0252	0.0251	
	25	Cr6+	0.0191	0.0191	
	28	Cr6+	0.0103	0.0103	

Note: _____

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	29	Cr6+	0.0107	0.0107	Y
	30	Cr6+	0.0186	0.0186	↓
	31	Cr6+	0.0221	0.0222	
	32	Cr6+	0.0195	0.0195	
	33	Cr6+	0.0163	0.0162	
	34	Cr6+	0.0252	0.0252	

Note: _____



CERTIFICATE OF ANALYSIS

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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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4082746-01

Sampled: 08/22/14 16:09

Matrix: Air

Sample Volume: 21.41 m³

Received: 08/26/14 16:05

Comments: Start Time 8/21/14 16:22

Analysis Date: 08/27/14 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	0.0204		0.0036

SEP 02 2014

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4082746-02

Sampled: 08/22/14 16:31

Matrix: Air

Sample Volume: 21.34 m³

Received: 08/26/14 16:05

Comments: Start Time 8/21/14 16:48 Moth observed in cartridge

Analysis Date: 08/27/14 13:34

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	0.0179		0.0036

SEP 02 2014

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082746-03

Sampled: 08/22/14 18:20

Matrix: Air

Sample Volume: 21.52 m³

Received: 08/26/14 16:05

Comments: Col 1 Start Time 8/21/14 18:25

Analysis Date: 08/27/14 12:03

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	0.0183		0.0036

SEP 02 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4082746-04

Sampled: 08/22/14 18:26

Matrix: Air

Sample Volume: 21.52 m³

Received: 08/26/14 16:05

Comments: Col 2 Start Time 8/21/14 18:32

Analysis Date: 08/27/14 12:23

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	0.0207		0.0036

SEP 02 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4082746-05

Sampled: 08/22/14 17:52

Matrix: Air

Sample Volume: 21.47 m³

Received: 08/26/14 16:05

Comments: Start Time 8/21/14 18:01

Analysis Date: 08/27/14 14:04

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	0.0180		0.0036

SEP 02 2014

Initials: *CR*

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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4082746-06

Sampled: 08/22/14 17:31

Matrix: Air

Sample Volume: 21.45 m³

Received: 08/26/14 16:05

Comments: Start Time 8/21/14 17:41

Analysis Date: 08/27/14 14:14

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	0.0252		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4082746-07

Sampled: 08/22/14 17:12

Matrix: Air

Sample Volume: 21.42 m³

Received: 08/26/14 16:05

Comments: Start Time 8/21/14 17:24

Analysis Date: 08/27/14 14:24

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	0.0237		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4082746-08	Sampled: 08/22/14 00:00
Matrix: Air	Sample Volume: 21.47 m ³	Received: 08/26/14 16:05
Comments:		Analysis Date: 08/27/14 14:33

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

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4082746-09

Sampled: 08/22/14 00:00

Matrix: Air

Sample Volume: 21.45 m³

Received: 08/26/14 16:05

Comments:

Analysis Date: 08/27/14 14:43

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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4082746-10

Sampled: 08/23/14 16:14

Matrix: Air

Sample Volume: 21.48 m³

Received: 08/26/14 16:05

Comments: Start Time 8/22/14 16:23

Analysis Date: 08/27/14 14:53

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	0.0323		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4082746-11

Sampled: 08/23/14 16:30

Matrix: Air

Sample Volume: 21.46 m³

Received: 08/26/14 16:05

Comments: Start Time 8/22/14 16:39

Analysis Date: 08/27/14 15:03

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	0.0496		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082746-12

Sampled: 08/23/14 17:47

Matrix: Air

Sample Volume: 21.02 m³

Received: 08/26/14 16:05

Comments: Col 1 Start Time 8/22/14 18:26

Analysis Date: 08/27/14 12:42

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	0.0312		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4082746-13

Sampled: 08/23/14 17:46

Matrix: Air

Sample Volume: 20.9 m³

Received: 08/26/14 16:05

Comments: Col 2 Start Time 8/22/14 18:33

Analysis Date: 08/27/14 13:02

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	0.0355		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4082746-14

Sampled: 08/23/14 17:28

Matrix: Air

Sample Volume: 21.13 m³

Received: 08/26/14 16:05

Comments: Start Time 8/22/14 18:00

Analysis Date: 08/27/14 16:22

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	0.0268		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4082746-15

Sampled: 08/23/14 17:18

Matrix: Air

Sample Volume: 21.31 m³

Received: 08/26/14 16:05

Comments: Start Time 8/22/14 17:37

Analysis Date: 08/27/14 15:23

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	0.0390		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4082746-16

