

LABORATORY DATA CONSULTANTS, INC.

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

September 10, 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 9, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32627:

SDG

4090421

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 #32627 (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	4090421	09/09/14	09/12/14	18	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	18
				18	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	18

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring
Collection Date: September 3 through September 4, 2014
LDC Report Date: September 9, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4090421

Sample Identification

OAM 1 (09/03/14)	PAM-1 (09/04/14)DUP
OAM 2 (09/03/14)	PAM-1D (09/04/14)DUP
PAM-1 (09/03/14)	
PAM-1D (09/03/14)	
PAM-2 (09/03/14)	
PAM-3 (09/03/14)	
PAM-4 (09/03/14)	
PAM-21 (09/03/14)	
PAM-31 (09/03/14)	
OAM 1 (09/04/14)	
OAM 2 (09/04/14)	
PAM-1 (09/04/14)	
PAM-1D (09/04/14)	
PAM-2 (09/04/14)	
PAM-3 (09/04/14)	
PAM-4 (09/04/14)	
PAM-21 (09/04/14)	
PAM-31 (09/04/14)	
PAM-1 (09/03/14)DUP	
PAM-1D (09/03/14)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 (09/03/14) and PAM-31 (09/04/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (09/03/14) and PAM-21 (09/04/14) 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 (09/03/14) and PAM-1D (09/03/14) and samples PAM-1 (09/04/14) and PAM-1D (09/04/14) 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 (09/03/14)	PAM-1D (09/03/14)			
Hexavalent chromium	0.0162	0.0140	15 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (09/04/14)	PAM-1D (09/04/14)			
Hexavalent chromium	0.0319	0.0302	5 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4090421**

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
4090421**

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 4090421**

No Sample Data Qualified in this SDG

LDC #: 32627A6
 SDG #: 4090421
 Laboratory: Eastern Research Group

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 9/11/14
 Page: 1 of 1
 Reviewer: SS
 2nd Reviewer: CR

METHOD: Hexavalent Chromium (ASTM D7614)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: <u>09/03-04/14</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>LCSD</u>
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	<u>FD = (3,4) (12,13)</u>
XI	Field blanks	ND	<u>FB = 8, 17 TB = 9, 18</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 (09/03/14)	11	OAM 2 (09/04/14)	21	PAM-1 (09/04/14)DUP	31	
2	OAM 2 (09/03/14)	12	PAM-1 (09/04/14)	22	PAM-1D (09/04/14)DUP	32	
3	PAM-1 (09/03/14)	13	PAM-1D (09/04/14)	23		33	
4	PAM-1D (09/03/14)	14	PAM-2 (09/04/14)	24		34	
5	PAM-2 (09/03/14)	15	PAM-3 (09/04/14)	25		35	
6	PAM-3 (09/03/14)	16	PAM-4 (09/04/14)	26		36	
7	PAM-4 (09/03/14)	17	PAM-21 (09/04/14)	27		37	
8	PAM-21 (09/03/14)	18	PAM-31 (09/04/14)	28		38	
9	PAM-31 (09/03/14)	19	PAM-1 (09/03/14)DUP	29		39	
10	OAM 1 (09/04/14)	20	PAM-1D (09/03/14)DUP	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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. Calibration				
Were all instruments calibrated daily, each set-up time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the proper number of standards used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial calibration correlation coefficients > 0.995?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial and continuing calibration verification %Rs within the 90-110% 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"/>	
<u>ARs</u> Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL (≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

VALIDATION 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# 32627A6

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. (Parent only)
	3	4		
Hexavalent Chromium	0.0162	0.0140	15	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual. (Parent only)
	12	13		
Hexavalent Chromium	0.0319	0.0302	5	

\\LDCFILESERVER\validation\FIELD DUPLICATES\FD_inorganic\32627A6.wpd

LDC #: 32627A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 9/8/14

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	<u>Cr⁺⁶</u>	s1	0.1	0.0000164	0.99997	0.99997	Y
		s2	0.1	0.0000408			
		s3	0.2	0.0000834			
		s4	0.5	0.0002058			
		s5	1	0.000407			
		s6	2	0.0008236			
<u>ICV 11:02</u> Calibration verification	<u>Cr⁺⁶</u>	<u>Found</u> 0.4957ng/ml	<u>True</u> 0.5ng/ml		99.1%R	99.2%R	↓
<u>CCV 12:01</u> Calibration verification	<u>Cr⁺⁶</u>	0.5154ng/ml	0.5ng/ml		103.1%R	103.1%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 11:31	Laboratory control sample	Cr ⁺⁶	1.07 ng/ml	1 ng/ml	107%R	107%R	Y
N	Matrix spike sample		(SSR-SR)				
Dup. 12:32	Duplicate sample	Cr ⁺⁶	0.0158 ng/m ³	0.0162 ng/m ³	2.50%RPD	2.62%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 Cr⁺⁶ (1) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(\text{area} - C_0) / C_1$ Recalculation: $(0.0000112 - (-1.54E-06)) / 0.000412 = 0.0309 \text{ ng/ml}$

$\text{area} = 0.0000112$ $(\text{ng/ml})(\text{vol})$ $(0.0309 \text{ ng/ml})(10 \text{ ml})$
 $C_0 = -1.54E-06$ $\frac{\quad}{\text{m}^3}$ $\frac{\quad}{21.7 \text{ m}^3} = 0.0142 \text{ ng/m}^3$
 $C_1 = 0.000412$ $\text{Vol} = 10 \text{ ml} \text{ m}^3 = 21.7$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	Cr ⁺⁶	0.0142	0.0142	Y	
	2	↓	0.0212	0.0212	↓	
	3		0.0162	0.0162		
	4		0.0140	0.0140		
	5		0.0150	0.0150		
	6		0.0153	0.0153		
	7		0.0174	0.0174		
	8		ND	ND		
	9		ND	ND		
	10		0.0163	0.0162		
	11		0.0108	0.0108		
	12		0.0319	0.0319		
	13		0.0302	0.0302		
	14		0.0247	0.0247		
	15		0.0552	0.0552		
	16		0.0210	0.0210		
	17		ND	ND		
	18		ND	ND		↓

Note: _____



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 4090421-01	Sampled: 09/03/14 16:20
Matrix: Air	Sample Volume: 21.7 m ³	Received: 09/04/14 11:38
Comments: Start Time 9/2/14 16:13		Analysis Date: 09/08/14 13:43

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	0.0142		0.0036

SEP 09 2014

Initials: *CR*

Eastern Research Group

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REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 2	Lab ID: 4090421-02	Sampled: 09/03/14 16:39
Matrix: Air	Sample Volume: 21.66 m ³	Received: 09/04/14 11:38
Comments: Start Time 9/2/14 16:35		Analysis Date: 09/08/14 13:53

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	0.0212		0.0036

SEP 09 2014

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REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4090421-03

Sampled: 09/03/14 17:56

Matrix: Air

Sample Volume: 21.47 m³

Received: 09/04/14 11:38

Comments: Col 1 Start Time 9/2/14 18:05

Analysis Date: 09/08/14 12:22

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	0.0162		0.0036

SEP 09 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1D	Lab ID: 4090421-04	Sampled: 09/03/14 18:00
Matrix: Air	Sample Volume: 21.53 m ³	Received: 09/04/14 11:38
Comments: Col 2 Start Time 9/2/14 18:05		Analysis Date: 09/08/14 12:42