Sampled: 08/23/14 15:06

Matrix: Air

Sample Volume: 21.38 m³

Received: 08/26/14 16:05

Comments: Start Time 8/22/14 17:20

Analysis Date: 08/27/14 15:33

Hexavalent Chromium

Results

MDL

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

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4082746-17

Sampled: 08/23/14 00:00

Matrix: Air

Sample Volume: 21.13 m³

Received: 08/26/14 16:05

Comments:

Analysis Date: 08/27/14 16:03

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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4082746-18

Sampled: 08/23/14 00:00

Matrix: Air

Sample Volume: 21.31 m³

Received: 08/26/14 16:05

Comments:

Analysis Date: 08/27/14 16:13

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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4082746-19

Sampled: 08/25/14 16:19

Matrix: Air

Sample Volume: 21.79 m³

Received: 08/26/14 16:05

Comments: Start Time 8/24/14 16:06

Analysis Date: 08/28/14 13:09

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0100		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4082746-20

Sampled: 08/25/14 16:35

Matrix: Air

Sample Volume: 21.71 m³

Received: 08/26/14 16:05

Comments: Start Time 8/24/14 16:27

Analysis Date: 08/28/14 13:19

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	0.0098		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082746-21

Sampled: 08/25/14 18:19

Matrix: Air

Sample Volume: 22.26 m³

Received: 08/26/14 16:05

Comments: Col 1 Start Time 8/24/14 17:35

Analysis Date: 08/28/14 11:48

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	0.0175		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4082746-22

Sampled: 08/25/14 18:20

Matrix: Air

Sample Volume: 22.26 m³

Received: 08/26/14 16:05

Comments: Col 2 Start Time 8/24/14 17:36

Analysis Date: 08/28/14 12:08

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	0.0182		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4082746-23

Sampled: 08/25/14 17:55

Matrix: Air

Sample Volume: 22.07 m³

Received: 08/26/14 16:05

Comments: Start Time 8/24/14 17:23

Analysis Date: 08/28/14 13:49

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0203		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4082746-24

Sampled: 08/25/14 17:31

Matrix: Air

Sample Volume: 21.86 m³

Received: 08/26/14 16:05

Comments: Start Time 8/24/14 17:14

Analysis Date: 08/28/14 13:58

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	0.0252		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4082746-25	Sampled: 08/25/14 17:15
Matrix: Air	Sample Volume: 21.78 m ³	Received: 08/26/14 16:05
Comments: Start Time 8/24/14 17:02		Analysis Date: 08/28/14 14:08

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	0.0191		0.0036

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4082746-26

Sampled: 08/25/14 00:00

Matrix: Air

Sample Volume: 22.07 m³

Received: 08/26/14 16:05

Comments:

Analysis Date: 08/28/14 14:18

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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4082746-27

Sampled: 08/25/14 00:00

Matrix: Air

Sample Volume: 21.86 m³

Received: 08/26/14 16:05

Comments:

Analysis Date: 08/28/14 14:28

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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4082759-01	Sampled: 08/26/14 16:24
Matrix: Air	Sample Volume: 21.55 m ³	Received: 08/27/14 16:39
Comments: Start Time 8/25/14 16:27		Analysis Date: 08/28/14 14:38

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	0.0103		0.0036

SEP 02 2014

Initials: *CR*

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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4082759-02

Sampled: 08/26/14 16:37

Matrix: Air

Sample Volume: 21.45 m³

Received: 08/27/14 16:39

Comments: Start Time 8/25/14 16:47

Analysis Date: 08/28/14 14:48

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0107

0.0036

SEP 02 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082759-03

Sampled: 08/26/14 17:56

Matrix: Air

Sample Volume: 21.1 m³

Received: 08/27/14 16:39

Comments: Col 1 Start Time 8/25/14 18:29

Analysis Date: 08/28/14 12:27

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0186		0.0036

SEP 02 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4082759-04

Sampled: 08/26/14 17:59

Matrix: Air

Sample Volume: 21.13 m³

Received: 08/27/14 16:39

Comments: Col 2 Start Time 8/25/14 18:30

Analysis Date: 08/28/14 12:47

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0221		0.0036

SEP 02 2014

Initials: *CR*

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4082759-05

Sampled: 08/26/14 17:36

Matrix: Air

Sample Volume: 21.14 m³

Received: 08/27/14 16:39

Comments: Start Time 8/25/14 18:07

Analysis Date: 08/28/14 14:58

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	0.0195		0.0036

SEP 02 2014

Initials: ER

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4082759-06

Sampled: 08/26/14 17:23

Matrix: Air

Sample Volume: 21.25 m³

Received: 08/27/14 16:39

Comments: Start Time 8/25/14 17:46

Analysis Date: 08/28/14 15:08

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	0.0163		0.0036

SEP 02 2014

Initials: ER

Eastern Research Group

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Environmental Resources Management, Inc

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4082759-07

Sampled: 08/26/14 17:09

Matrix: Air

Sample Volume: 21.39 m³

Received: 08/27/14 16:39

Comments: Start Time 8/25/14 17:23

Analysis Date: 08/28/14 15:18

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	0.0252		0.0036

SEP 02 2014

Initials: *CR*

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: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4082759-08

Sampled: 08/26/14 00:00

Matrix: Air

Sample Volume: 21.14 m³

Received: 08/27/14 16:39

Comments:

Analysis Date: 08/28/14 15:47

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

SEP 02 2014

Initials: ER

Eastern Research Group

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 08/29/14 13:37

SUBMITTED: 08/26/14 to 08/27/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4082759-09

Sampled: 08/26/14 00:00

Matrix: Air

Sample Volume: 21.25 m³

Received: 08/27/14 16:39

Comments:

Analysis Date: 08/28/14 15:57

Hexavalent Chromium

Results

MDL

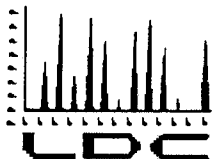
<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

SEP 02 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

September 8, 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 September 3, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32592:

SDG

4082806/4082902

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: August 27 through August 28, 2014
LDC Report Date: September 4, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4082806/4082902

Sample Identification

OAM 1 (08/27/14)	PAM-1 (08/28/14) DUP
OAM 2 (08/27/14)	PAM-1D (08/28/14) DUP
PAM-1 (08/27/14)	
PAM-1D (08/27/14)	
PAM-2 (08/27/14)	
PAM-3 (08/27/14)	
PAM-4 (08/27/14)	
PAM-21 (08/27/14)	
PAM-31 (08/27/14)	
OAM 1 (08/28/14)	
OAM 2 (08/28/14)	
PAM-1 (08/28/14)	
PAM-1D (08/28/14)	
PAM-2 (08/28/14)	
PAM-3 (08/28/14)	
PAM-4 (08/28/14)	
PAM-21 (08/28/14)	
PAM-31 (08/28/14)	
PAM-1 (08/27/14) DUP	
PAM-1D (08/27/14) 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 (08/27/14) and PAM-31 (08/28/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (08/27/14) and PAM-21 (08/28/14) were identified as field blanks. No hexavalent chromium was found with the following exceptions:

Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PAM-21 (08/28/14)	8/28/14	Hexavalent chromium	0.0130 ng/m ³	OAM 1 (08/28/14) OAM 2 (08/28/14) PAM-1 (08/28/14) PAM-1D (08/28/14) PAM-2 (08/28/14) PAM-3 (08/28/14) PAM-4 (08/28/14)

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
OAM 1 (08/28/14)	Hexavalent chromium	0.0146 ng/m ³	0.0146U ng/m ³
OAM 2 (08/28/14)	Hexavalent chromium	0.0154 ng/m ³	0.0154U ng/m ³
PAM-1 (08/28/14)	Hexavalent chromium	0.0331 ng/m ³	0.0331U ng/m ³
PAM-1D (08/28/14)	Hexavalent chromium	0.0243 ng/m ³	0.0243U ng/m ³

Sample	Analyte	Reported Concentration	Modified Final Concentration
PAM-3 (08/28/14)	Hexavalent chromium	0.0108 ng/m ³	0.0108U ng/m ³
PAM-4 (08/28/14)	Hexavalent chromium	0.0330 ng/m ³	0.0330U ng/m ³

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 (08/27/14) and PAM-1D (08/27/14) and samples PAM-1 (08/28/14) and PAM-1D (08/28/14) 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 (08/27/14)	PAM-1D (08/27/14)			
Hexavalent chromium	0.0688	0.0683	1 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (08/28/14)	PAM-1D (08/28/14)			
Hexavalent chromium	0.0331	0.0243	31 (≤20)	J (all detects)	A

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4082806/4082902**

SDG	Sample	Analyte	Flag	A or P	Reason
4082806/ 4082902	PAM-1 (08/28/14) PAM-1D (08/28/14) PAM-2 (08/28/14) PAM-4 (08/28/14)	Hexavalent chromium	J (all detects)	A	Field duplicates (RPD)