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0140		0.0036

SEP 09 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4090421-05	Sampled: 09/03/14 17:41
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/04/14 11:38
Comments: Start Time 9/2/14 17:41		Analysis Date: 09/08/14 14:23

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	0.0150		0.0036

SEP 09 2014

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4090421-06

Sampled: 09/03/14 17:29

Matrix: Air

Sample Volume: 21.63 m³

Received: 09/04/14 11:38

Comments: Start Time 9/2/14 17:27

Analysis Date: 09/08/14 14:33

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	0.0153		0.0036

SEP 09 2014

Initials: CR

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4090421-07	Sampled: 09/03/14 17:09
Matrix: Air	Sample Volume: 21.66 m ³	Received: 09/04/14 11:38
Comments: Start Time 9/2/14 17:05		Analysis Date: 09/08/14 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	0.0174		0.0036

SEP 09 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: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21	Lab ID: 4090421-08	Sampled: 09/03/14 00:00
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/04/14 11:38
Comments:		Analysis Date: 09/08/14 14:53

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 09 2014

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FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4090421-09

Sampled: 09/03/14 00:00

Matrix: Air

Sample Volume: 21.63 m³

Received: 09/04/14 11:38

Comments:

Analysis Date: 09/08/14 15:03

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

SEP 09 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4090524-01

Sampled: 09/04/14 16:24

Matrix: Air

Sample Volume: 21.58 m³

Received: 09/05/14 11:21

Comments: Start Time 9/3/14 16:26

Analysis Date: 09/08/14 15:12

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0163		0.0036

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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: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 2	Lab ID: 4090524-02	Sampled: 09/04/14 16:40
Matrix: Air	Sample Volume: 21.54 m ³	Received: 09/05/14 11:21
Comments: Start Time 9/3/14 16:44		Analysis Date: 09/08/14 15:22

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	0.0108		0.0036

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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: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4090524-03	Sampled: 09/04/14 17:58
Matrix: Air	Sample Volume: 21.54 m ³	Received: 09/05/14 11:21
Comments: Col 1 Start Time 9/3/14 18:02		Analysis Date: 09/08/14 13:02

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	0.0319		0.0036

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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: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4090524-04	Sampled: 09/04/14 18:01
Matrix: Air	Sample Volume: 21.54 m ³	Received: 09/05/14 11:21
Comments: Col 2 Start Time 9/3/14 18:05		Analysis Date: 09/08/14 13:21

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	0.0302		0.0036

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Initials: *ER*

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4090524-05	Sampled: 09/04/14 17:42
Matrix: Air	Sample Volume: 21.55 m ³	Received: 09/05/14 11:21
Comments: Start Time 9/3/14 17:46		Analysis Date: 09/08/14 15:32

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	0.0247		0.0036

SEP 09 2014

Initials: *ER*

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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: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4090524-06	Sampled: 09/04/14 17:23
Matrix: Air	Sample Volume: 21.43 m ³	Received: 09/05/14 11:21
Comments: Start Time 9/3/14 17:34		Analysis Date: 09/08/14 15:42

<u>Analyte</u>	<u>CAS Number</u>	<u>Hexavalent Chromium</u>		<u>MDL</u>
		<u>Results</u>	<u>Flag</u>	
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0552		0.0036

SEP 09 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: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4090524-07

Sampled: 09/04/14 17:08

Matrix: Air

Sample Volume: 21.51 m³

Received: 09/05/14 11:21

Comments: Start Time 9/3/14 17:14

Analysis Date: 09/08/14 15:52

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	0.0210		0.0036

SEP 09 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4090524-08

Sampled: 09/04/14 00:00

Matrix: Air

Sample Volume: 21.55 m³

Received: 09/05/14 11:21

Comments:

Analysis Date: 09/08/14 16:22

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

SEP 09 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 09/09/14 15:49

SUBMITTED: 09/04/14 to 09/05/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4090524-09

Sampled: 09/04/14 00:00

Matrix: Air

Sample Volume: 21.43 m³

Received: 09/05/14 11:21

Comments:

Analysis Date: 09/08/14 16:32

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

SEP 09 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 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 September 11, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32648:

SDG

4090913

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 #32648 (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		
A	4090913	09/11/14	09/16/14	18	0																												
Total	T/CR			18	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		

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: September 5 through September 8, 2014
LDC Report Date: September 12, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4090913

Sample Identification

OAM 1(09/05/14)	PAM-1(09/08/14)DUP
OAM 2(09/05/14)	PAM-1D(09/08/14)DUP
PAM-1(09/05/14)	
PAM-1D(09/05/14)	
PAM-2(09/05/14)	
PAM-3(09/05/14)	
PAM-4(09/05/14)	
PAM-21(09/05/14)	
PAM-31(09/05/14)	
OAM 1(09/08/14)	
OAM 2(09/08/14)	
PAM-1(09/08/14)	
PAM-1D(09/08/14)	
PAM-2(09/08/14)	
PAM-3(09/08/14)	
PAM-4(09/08/14)	
PAM-21(09/08/14)	
PAM-31(09/08/14)	
PAM-1(09/05/14)DUP	
PAM-1D(09/05/14)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(09/05/14) and PAM-31(09/08/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (09/05/14) and PAM-21 (09/08/14) 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(09/05/14) and PAM-1D(09/05/14) and samples PAM-1(09/08/14) and PAM-1D(09/08/14) 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(09/05/14)	PAM-1D(09/05/14)			
Hexavalent chromium	0.0455	0.0427	6 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(09/08/14)	PAM-1D(09/08/14)			
Hexavalent chromium	0.0152	0.0130	16 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4090913**

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
4090913**

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 4090913**

No Sample Data Qualified in this SDG

LDC #: 32648A6

VALIDATION COMPLETENESS WORKSHEET

Date: 9/11/14

SDG #: 4090913

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: JD

2nd Reviewer: a

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: 9/5/14 ~ 9/8/14
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)
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(09/05/14)	11	OAM 2(09/08/14)	21	PAM-1(09/08/14)DUP	31	
2	OAM 2(09/05/14)	12	PAM-1(09/08/14)	22	PAM-1D(09/08/14)DUP	32	
3	PAM-1(09/05/14)	13	PAM-1D(09/08/14)	23		33	
4	PAM-1D(09/05/14)	14	PAM-2(09/08/14)	24		34	
5	PAM-2(09/05/14)	15	PAM-3(09/08/14)	25		35	
6	PAM-3(09/05/14)	16	PAM-4(09/08/14)	26		36	
7	PAM-4(09/05/14)	17	PAM-21(09/08/14)	27		37	
8	PAM-21(09/05/14)	18	PAM-31(09/08/14)	28		38	
9	PAM-31(09/05/14)	19	PAM-1(09/05/14)DUP	29		39	
10	OAM 1(09/08/14)	20	PAM-1D(09/05/14)DUP	30		40	

Notes: _____

Method: Inorganics (EPA Method See Lab)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? <u>85-115</u>	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. <u>80-125</u>			/	
<u>air</u> 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 #: 32648A0

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: SD
 2nd Reviewer: ca

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# 32648A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0455	0.0427	6	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0152	0.0130	16	