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG
4082806/4082902**

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
4082806/4082902**

SDG	Sample	Analyte	Modified Final Concentration	A or P
4082806/ 4082902	OAM 1 (08/28/14)	Hexavalent chromium	0.0146U ng/m ³	A
4082806/ 4082902	OAM 2 (08/28/14)	Hexavalent chromium	0.0154U ng/m ³	A
4082806/ 4082902	PAM-1 (08/28/14)	Hexavalent chromium	0.0331U ng/m ³	A
4082806/ 4082902	PAM-1D (08/28/14)	Hexavalent chromium	0.0243U ng/m ³	A
4082806/ 4082902	PAM-3 (08/28/14)	Hexavalent chromium	0.0108U ng/m ³	A
4082806/ 4082902	PAM-4 (08/28/14)	Hexavalent chromium	0.0330U ng/m ³	A

LDC #: 32592A6
 SDG #: 4082806/4082902
 Laboratory: Eastern Research Group

VALIDATION COMPLETENESS WORKSHEET
 Level IV

Date: 9/3/14
 Page: 1 of 1
 Reviewer: SD
 2nd Reviewer: DL

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: 8/27 - 28/14
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) (12,13)
XI	Field blanks	SW	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: AVG

1	OAM 1 (08/27/14)	11	OAM 2 (08/28/14)	21	PAM-1 (08/28/14) DUP	31	
2	OAM 2 (08/27/14)	12	PAM-1 (08/28/14)	22	PAM-1D (08/28/14) DUP	32	
3	PAM-1 (08/27/14)	13	PAM-1D (08/28/14)	23		33	
4	PAM-1D (08/27/14)	14	PAM-2 (08/28/14)	24		34	
5	PAM-2 (08/27/14)	15	PAM-3 (08/28/14)	25		35	
6	PAM-3 (08/27/14)	16	PAM-4 (08/28/14)	26		36	
7	PAM-4 (08/27/14)	17	PAM-21 (08/28/14)	27		37	
8	PAM-21 (08/27/14)	18	PAM-31 (08/28/14)	28		38	
9	PAM-31 (08/27/14)	19	PAM-1 (08/27/14) DUP	29		39	
10	OAM 1 (08/28/14)	20	PAM-1D (08/27/14) DUP	30		40	

Notes: _____

LDC #: 32592A
~~32591A~~

VALIDATION FINDINGS CHECKLIST

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

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? <i>85-115</i>	/			
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.			/	
<i>Ans</i> 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?			/	

LDC #: 32592AC

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: JD
 2nd Reviewer: AL

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.	/			

VALIDATION FINDINGS WORKSHEET
Field Blanks

METHOD: Inorganics, EPA Method See Cover
Blank units: ng/m3 **Associated sample units:** ng/m3
Sampling date: 8/28/14 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: _____

Associated Samples: 10-16

Analyte	Blank ID	Action Limit	Sample Identification						
			10	11	12	13	15	16	
	17								
Hexavalent Chromium	0.0130	0.065	0.0146	0.0154	0.0331	0.0243	0.0108	0.0330	

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
 Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual. (Samples 1-7, 12-14, 16)
	3	4		
Hexavalent Chromium	0.0688	0.0683	1	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual. (Samples 1-7, 12-14, 16)
	12	13		
Hexavalent Chromium	0.0331	0.0243	31	Jdet/A

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32592A6.wpd

LDC #: 32592A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr+6 was recalculated. Calibration date: 9/2/14

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. (mg/L)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr+6	s1	0.1	0.0000174	0.99992	0.99992	Y
		s2	0.1	0.0000372			
		s3	0.2	0.00008			
		s4	0.5	0.0002019			
		s5	1	0.0003993			
		s6	2	0.0008213			
ICV 10:53 Calibration verification	Cr+6	<u>Found</u> 0.522ng/ml	<u>True</u> 0.5ng/ml		104.4%R	104.5%R	Y*
CCV 11:52 Calibration verification	Cr+6	0.530ng/ml	0.5ng/ml		106%R	106.1%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. * Rounding

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	
LCS 11:23	Laboratory control sample	C _{r+6}	1.009 ng/ml	1.000 ng/ml	109%R	109%R	Y
	Matrix spike sample		(SSR-SR)				
Dup 12:23	Duplicate sample	C _{r+6}	0.0676 ng/m ³	0.0688 ng/m ³	1.76%RPD	1.83%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.

Y* = Rounding

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 (-) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(\text{area} - C_0) / C_1 \times V_f = 10 \text{ ml}$ Recalculation: $\frac{(0.0000692 - (-4.29 \text{E-}06))}{0.0004111} = 0.17876 \text{ ng/ml}$

Area = 0.0000692
 $C_0 = -4.29 \text{E-}06$
 $C_1 = 0.0004111$

$\frac{(\text{ng/ml})(\text{Vf})}{\text{m}^3} = \text{ng/m}^3$
 $\text{m}^3 = 21.62 \text{ m}^3$

$\frac{(0.17876 \text{ ng/ml})(10 \text{ ml})}{21.62 \text{ m}^3} = 0.0827 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0527	0.0527	Y
	2		0.0418	0.0417	
	3		0.0688	0.0688	
	4		0.0683	0.0684	
	5		0.0816	0.0815	
	6		0.0822	0.0823	
	7		0.0827	0.0827	
	8		ND	ND	
	9		ND	ND	
	10		0.0146	0.0146	
	11		0.0154	0.0155	
	12		0.0331	0.0331	
	13		0.0243	0.0243	
	14		0.0782	0.0782	
	15		0.0108	0.0109	
	16		0.0330	0.0330	
	17		0.0130	0.0129	
	18		ND	ND	N

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: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4082806-01

Sampled: 08/27/14 16:07

Matrix: Air

Sample Volume: 21.26 m³

Received: 08/28/14 10:47

Comments: Start Time 8/26/14 16:30

Analysis Date: 09/02/14 14:47

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	0.0527		0.0036

SEP 04 2014

Initials: CR

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4082806-02

Sampled: 08/27/14 16:28

Matrix: Air

Sample Volume: 21.38 m³

Received: 08/28/14 10:47

Comments: Start Time 8/26/14 16:42

Analysis Date: 09/02/14 14:57

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0418

0.0036

SEP 04 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082806-03

Sampled: 08/27/14 18:06

Matrix: Air

Sample Volume: 21.68 m³

Received: 08/28/14 10:47

Comments: Col 1 Start Time 8/26/14 18:01

Analysis Date: 09/02/14 12:13

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	0.0688		0.0036

SEP 04 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4082806-04	Sampled: 08/27/14 18:10
Matrix: Air	Sample Volume: 21.7 m ³	Received: 08/28/14 10:47
Comments: Col 2 Start Time 8/26/14 18:03		Analysis Date: 09/02/14 12:32

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	0.0683		0.0036

SEP 04 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4082806-05

Sampled: 08/27/14 17:44

Matrix: Air

Sample Volume: 21.66 m³

Received: 08/28/14 10:47

Comments: Start Time 8/26/14 17:40

Analysis Date: 09/02/14 15:06

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	0.0816		0.0036

SEP 04 2014

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4082806-06

Sampled: 08/27/14 17:28

Matrix: Air

Sample Volume: 21.61 m³

Received: 08/28/14 10:47

Comments: Start Time 8/26/14 17:28

Analysis Date: 09/02/14 15:16

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	0.0822		0.0036

SEP 04 2014

Initials: CR

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4082806-07

Sampled: 08/27/14 17:13

Matrix: Air

Sample Volume: 21.62 m³

Received: 08/28/14 10:47

Comments: Start Time 8/26/14 17:12

Analysis Date: 09/02/14 15:26

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0827

0.0036

SEP 04 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4082806-08

Sampled: 08/27/14 00:00

Matrix: Air

Sample Volume: 21.66 m³

Received: 08/28/14 10:47

Comments:

Analysis Date: 09/02/14 15:36

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

SEP 04 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4082806-09

Sampled: 08/27/14 00:00

Matrix: Air

Sample Volume: 21.61 m³

Received: 08/28/14 10:47

Comments:

Analysis Date: 09/02/14 15:46

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

SEP 04 2014

Initials: CR

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4082902-01

Sampled: 08/28/14 16:09

Matrix: Air

Sample Volume: 21.45 m³

Received: 08/29/14 11:32

Comments: Start Time 8/27/14 16:19

Analysis Date: 09/02/14 15:56

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0146	U	0.0036

SEP 04 2014

Initials: ER

Eastern Research Group

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 2

Lab ID: 4082902-02

Sampled: 08/28/14 16:27

Matrix: Air

Sample Volume: 21.38 m³

Received: 08/29/14 11:32

Comments: Start Time 8/27/14 16:39

Analysis Date: 09/02/14 16:26

Hexavalent Chromium

Results

MDL

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

SEP 04 2014

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4082902-03

Sampled: 08/28/14 18:11

Matrix: Air

Sample Volume: 21.58 m³

Received: 08/29/14 11:32

Comments: Col 1 Start Time 8/27/14 18:12

Analysis Date: 09/02/14 12:52

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0331 *UJ*

0.0036

SEP 04 2014

Initials: *CR*

Eastern Research Group

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PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4082902-04