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

LDC #: 3268A6

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 9/10/14

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	0.0000142	0.99999	0.99999	y
		s2	0.1	0.0000337			
		s3	0.2	0.0000773			
		s4	0.5	0.0001989			
		s5	1	0.000398			
		s6	2	0.000805			
ICV 10:42 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5005 ng/ml	<u>True</u> 0.5 ng/ml		100.1%R	100.1%R	↓
CCV 13:42 Calibration verification	Cr ⁺⁶	0.526 ng/ml	0.5 ng/ml		105.4%R	105.4%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. _____

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 11:12	Laboratory control sample	Cr ⁺⁶	1.072 ng/ml	1 ng/ml	107%R	107%R	Y
N	Matrix spike sample		(SSR-SR)				
Dup	Duplicate sample	Cr ⁺⁶	0.0464 ng/m ³	0.0455 ng/m ³	1.96%RPD	1.96%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 Cr⁺⁶ (6) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(area - C_0) / C_1$
 $area = 0.0000179$
 $C_0 = -5.40E-06$
 $C_1 = 0.0004050$

Recalculation: $\frac{(0.0000179 - (-5.40E-06))}{0.0004050} = 0.0575 \text{ ng/ml}$

$m^3 = 21.08$
 $VE = 10 \text{ ml}$
 $\frac{(ng/ml)(\mu l)}{m^3} = ng/m^3$
 $\frac{(0.0575 \text{ ng/ml})(10 \text{ ml})}{21.08 \text{ m}^3} = 0.0273 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0203	0.0202	Y
	2		0.0205	0.0204	
	3		0.0455	0.0455	
	4		0.0427	0.0427	
	5		0.0444	0.0444	
	6		0.0273	0.0273	
	7		0.0432	0.0432	
	8		ND	ND	
	9		ND	ND	
	10		0.0109	0.0108	
	11		0.0144	0.0144	
	12		0.0152	0.0152	
	13		0.0130	0.0130	
	14		0.0148	0.0148	
	15		0.0227	0.0226	
	16		0.0168	0.0168	
	17		ND	ND	
	18		ND	ND	

Note: _____



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4090913-01	Sampled: 09/05/14 15:57
Matrix: Air	Sample Volume: 21.1 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/4/14 16:30		Analysis Date: 09/10/14 13:22

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	0.0203		0.0036

SEP 12 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4090913-02	Sampled: 09/05/14 16:13
Matrix: Air	Sample Volume: 21.13 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/4/14 16:45		Analysis Date: 09/10/14 13:32

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	0.0205		0.0036

SEP 12 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4090913-03	Sampled: 09/05/14 17:28
Matrix: Air	Sample Volume: 21.07 m ³	Received: 09/09/14 11:11
Comments: Col 1 Start Time 9/4/14 18:04		Analysis Date: 09/10/14 12:02

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	0.0455		0.0036

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4090913-04	Sampled: 09/05/14 17:29
Matrix: Air	Sample Volume: 21.04 m ³	Received: 09/09/14 11:11
Comments: Col 2 Start Time 9/4/14 18:06		Analysis Date: 09/10/14 12:22

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	0.0427		0.0036

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4090913-05	Sampled: 09/05/14 17:11
Matrix: Air	Sample Volume: 21.04 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/4/14 17:48		Analysis Date: 09/10/14 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	0.0444		0.0036

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4090913-06	Sampled: 09/05/14 16:56
Matrix: Air	Sample Volume: 21.08 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/4/14 17:30		Analysis Date: 09/10/14 14:12

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	0.0273		0.0036

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4090913-07	Sampled: 09/05/14 16:43
Matrix: Air	Sample Volume: 21.14 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/4/14 17:13		Analysis Date: 09/10/14 14:22

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	0.0432		0.0036

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Initials: ER

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4090913-08	Sampled: 09/05/14 00:00
Matrix: Air	Sample Volume: 21.04 m ³	Received: 09/09/14 11:11
Comments:		Analysis Date: 09/10/14 14:32

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	ND	U	0.0036

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4090913-09	Sampled: 09/05/14 00:00
Matrix: Air	Sample Volume: 21.08 m ³	Received: 09/09/14 11:11
Comments:		Analysis Date: 09/10/14 14:42

Hexavalent Chromium

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

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4090913-10	Sampled: 09/08/14 16:19
Matrix: Air	Sample Volume: 21.45 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/7/14 16:29		Analysis Date: 09/10/14 14:51

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0109		0.0036

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4090913-11	Sampled: 09/08/14 16:35
Matrix: Air	Sample Volume: 21.49 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/7/14 16:42		Analysis Date: 09/10/14 15:01

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	0.0144		0.0036

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4090913-12

Sampled: 09/08/14 17:32

Matrix: Air

Sample Volume: 21.66 m³

Received: 09/09/14 11:11

Comments: Col 1 Start Time 9/7/14 17:27

Analysis Date: 09/10/14 12:42

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0152		0.0036

SEP 12 2014

Initials: *ER*

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4090913-13

Sampled: 09/08/14 17:33

Matrix: Air

Sample Volume: 21.69 m³

Received: 09/09/14 11:11

Comments: Col 2 Start Time 9/7/14 17:27

Analysis Date: 09/10/14 13:01

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0130		0.0036

SEP 12 2014

Initials: *CR*

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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: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4090913-14	Sampled: 09/08/14 17:17
Matrix: Air	Sample Volume: 21.62 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/7/14 17:16		Analysis Date: 09/10/14 15:11

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	0.0148		0.0036

SEP 12 2014

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ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-3	Lab ID: 4090913-15	Sampled: 09/08/14 17:08
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/7/14 17:08		Analysis Date: 09/10/14 15:21

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	0.0227		0.0036

SEP 12 2014

Initials: *CR*

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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: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4090913-16	Sampled: 09/08/14 16:59
Matrix: Air	Sample Volume: 21.56 m ³	Received: 09/09/14 11:11
Comments: Start Time 9/7/14 17:01		Analysis Date: 09/10/14 15:31

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0168		0.0036

SEP 12 2014

Initials: CR



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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4090913-17

Sampled: 09/08/14 00:00

Matrix: Air

Sample Volume: 21.62 m³

Received: 09/09/14 11:11

Comments:

Analysis Date: 09/10/14 16:01

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 12 2014

Initials: ER

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FILE #: 3926.00

REPORTED: 09/11/14 14:56

SUBMITTED: 09/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

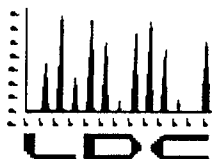
Description: PAM-31	Lab ID: 4090913-18	Sampled: 09/08/14 00:00
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/09/14 11:11
Comments:		Analysis Date: 09/10/14 16:11

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 12 2014

Initials: *ER*



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 16, 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 15, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32669:

SDG

4091029

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: September 9, 2014
LDC Report Date: September 15, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4091029

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.