Sampled: 08/28/14 18:14

Matrix: Air

Sample Volume: 21.56 m³

Received: 08/29/14 11:32

Comments: Col 2 Start Time 8/27/14 18:17

Analysis Date: 09/02/14 13:12

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0243	US	0.0036

SEP 04 2014

Initials: ER

Eastern Research Group

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2 **Lab ID:** 4082902-05 **Sampled:** 08/28/14 17:52

Matrix: Air **Sample Volume:** 21.61 m³ **Received:** 08/29/14 11:32

Comments: Start Time 8/27/14 17:52 **Analysis Date:** 09/02/14 16:36

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	0.0782	J	0.0036

SEP 04 2014

Initials: ER

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

FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4082902-06	Sampled: 08/28/14 17:39
Matrix: Air	Sample Volume: 21.66 m ³	Received: 08/29/14 11:32
Comments: Start Time 8/27/14 17:35		Analysis Date: 09/02/14 16:46

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	0.0108	U	0.0036

SEP 04 2014

Initials: ER

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ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4082902-07	Sampled: 08/28/14 17:24
Matrix: Air	Sample Volume: 21.65 m ³	Received: 08/29/14 11:32
Comments: Start Time 8/27/14 17:21		Analysis Date: 09/02/14 16:55

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	0.0330	UJ	0.0036

SEP 04 2014

Initials: CR

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4082902-08	Sampled: 08/28/14 00:00
Matrix: Air	Sample Volume: 21.61 m ³	Received: 08/29/14 11:32
Comments:		Analysis Date: 09/02/14 17:05

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	0.0130		0.0036

SEP 04 2014

Initials: CR

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/03/14 13:26

SUBMITTED: 08/28/14 to 08/29/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-31	Lab ID: 4082902-09	Sampled: 08/28/14 00:00
Matrix: Air	Sample Volume: 21.66 m ³	Received: 08/29/14 11:32
Comments:		Analysis Date: 09/02/14 17:15

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

SEP 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

September 9, 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 September 5, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32613:

SDG

4090338

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: August 29 through September 2, 2014
LDC Report Date: September 8, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4090338

Sample Identification

OAM 1 (08/29/14)	PAM-1 (09/02/14)DUP
OAM 2 (08/29/14)	PAM-1D (09/02/14)DUP
PAM-1 (08/29/14)	
PAM-1D (08/29/14)	
PAM-2 (08/29/14)	
PAM-3 (08/29/14)	
PAM-4 (08/29/14)	
PAM-21 (08/29/14)	
PAM-31 (08/29/14)	
OAM 1 (09/02/14)	
OAM 2 (09/02/14)	
PAM-1 (09/02/14)	
PAM-1D (09/02/14)	
PAM-2 (09/02/14)	
PAM-3 (09/02/14)	
PAM-4 (09/02/14)	
PAM-21 (09/02/14)	
PAM-31 (09/02/14)	
PAM-1 (08/29/14)DUP	
PAM-1D (08/29/14)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 (08/29/14) and PAM-31 (09/02/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (08/29/14) and PAM-21 (09/02/14) 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 (08/29/14) and PAM-1D (08/29/14) and samples PAM-1 (09/02/14) and PAM-1D (09/02/14) 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 (08/29/14)	PAM-1D (08/29/14)			
Hexavalent chromium	0.0185	0.0155	18 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (09/02/14)	PAM-1D (09/02/14)			
Hexavalent chromium	0.0486	0.0462	5 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4090338**

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
4090338**

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 4090338**

No Sample Data Qualified in this SDG

LDC #: 32613A6
 SDG #: 4090338
 Laboratory: Eastern Research Group

VALIDATION COMPLETENESS WORKSHEET
 Level IV

Date: 9/8/14
 Page: 1 of 1
 Reviewer: HK
 2nd Reviewer: 02

METHOD: Hexavalent Chromium (ASTM D7614)