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

Samples 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	0.0143	0.0135	6 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4091029**

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
4091029**

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 4091029**

No Sample Data Qualified in this SDG

LDC #: 32669A6

VALIDATION COMPLETENESS WORKSHEET

Date: 9/15/14

SDG #: 4091029

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: JD

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: 9/09/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD = (3,4)
XI	Field blanks	ND	FB = 8 TB = 9

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

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

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 (over))

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

VALIDATION 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# 32669A6

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. (Parent only)
	3	4		
Hexavalent Chromium	0.0143	0.0135	6	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32669A6.wpd

LDC #: 32669AB

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C_{r+6} was recalculated. Calibration date: 9/11/14

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	C _{r+6}	s1	0.1	0.0000125	0.99995	0.99995	y
		s2	0.1	0.0000321			
		s3	0.2	0.000078			
		s4	0.5	0.0001966			
		s5	1	0.0003994			
		s6	2	0.0007941			
ICV 10:31 Calibration verification	C _{r+6}	<u>Found</u> 0.507ng/ml	<u>True</u> 0.5ng/ml		101.4%R	101.3%R	↓
CCV 11:30 Calibration verification	C _{r+6}	0.525ng/ml	0.5ng/ml		105.2%R	105.1%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>LC5</u> <u>11:00</u>	Laboratory control sample	<u>Cr⁺⁶</u>	<u>1.09 ng/ml</u>	<u>1.00 ng/ml</u>	<u>109%R</u>	<u>109%R</u>	<u>Y</u>
	Matrix spike sample		(SSR-SR)				
<u>Dup</u> <u>12:29</u>	Duplicate sample	<u>Cr⁺⁶</u>	<u>0.0171 ng/lm³</u>	<u>0.0142 ng/lm³</u>	<u>18.5%RPD</u>	<u>17.5%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 (6) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(Area - C_0) / C_1$ $m^3 = 21.82$ Recalculation: $\frac{(0.000059 - (-4.97E-06))}{0.0004006} = 0.0271 \text{ ng/l}$

$ng/ml = 0.0271$
 $vt = 10 \text{ ml}$

Area = 0.000059
 $C_0 = -4.97E-06$
 $C_1 = 0.0004006$

$\frac{(ng/ml)(vt)}{m^3}$ $\frac{(0.0271)(10 \text{ ml})}{21.82 \text{ m}^3} = 0.0124 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	ND	ND	Y
	2	↓	0.0113	0.0113	↓
	3	↓	0.0143	0.0142	↓
	4	↓	0.0135	0.0135	↓
	5	↓	0.0115	0.0115	↓
	6	↓	0.0124	0.0124	↓
	7	↓	0.0151	0.0151	↓
	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: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4091029-01

Sampled: 09/09/14 16:23

Matrix: Air

Sample Volume: 21.62 m³

Received: 09/10/14 11:21

Comments: Start Time 9/8/14 16:24

Analysis Date: 09/11/14 13:11

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 15 2014

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4091029-02

Sampled: 09/09/14 16:46

Matrix: Air

Sample Volume: 21.72 m³

Received: 09/10/14 11:21

Comments: Start Time 9/8/14 16:38

Analysis Date: 09/11/14 13:21

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0113		0.0036

SEP 15 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4091029-03	Sampled: 09/09/14 17:55
Matrix: Air	Sample Volume: 21.89 m ³	Received: 09/10/14 11:21
Comments: Col 1 Start Time 9/8/14 17:36		Analysis Date: 09/11/14 12:19

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0143		0.0036

SEP 15 2014

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FILE #: 3926.00

REPORTED: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4091029-04	Sampled: 09/09/14 17:58
Matrix: Air	Sample Volume: 21.92 m ³	Received: 09/10/14 11:21
Comments: Col 2 Start Time 9/8/14 17:37		Analysis Date: 09/11/14 12:39

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	0.0135		0.0036

SEP 15 2014

Initials: *CR*

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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: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4091029-05	Sampled: 09/09/14 17:40
Matrix: Air	Sample Volume: 21.88 m ³	Received: 09/10/14 11:21
Comments: Start Time 9/8/14 17:21		Analysis Date: 09/11/14 13:31

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0115		0.0036

SEP 15 2014

Initials: *CR*

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4091029-06

Sampled: 09/09/14 17:27

Matrix: Air

Sample Volume: 21.82 m³

Received: 09/10/14 11:21

Comments: Start Time 9/8/14 17:12

Analysis Date: 09/11/14 13:41

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0124		0.0036

SEP 15 2014

Initials: *ER*

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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: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4091029-07	Sampled: 09/09/14 17:15
Matrix: Air	Sample Volume: 21.77 m ³	Received: 09/10/14 11:21
Comments: Start Time 9/8/14 17:03		Analysis Date: 09/11/14 13:51

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0151		0.0036

SEP 15 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: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4091029-08

Sampled: 09/09/14 00:00

Matrix: Air

Sample Volume: 21.88 m³

Received: 09/10/14 11:21

Comments:

Analysis Date: 09/11/14 14:01

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

SEP 15 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: 09/15/14 16:02

SUBMITTED: 09/10/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4091029-09

Sampled: 09/09/14 00:00

Matrix: Air

Sample Volume: 21.82 m³

Received: 09/10/14 11:21

Comments:

Analysis Date: 09/11/14 14:30

Hexavalent Chromium

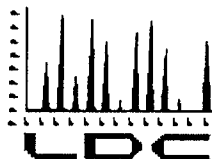
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	ND	U	0.0036

SEP 15 2014

Initials: ER

Eastern Research Group

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



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 18, 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 16, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32678:

SDG

4091116/4091220

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: September 10 through September 11, 2014
LDC Report Date: September 17, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4091116/4091220

Sample Identification

OAM 1(09/10/14)	PAM-1(09/11/14)DUP
OAM 2(09/10/14)	PAM-1D(09/11/14)DUP
PAM-1(09/10/14)	
PAM-1D(09/10/14)	
PAM-2(09/10/14)	
PAM-3(09/10/14)	
PAM-4(09/10/14)	
PAM-21(09/10/14)	
PAM-31(09/10/14)	
OAM 1(09/11/14)	
OAM 2(09/11/14)	
PAM-1(09/11/14)	
PAM-1D(09/11/14)	
PAM-2(09/11/14)	
PAM-3(09/11/14)	
PAM-4(09/11/14)	
PAM-21(09/11/14)	
PAM-31(09/11/14)	
PAM-1(09/10/14)DUP	
PAM-1D(09/10/14)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(09/10/14) and PAM-31(09/11/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (09/10/14) and PAM-21 (09/11/14) 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(09/10/14) and PAM-1D(09/10/14) and samples PAM-1(09/11/14) and PAM-1D(09/11/14) 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(09/10/14)	PAM-1D(09/10/14)			
Hexavalent chromium	0.0054	0.0057	5 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(09/11/14)	PAM-1D(09/11/14)			
Hexavalent chromium	0.0280	0.0293	5 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4091116/4091220**

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
4091116/4091220**

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
4091116/4091220**

No Sample Data Qualified in this SDG

LDC #: 32678A6

VALIDATION COMPLETENESS WORKSHEET

Date: 9/17/14

SDG #: 4091116/4091220

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: kk2nd 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: 9/10/14 - 9/11/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	not required
VI.	Duplicates	SW 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)
XI.	Field blanks	ND	FB = 8, 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 (09/10/14)	11	OAM 2 (09/11/14)	21	PAM-1 (09/11/14)DUP	31	
2	OAM 2 (09/10/14)	12	PAM-1 (09/11/14)	22	PAM-1D (09/11/14)DUP	32	
3	PAM-1 (09/10/14)	13	PAM-1D (09/11/14)	23		33	
4	PAM-1D (09/10/14)	14	PAM-2 (09/11/14)	24		34	
5	PAM-2 (09/10/14)	15	PAM-3 (09/11/14)	25		35	
6	PAM-3 (09/10/14)	16	PAM-4 (09/11/14)	26		36	
7	PAM-4 (09/10/14)	17	PAM-21 (09/11/14)	27		37	
8	PAM-21 (09/10/14)	18	PAM-31 (09/11/14)	28		38	
9	PAM-31 (09/10/14)	19	PAM-1 (09/10/14)DUP	29		39	
10	OAM 1 (09/11/14)	20	PAM-1D (09/10/14)DUP	30		40	

Notes: Date 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 matrix spike (MS) ^{KK} and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD ^{MS/MSD} or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD ^{KK} 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.		✓		

VALIDATION FINDINGS WORKSHEET Duplicate Analysis

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 Was a duplicate sample analyzed for each matrix in this SDG?
- Y N N/A Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for ^{Air}water and $\leq 35\%$ for soil samples ($\leq 10\%$ for Method 300.0)? If no, see qualification below. A control limit of \pm CRDL ($\pm 2X$ 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. If field blanks were used for laboratory duplicates, see overall assessment.

LEVEL IV ONLY:

- Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Duplicate ID	Matrix	Analyte	RPD (Limits)	Associated Samples	Qualifications
	9/15/14	19	Air	Cr6+	26.9 (20)	3	J/05/A*KK no qual ($< 5xMDL$)

Comments: ^{*} ~~other client dup~~ passing in matrix RPD $\leq 20\%$ KK

LDC# 32678A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JK
2nd Reviewer: CV

Inorganics: Method See Cover

Analyte	Concentration (ng/m ³)		RPD (≤20)	Qual. (>5X)
	3	4		
Hexavalent Chromium	0.0054	0.0057	5	

Analyte	Concentration (ng/m ³)		RPD (≤20)	Qual. (>5X)
	12	13		
Hexavalent Chromium	0.0280	0.0293	5	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32678A6.wpd

LDC #: 32678A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr6+ was recalculated. Calibration date: 9/15/14

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

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

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	0.0000187	0.99992	0.99992	Y
		s2	0.10	0.0000364			
		s3	0.20	0.0000829			
		s4	0.50	0.0002134			
		s5	1.00	0.0004107			
		s6	2.00	0.0008244			
Calibration verification		CCV	0.5123	0.5000	102.5	102.5	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/ml Found / S (units)	ng/ml True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	Cr6+	1.0862	1.00	109	109	Y
—	Matrix spike sample	—	(SSR-SR) —	—	—	—	—
Z1	Duplicate sample	Cr6+	0.0293 ng/m ³	0.0294 ng/m ³	0.3407	0.165	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 Cr6+ reported with a positive detect were recalculated and verified using the following equation:

Concentration =
$$\left[\frac{(\text{Area} \times X \text{ coefficient}) + \text{Constant}}{V_f} \right] V_i$$

Recalculation:
$$3: \left(\frac{(0.000234 \text{ mAU} \cdot \text{min}) (2421.52) + 0.001376}{207 \text{ ml}} \right) 10 \text{ ml}$$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr6+	0.0080	0.0080	Y
	3		0.0054	0.0054	
	4		0.0057	0.0058 0.0057	
	5		0.0129	0.0130	
	6		0.0107	0.0108	
	7		0.0140	0.0140	
	10		0.0222	0.0223	
	11		0.0247	0.0248	
	12		0.0280	0.0280	
	13		0.0293	0.0293	
	14		0.0223	0.0224	
	15		0.0184	0.0185	
	16	↓	0.117	0.117	↓

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: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 4091116-01	Sampled: 09/10/14 16:34
Matrix: Air	Sample Volume: 21.63 m ³	Received: 09/11/14 11:09
Comments: Start Time 9/9/14 16:32		Analysis Date: 09/15/14 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	0.0080		0.0036

KK 9-17-14

Eastern Research Group

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REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4091116-02	Sampled: 09/10/14 17:01
Matrix: Air	Sample Volume: 21.77 m ³	Received: 09/11/14 11:09
Comments: Start Time 9/9/14 16:50		Analysis Date: 09/15/14 16:03

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

KE 9.17.14

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REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4091116-03	Sampled: 09/10/14 18:29
Matrix: Air	Sample Volume: 22.04 m ³	Received: 09/11/14 11:09
Comments: Col 1 Start Time 9/9/14 17:59		Analysis Date: 09/15/14 13:15

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	0.0054		0.0036

KK 9.17.14

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REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4091116-04	Sampled: 09/10/14 18:34
Matrix: Air	Sample Volume: 22.08 m ³	Received: 09/11/14 11:09
Comments: Col 2 Start Time 9/9/14 18:02		Analysis Date: 09/15/14 13:35

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	0.0057		0.0036

ICK 9.17.14

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REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-2	Lab ID: 4091116-05	Sampled: 09/10/14 18:07
Matrix: Air	Sample Volume: 21.95 m ³	Received: 09/11/14 11:09
Comments: Start Time 9/9/14 17:44		Analysis Date: 09/15/14 16:13

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	0.0129		0.0036

KX 9.17.14

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REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4091116-06	Sampled: 09/10/14 17:49
Matrix: Air	Sample Volume: 21.87 m ³	Received: 09/11/14 11:09
Comments: Start Time 9/9/14 17:31		Analysis Date: 09/15/14 16:23

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	0.0107		0.0036

kk 9.17.14

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REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4091116-07	Sampled: 09/10/14 17:31
Matrix: Air	Sample Volume: 21.78 m ³	Received: 09/11/14 11:09
Comments: Start Time 9/9/14 17:19		Analysis Date: 09/15/14 16:33

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	0.0140		0.0036

KK 9.17.14

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21

Lab ID: 4091116-08

Sampled: 09/10/14 00:00

Matrix: Air

Sample Volume: 21.95 m³

Received: 09/11/14 11:09

Comments:

Analysis Date: 09/15/14 16:42

Hexavalent Chromium

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

KE 9.17.14

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4091116-09

Sampled: 09/10/14 00:00

Matrix: Air

Sample Volume: 21.87 m³

Received: 09/11/14 11:09

Comments:

Analysis Date: 09/15/14 16:52

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

kk 9.17.14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 4091220-01	Sampled: 09/11/14 15:57
Matrix: Air	Sample Volume: 20.97 m ³	Received: 09/12/14 11:08
Comments: Start Time 9/10/14 16:39		Analysis Date: 09/15/14 17:02

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	0.0222		0.0036

KK 9.17.14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4091220-02

Sampled: 09/11/14 16:18

Matrix: Air

Sample Volume: 20.87 m³

Received: 09/12/14 11:08

Comments: Start Time 9/10/14 17:07

Analysis Date: 09/15/14 17:12

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	0.0247		0.0036

KK 9.17.14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4091220-03

Sampled: 09/11/14 17:33

Matrix: Air

Sample Volume: 20.7 m³

Received: 09/12/14 11:08

Comments: Col 1 Start Time 9/10/14 18:33

Analysis Date: 09/15/14 13:55

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	0.0280		0.0036

KK 9.17.14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4091220-04	Sampled: 09/11/14 17:37
Matrix: Air	Sample Volume: 20.7 m ³	Received: 09/12/14 11:08
Comments: Col 2 Start Time 9/10/14 18:37		Analysis Date: 09/15/14 14:39

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	0.0293		0.0036

kk 9.17.14

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: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4091220-05	Sampled: 09/11/14 17:14
Matrix: Air	Sample Volume: 20.75 m ³	Received: 09/12/14 11:08
Comments: Start Time 9/10/14 18:11		Analysis Date: 09/15/14 17:22