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

Validation Area			Comments
I.	Technical holding times	A	Sampling dates: 8/29/14 and 9/2/14
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Blanks	A	
V.	Matrix Spike/Matrix Spike Duplicates	N	Ess 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 = (34) (12,13) (12,13)
XI.	Field blanks	ND	FB = 9, 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 (08/29/14)	11	OAM 2 (09/02/14)	21	PAM-1 (09/02/14)DUP	31	
2	OAM 2 (08/29/14)	12	PAM-1 (09/02/14)	22	PAM-1D (09/02/14)DUP	32	
3	PAM-1 (08/29/14)	13	PAM-1D (09/02/14)	23		33	
4	PAM-1D (08/29/14)	14	PAM-2 (09/02/14)	24		34	
5	PAM-2 (08/29/14)	15	PAM-3 (09/02/14)	25		35	
6	PAM-3 (08/29/14)	16	PAM-4 (09/02/14)	26		36	
7	PAM-4 (08/29/14)	17	PAM-21 (09/02/14)	27		37	
8	PAM-21 (08/29/14)	18	PAM-31 (09/02/14)	28		38	
9	PAM-31 (08/29/14)	19	PAM-1 (08/29/14)DUP	29		39	
10	OAM 1 (09/02/14)	20	PAM-1D (08/29/14)DUP	30		40	

Notes: Dates appended to ID to differentiate between samples

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>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 ^{MS} 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} 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 FINDINGS CHECKLIST

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# 32613A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: KK
2nd Reviewer: *a*

Inorganics: Method See Cover

Analyte	Concentration (ng/m ³)		RPD (≤20)
	3	4	
Hexavalent Chromium	0.0185	0.0155	18

Analyte	Concentration (ng/m ³)		RPD (≤20)
	12	13	
Hexavalent Chromium	0.0486	0.0462	5

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32613A6.wpd

LDC #: 32613A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
 Reviewer: KE
 2nd Reviewer: CL

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr6+ was recalculated. Calibration date: 9/24/14

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)	(mAU*min) Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Hexavalent Chromium ↓	s1	0.05	0.0000163	0.99999	0.99999	Y
		s2	0.10	0.0000369			
		s3	0.20	0.0000796			
		s4	0.50	0.0001989			
		s5	1.00	0.0003998			
		s6	2.00	0.0008012			
Calibration verification	↓	CCV	0.5321	0.500	106.4	106.4	Y
Calibration verification	-	-	-	-	-	-	-
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:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100 \quad \text{Where,} \quad \text{Found} = \text{concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found} = \text{SSR (spiked sample result) - SR (sample result).}$$

$$\text{True} = \text{concentration of each analyte in the source.}$$

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

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

$$D = \text{Duplicate sample concentration}$$

Sample ID	Type of Analysis	Element	ng/m ³ Found / S (units)	ng/m ³ True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	Cr6+	1.0875 ng/mL	1.00 ng/mL	109 108	109	Y
1	Matrix spike sample	-	(SSR-SR) -	-	-	-	-
19	Duplicate sample	Cr6+ 0.0386	0.0386 0.0436	0.0436	12.2	11.9	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".

- N N/A Have results been reported and calculated correctly?
- N N/A Are results within the calibrated range of the instruments?
- 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 =

Recalculation:

$$\frac{[(Area) \times Coefficient] + Constant}{V_{air}(m^3)} \times V_i(ml) : \frac{[(0.0000146 \text{ mAU} \cdot \text{min})(2487.324) + (0.006280)](10 \text{ ml})}{21.61 \text{ m}^3} = 0.0197 \frac{\text{ng}}{\text{m}^3}$$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr6+	0.0197	0.0197	Y
	2		0.0200	0.0200	
	3		0.0185	0.0185	
	4		0.0155	0.0154	
	5		0.0255	0.0255	
	6		0.0409	0.0409	
	7		0.0333	0.0333	
	10		0.0127	0.0126	
	11		0.0105	0.0104	
	12		0.0486	0.0486	
	13		0.0462	0.0461	
	14		0.0214	0.0214	
	15		0.0238	0.0238	
	16		0.0893	0.0893	

Note: _____



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4090338-01

Sampled: 08/29/14 16:18

Matrix: Air

Sample Volume: 21.61 m³

Received: 09/03/14 13:15

Comments: Start Time 8/28/14 16:18

Analysis Date: 09/04/14 13:04

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	0.0197		0.0036

SEP 08 2014

Initials: *CR*

Eastern Research Group

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REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4090338-02