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	0.0223		0.0036

KK 9.17.14

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4091220-06

Sampled: 09/11/14 17:04

Matrix: Air

Sample Volume: 20.79 m³

Received: 09/12/14 11:08

Comments: Start Time 9/10/14 17:58

Analysis Date: 09/15/14 17:52

Hexavalent Chromium

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

KK 9.17.14

Eastern Research Group	<i>The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.</i>
------------------------	---



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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4091220-07

Sampled: 09/11/14 16:50

Matrix: Air

Sample Volume: 20.9 m³

Received: 09/12/14 11:08

Comments: Start Time 9/10/14 17:37

Analysis Date: 09/15/14 18:02

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	0.117		0.0036

KK 9.17.14

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4091220-08

Sampled: 09/11/14 00:00

Matrix: Air

Sample Volume: 20.75 m³

Received: 09/12/14 11:08

Comments:

Analysis Date: 09/15/14 18:12

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

kk 9.17.14

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FILE #: 3926.00

REPORTED: 09/16/14 15:18

SUBMITTED: 09/11/14 to 09/12/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4091220-09	Sampled: 09/11/14 00:00
Matrix: Air	Sample Volume: 20.79 m ³	Received: 09/12/14 11:08
Comments:		Analysis Date: 09/15/14 18:22

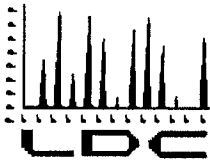
Hexavalent Chromium

<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	ND	U	0.0036

JK 9-17-14

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

LDC Project #32703:

SDG

Fraction

4091622

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: September 12 through September 15, 2014
LDC Report Date: September 19, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 4091622

Sample Identification

OAM 1(09/12/14)	PAM-1(09/15/14)DUP
OAM 2(09/12/14)	PAM-1D(09/15/14)DUP
PAM-1(09/12/14)	
PAM-1D(09/12/14)	
PAM-2(09/12/14)	
PAM-3(09/12/14)	
PAM-4(09/12/14)	
PAM-21(09/12/14)	
PAM-31(09/12/14)	
OAM 1(09/15/14)	
OAM 2(09/15/14)	
PAM-1(09/15/14)	
PAM-1D(09/15/14)	
PAM-2(09/15/14)	
PAM-3(09/15/14)	
PAM-4(09/15/14)	
PAM-21(09/15/14)	
PAM-31(09/15/14)	
PAM-1(09/12/14)DUP	
PAM-1D(09/12/14)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(09/12/14) and PAM-31(09/15/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (09/12/14) and PAM-21 (09/15/14) 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(09/12/14) and PAM-1D(09/12/14) and samples PAM-1(09/15/14) and PAM-1D(09/15/14) 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(09/12/14)	PAM-1D(09/12/14)			
Hexavalent chromium	0.0192	0.0190	1 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(09/15/14)	PAM-1D(09/15/14)			
Hexavalent chromium	0.0170	0.0153	11 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4091622**

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
4091622**

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 4091622**

No Sample Data Qualified in this SDG

LDC #: 32703A6

VALIDATION COMPLETENESS WORKSHEET

Date: 9/19/14

SDG #: 4091622

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: 9/12/14, 9/15/14
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)
XI.	Field blanks	NO	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(09/12/14)	11	OAM 2(09/15/14)	21	PAM-1(09/15/14) MS DU	31	
2	OAM 2(09/12/14)	12	PAM-1(09/15/14)	22	PAM-1D(09/15/14) MS DU	32	
3	PAM-1(09/12/14)	13	PAM-1D(09/15/14)	23		33	
4	PAM-1D(09/12/14)	14	PAM-2(09/15/14)	24		34	
5	PAM-2(09/12/14)	15	PAM-3(09/15/14)	25		35	
6	PAM-3(09/12/14)	16	PAM-4(09/15/14)	26		36	
7	PAM-4(09/12/14)	17	PAM-21(09/15/14)	27		37	
8	PAM-21(09/12/14)	18	PAM-31(09/15/14)	28		38	
9	PAM-31(09/12/14)	19	PAM-1(09/12/14) MS DU	29		39	
10	OAM 1(09/15/14)	20	PAM-1D(09/12/14) MS DU	30		40	

Notes: Dup was appended to differentiate between samples.

Method: Inorganics (EPA Method See Lab 10)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? <u>85-115</u>	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for <u>waters</u> 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# 32703A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0192	0.0190	1	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0170	0.0153	11	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32703A6.wpd

LDC #: 32703A6

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

Page: 1 of 1

Reviewer: JD

2nd Reviewer: AL

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 9/17/14

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	50 ng/ml Conc. (ng/L)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.1	0.0000134	0.99990	0.99990	y
		s2	0.1	0.0000316			
		s3	0.2	0.0000801			
		s4	0.5	0.0001925			
		s5	1	0.0003892			
		s6	2	0.0008001			
ICV 10:56 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.530 ng/ml	<u>True</u> 0.500 ng/ml		106%R	106%R	↓
CCV 11:56 Calibration verification	Cr ⁺⁶	0.533 ng/ml	0.500 ng/ml		106.6%R	106.6%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	
LLS 11:26	Laboratory control sample	Cr+6	1.06 ng/ml	1 ng/ml	106%R	106%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
DUP 12:26	Duplicate sample	↓	0.0205 ng/m ³	0.0192 ng/m ³	6.55% RPD	6.03% 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".

- N N/A Have results been reported and calculated correctly?
- Y N N/A Are results within the calibrated range of the instruments?
- Y N N/A Are all detection limits below the CRQL?

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

Concentration = $(A - C_0) / C_1$ $V_f = 10 \text{ ml}$ $m^3 = 21.43$ Recalculation: $\frac{(0.0000625 - (-6.78E-06))}{0.0004020} = 0.172 \text{ ng/ml}$

$A = 0.0000625$ $(\text{ng/ml})(C_0 V_f)$
 $C_0 = -6.78E-06$ $\frac{\hspace{10em}}{m^3} = \text{ng/m}^3$ $\frac{(0.172 \text{ ng/ml})(10 \text{ ml})}{21.43 m^3} = 0.0804 \text{ ng/m}^3$
 $C_1 = 0.0004020$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	C _s +6	0.0124	0.0124	Y
	2		ND	ND	
	3		0.0192	0.0192	
	4		0.0190	0.0190	
	5		0.0804	0.0804	
	6		ND	ND	
	7		0.0199	0.0199	
	8		ND	ND	
	9		ND	ND	
	10		0.0159	0.0158	
	11		0.0235	0.0235	
	12		0.0170	0.0170	
	13		0.0153	0.0153	
	14		0.0225	0.0225	
	15		0.0149	0.0149	
	16		0.0945	0.0945	
	17		ND	ND	
	18		ND	ND	Y

Note: _____



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FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4091622-01	Sampled: 09/12/14 15:25
Matrix: Air	Sample Volume: 20.87 m ³	Received: 09/16/14 11:19
Comments: Start Time 9/11/14 16:04		Analysis Date: 09/17/14 13:37

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	0.0124		0.0036

KK 9.19.14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4091622-02

Sampled: 09/12/14 15:56

Matrix: Air

Sample Volume: 21.19 m³

Received: 09/16/14 11:19

Comments: Start Time 9/11/14 16:23

Analysis Date: 09/17/14 13:46

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

KK 9.19.14

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FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4091622-03	Sampled: 09/12/14 17:44
Matrix: Air	Sample Volume: 21.72 m ³	Received: 09/16/14 11:19
Comments: Col 1 Start Time 9/11/14 17:36		Analysis Date: 09/17/14 12:17

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	0.0192		0.0036

KK 9.19.14

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4091622-04

Sampled: 09/12/14 17:44

Matrix: Air

Sample Volume: 21.69 m³

Received: 09/16/14 11:19

Comments: Col 2 Start Time 9/11/14 17:38

Analysis Date: 09/17/14 12:36

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.0190		0.0036

KK 9.19.14

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: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4091622-05

Sampled: 09/12/14 17:07

Matrix: Air

Sample Volume: 21.43 m³

Received: 09/16/14 11:19

Comments: Start Time 9/11/14 17:18

Analysis Date: 09/17/14 14:16

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	0.0804		0.0036

kk 9.19.14



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Malvern, PA 19355

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4091622-06

Sampled: 09/12/14 16:46

Matrix: Air

Sample Volume: 21.27 m³

Received: 09/16/14 11:19

Comments: Start Time 9/11/14 17:08

Analysis Date: 09/17/14 14:26

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

KK 9.19.14

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4091622-07	Sampled: 09/12/14 16:29
Matrix: Air	Sample Volume: 21.23 m ³	Received: 09/16/14 11:19
Comments: Start Time 9/11/14 16:54		Analysis Date: 09/17/14 14:36

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	0.0199		0.0036

KK 9.19.14

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4091622-08

Sampled: 09/12/14 00:00

Matrix: Air

Sample Volume: 21.43 m³

Received: 09/16/14 11:19

Comments:

Analysis Date: 09/17/14 14:46

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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kk 9.19.14



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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4091622-09

Sampled: 09/12/14 00:00

Matrix: Air

Sample Volume: 21.27 m³

Received: 09/16/14 11:19

Comments:

Analysis Date: 09/17/14 14:56

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

kk 9.19.14

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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: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4091622-10	Sampled: 09/15/14 16:15
Matrix: Air	Sample Volume: 21.69 m ³	Received: 09/16/14 11:19
Comments: Start Time 9/14/14 16:09		Analysis Date: 09/17/14 15:06

Hexavalent Chromium

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

KK 9.19.14

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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: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4091622-11	Sampled: 09/15/14 16:36
Matrix: Air	Sample Volume: 21.48 m ³	Received: 09/16/14 11:19
Comments: Start Time 9/14/14 16:44		Analysis Date: 09/17/14 15:16

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0235		0.0036

kk 9.19.14

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4091622-12

Sampled: 09/15/14 18:08

Matrix: Air

Sample Volume: 21.94 m³

Received: 09/16/14 11:19

Comments: Col 1 Start Time 9/14/14 17:46

Analysis Date: 09/17/14 12:56

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	0.0170		0.0036

KK 9.19.14

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1D **Lab ID:** 4091622-13 **Sampled:** 09/15/14 18:09

Matrix: Air **Sample Volume:** 21.91 m³ **Received:** 09/16/14 11:19

Comments: Col 2 Start Time 9/14/14 17:48 **Analysis Date:** 09/17/14 13:16

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0153		0.0036

KK 9.19.14

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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: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4091622-14

Sampled: 09/15/14 17:44

Matrix: Air

Sample Volume: 21.86 m³

Received: 09/16/14 11:19

Comments: Start Time 9/14/14 17:27

Analysis Date: 09/17/14 15:26

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	0.0225		0.0036

PK 9.19.14

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FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4091622-15

Sampled: 09/15/14 17:29

Matrix: Air

Sample Volume: 21.73 m³

Received: 09/16/14 11:19

Comments: Start Time 9/14/14 17:20

Analysis Date: 09/17/14 15:35

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	0.0149		0.0036

KK 9.19.14

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FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4091622-16

Sampled: 09/15/14 17:13

Matrix: Air

Sample Volume: 21.72 m³

Received: 09/16/14 11:19

Comments: Start Time 9/14/14 17:06

Analysis Date: 09/17/14 15:45

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	0.0945		0.0036

kk 9.19.14

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FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4091622-17

Sampled: 09/15/14 00:00

Matrix: Air

Sample Volume: 21.86 m³

Received: 09/16/14 11:19

Comments:

Analysis Date: 09/17/14 16:15

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

KK 9.19.14

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 09/18/14 15:30

SUBMITTED: 09/16/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4091622-18

Sampled: 09/15/14 00:00

Matrix: Air

Sample Volume: 21.73 m³

Received: 09/16/14 11:19

Comments:

Analysis Date: 09/17/14 16:25

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

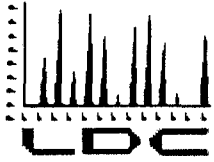
U

0.0036

KE 9.19.14

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 23, 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 22, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32716:

SDG

4091716

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: September 16, 2014
LDC Report Date: September 23, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4091716

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.

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

Samples 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	0.101	0.0867	15 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4091716**

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
4091716**

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 4091716**

No Sample Data Qualified in this SDG

LDC #: 32716A6

VALIDATION COMPLETENESS WORKSHEET

Date: 9/22/14

SDG #: 4091716

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: SO

2nd Reviewer: [Signature]

METHOD: Hexavalent Chromium (ASTM D7614)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/16/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VI.	Duplicates	A	Dup.
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD=(3,4)
XI	Field blanks	ND	FB=8 TB=9

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

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

Validated Samples: Aius

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.	/			
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>Ans</u> 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 #: 32716 AB

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: SD
 2nd Reviewer: u

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 32716A6

Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.101	0.0867	15	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32716A6.wpd

LDC #: 32716AP

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: 9/18/14

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	0.0000135	0.99992	0.99992	
		s2	0.1	0.0000322			
		s3	0.2	0.0000792			
		s4	0.5	0.0002065			
		s5	1	0.0004023			
		s6	2	0.0008186			
ICV 11:04 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5153mg/ml	<u>True</u> 0.5 mg/ml		103.1%R	103.1%R	
CCV 12:05 Calibration verification	Cr ⁺⁶	0.520mg/ml	0.5mg/ml		104.0%R	104.0%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 #: 32716A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 11:33	Laboratory control sample	Cr ⁶⁺	1.095 ug/ml	1.00 ug/ml	110%R	110%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
Dup	Duplicate sample		0.105 ug/m ³	0.101 ug/m ³	3.88%RPD	4.59%RPD	Y

Comments: _____

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 (5) Cr⁶⁺ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1 \cdot V_f = 10 \text{ ml}$
 $m^3 = 21.67$
 Recalculation: $(0.0000583 - (-5.57E-06)) / 0.0004119 = 0.1551 \text{ ng/l}$
 $(0.1551 \text{ ng/ml})(10 \text{ ml}) / 21.67 \text{ m}^3 = 0.0716 \text{ ng/l}$

$A = 0.0000583$
 $C_0 = 0.00000557$
 $C_1 = 0.0004119$

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

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	Cr ⁶⁺	0.0230	0.0230	Y	
	2	↓	0.0189	0.0189	↓	
	3		0.101	0.101		
	4		0.0867	0.0866		
	5		0.0716	0.0716		
	6		0.0206	0.205		
	7		0.0327	0.0326		
	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: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4091716-01	Sampled: 09/16/14 16:25
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/17/14 10:43
Comments: Start Time 9/15/14 16:25		Analysis Date: 09/18/14 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	0.0230		0.0036