Sampled: 08/29/14 16:34

Matrix: Air

Sample Volume: 21.2 m³

Received: 09/03/14 13:15

Comments: Start Time 8/28/14 17:00

Analysis Date: 09/04/14 13:14

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0200

0.0036

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1	Lab ID: 4090338-03	Sampled: 08/29/14 17:35
Matrix: Air	Sample Volume: 20.88 m ³	Received: 09/03/14 13:15
Comments: Col 1 Start Time 8/28/14 18:23		Analysis Date: 09/04/14 11:43

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

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4090338-04	Sampled: 08/29/14 17:33
Matrix: Air	Sample Volume: 20.84 m ³	Received: 09/03/14 13:15
Comments: Col 2 Start Time 8/28/14 18:23		Analysis Date: 09/04/14 12:03

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	0.0155		0.0036

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REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-2	Lab ID: 4090338-05	Sampled: 08/29/14 17:18
Matrix: Air	Sample Volume: 20.98 m ³	Received: 09/03/14 13:15
Comments: Start Time 8/28/14 17:59		Analysis Date: 09/04/14 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	0.0255		0.0036

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REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4090338-06

Sampled: 08/29/14 17:08

Matrix: Air

Sample Volume: 21.02 m³

Received: 09/03/14 13:15

Comments: Start Time 8/28/14 17:46

Analysis Date: 09/04/14 13:54

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0409		0.0036

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4090338-07	Sampled: 08/29/14 16:58
Matrix: Air	Sample Volume: 21.09 m ³	Received: 09/03/14 13:15
Comments: Start Time 8/28/14 17:31		Analysis Date: 09/04/14 14:04

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	0.0333		0.0036

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Initials: *ER*

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4090338-08

Sampled: 08/29/14 00:00

Matrix: Air

Sample Volume: 20.98 m³

Received: 09/03/14 13:15

Comments:

Analysis Date: 09/04/14 14:14

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

SEP 08 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4090338-09

Sampled: 08/29/14 00:00

Matrix: Air

Sample Volume: 21.02 m³

Received: 09/03/14 13:15

Comments:

Analysis Date: 09/04/14 14:23

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

SEP 08 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4090338-10	Sampled: 09/02/14 16:04
Matrix: Air	Sample Volume: 21.38 m ³	Received: 09/03/14 13:15
Comments: Start Time 9/1/14 16:18		Analysis Date: 09/04/14 14:33

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	0.0127		0.0036

SEP 08 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 2	Lab ID: 4090338-11	Sampled: 09/02/14 16:28
Matrix: Air	Sample Volume: 21.33 m ³	Received: 09/03/14 13:15
Comments: Start Time 9/1/14 16:46		Analysis Date: 09/04/14 14:43

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	0.0105		0.0036

SEP 08 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4090338-12

Sampled: 09/02/14 17:55

Matrix: Air

Sample Volume: 21.71 m³

Received: 09/03/14 13:15

Comments: Col 1 Start Time 9/1/14 17:48

Analysis Date: 09/04/14 12:22

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	0.0486		0.0036

SEP 08 2014

Initials: *CR*

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: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4090338-13

Sampled: 09/02/14 17:57

Matrix: Air

Sample Volume: 21.74 m³

Received: 09/03/14 13:15

Comments: Col 2 Start Time 9/1/14 17:47

Analysis Date: 09/04/14 12:42

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	0.0462		0.0036

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-2	Lab ID: 4090338-14	Sampled: 09/02/14 17:33
Matrix: Air	Sample Volume: 21.65 m ³	Received: 09/03/14 13:15
Comments: Start Time 9/1/14 17:30		Analysis Date: 09/04/14 14:53

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	0.0214		0.0036

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REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4090338-15	Sampled: 09/02/14 17:20
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/03/14 13:15
Comments: Start Time 9/1/14 17:20		Analysis Date: 09/04/14 15:03

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	0.0238		0.0036

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REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4090338-16	Sampled: 09/02/14 16:58
Matrix: Air	Sample Volume: 21.37 m ³	Received: 09/03/14 13:15
Comments: Start Time 9/1/14 17:13		Analysis Date: 09/04/14 15:13

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	0.0893		0.0036

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FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21	Lab ID: 4090338-17	Sampled: 09/02/14 00:00
Matrix: Air	Sample Volume: 21.65 m ³	Received: 09/03/14 13:15
Comments:		Analysis Date: 09/04/14 15:43

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

SEP 08 2014

Initials: ER

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/05/14 13:01

SUBMITTED: 09/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-31	Lab ID: 4090338-18	Sampled: 09/02/14 00:00
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/03/14 13:15
Comments:		Analysis Date: 09/04/14 15:53

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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