JK 9/23/14

Eastern Research Group

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Environmental Resources Management, Inc

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FILE #: 3926.00

REPORTED: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4091716-02	Sampled: 09/16/14 16:48
Matrix: Air	Sample Volume: 21.63 m ³	Received: 09/17/14 10:43
Comments: Start Time 9/15/14 16:46		Analysis Date: 09/18/14 13:14

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	0.0189		0.0036

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4091716-03	Sampled: 09/16/14 18:18
Matrix: Air	Sample Volume: 21.58 m ³	Received: 09/17/14 10:43
Comments: Col 1 Start Time 9/15/14 18:19		Analysis Date: 09/18/14 12:23

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	0.101		0.0036

14 9/23/14

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Environmental Resources Management, Inc

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description:	PAM-1D	Lab ID:	4091716-04	Sampled:	09/16/14 18:23
Matrix:	Air	Sample Volume:	21.66 m ³	Received:	09/17/14 10:43
Comments:	Col 2 Start Time 9/15/14 18:19			Analysis Date:	09/18/14 12:43

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	0.0867		0.0036

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FILE #: 3926.00

REPORTED: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4091716-05	Sampled: 09/16/14 17:56
Matrix: Air	Sample Volume: 21.67 m ³	Received: 09/17/14 10:43
Comments: Start Time 9/15/14 17:51		Analysis Date: 09/18/14 13:24

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	0.0716		0.0036

KK 9/23/14

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REPORTED: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4091716-06	Sampled: 09/16/14 17:42
Matrix: Air	Sample Volume: 21.95 m ³	Received: 09/17/14 10:43
Comments: Start Time 9/15/14 17:36		Analysis Date: 09/18/14 13:34

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	0.0206		0.0036

KK 9/23/14

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4091716-07	Sampled: 09/16/14 17:18
Matrix: Air	Sample Volume: 21.56 m ³	Received: 09/17/14 10:43
Comments: Start Time 9/15/14 17:21		Analysis Date: 09/18/14 13:43

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	0.0327		0.0036

KK 9/23/14

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Page 9 of 13



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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4091716-08	Sampled: 09/16/14 00:00
Matrix: Air	Sample Volume: 21.67 m ³	Received: 09/17/14 10:43
Comments:		Analysis Date: 09/18/14 13:53

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

KL 9/23/14

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FILE #: 3926.00

REPORTED: 09/22/14 12:29

SUBMITTED: 09/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4091716-09	Sampled: 09/16/14 00:00
Matrix: Air	Sample Volume: 21.95 m ³	Received: 09/17/14 10:43
Comments:		Analysis Date: 09/18/14 14:23

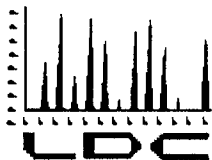
Hexavalent Chromium

<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

PK 9/23/14

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 24, 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 23, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32725:

SDG

4091821/4091909

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: September 17 through September 18, 2014
LDC Report Date: September 24, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 4091821/4091909

Sample Identification

OAM 1(09/17/14)	PAM-1(09/18/14)DUP
OAM 2(09/17/14)	PAM-1D(09/18/14)DUP
PAM-1(09/17/14)	
PAM-1D(09/17/14)	
PAM-2(09/17/14)	
PAM-3(09/17/14)	
PAM-4(09/17/14)	
PAM-21(09/17/14)	
PAM-31(09/17/14)	
OAM 1(09/18/14)	
OAM 2(09/18/14)	
PAM-1(09/18/14)	
PAM-1D(09/18/14)	
PAM-2(09/18/14)	
PAM-3(09/18/14)	
PAM-4(09/18/14)	
PAM-21(09/18/14)	
PAM-31(09/18/14)	
PAM-1(09/17/14)DUP	
PAM-1D(09/17/14)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(09/17/14) and PAM-31(09/18/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (09/17/14) and PAM-21 (09/18/14) 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(09/17/14) and PAM-1D(09/17/14) and samples PAM-1(09/18/14) and PAM-1D(09/18/14) 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(09/17/14)	PAM-1D(09/17/14)			
Hexavalent chromium	0.0140	0.0161	14 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(09/18/14)	PAM-1D(09/18/14)			
Hexavalent chromium	0.0325	0.0281	15 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4091821/4091909**

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
4091821/4091909**

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
4091821/4091909**

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

LDC #: 32725A6
 SDG #: 4091821/4091909
 Laboratory: Eastern Research Group

VALIDATION COMPLETENESS WORKSHEET
 Level IV

Date: 9/23/14
 Page: 1 of 1
 Reviewer: SD
 2nd Reviewer: OR

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>9/17-18/14</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>LCSID</u>
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	<u>FD = (3,4) (12,13)</u>
XI	Field blanks	ND	<u>FB = 8, 17 TB = 9, 18</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 (9/17/14)	11	OAM 2 (9/18/14)	21	PAM-1 ^(9/18/14) DUP	31	
2	OAM 2	12	PAM-1	22	PAM-1DDUP	32	
3	PAM-1	13	PAM-1D	23		33	
4	PAM-1D	14	PAM-2	24		34	
5	PAM-2	15	PAM-3	25		35	
6	PAM-3	16	PAM-4	26		36	
7	PAM-4	17	PAM-21	27		37	
8	PAM-21	18	PAM-31	28		38	
9	PAM-31	19	PAM-1DUP ^(9/17/14)	29		39	
10	OAM 1 (9/18/14)	20	PAM-1DDUP	30		40	

Notes: Date appended to differentiate between samples

Method: Inorganics (EPA Method See box)

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 99-110% QC limits? <u>85-115</u>	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
<u>10/5</u> Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\leq \text{CRDL}$ ($\leq 2\text{X CRDL}$ for soil) was used for samples that were $\leq 5\text{X}$ the CRDL, including when only one of the duplicate sample values were $< 5\text{X}$ 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?			/	

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 32725A6

Field Duplicates

Page 1 of 1
Reviewer: 30
2nd Reviewer: 02

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	3	4		
Hexavalent Chromium	0.0140	0.0161	14	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	12	13		
Hexavalent Chromium	0.0325	0.0281	15	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32725A6.wpd

LDC #: 32725A6

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C^{to} was recalculated. Calibration date: 9/22/14

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	C ^{to}	s1	0.1	0.0000143	0.99996	0.99996	Y
		s2	0.1	0.0000372			
		s3	0.2	0.0000797			
		s4	0.5	0.0001972			
		s5	1	0.0003961			
		s6	2	0.0008077			
ICV 11:08 Calibration verification	↓	<u>Found</u> 0.5008 ng/ml	<u>True</u> 0.5 ng/ml		100.2%R	100.2%R	↓
CCV 12:07 Calibration verification	↓	0.501 ng/ml	0.5 ng/ml		100.2%R	100.2%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.

LDC #: 32725AP

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 11:38	Laboratory control sample	Cr ⁺⁶	1.059 ng/ml	1.00 ng/ml	106%R	106%R	Y
✓	Matrix spike sample		(SSR-SR)				
Dup 12:38	Duplicate sample	Cr ⁺⁶	0.0153 ng/ml ³	0.0141 ng/ml ³	8.16%RPD	8.61%RPD	Y

Comments: _____

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 = $(A - C_0) / C_1$ $\frac{V_f = 10 \text{ ml}}{m^3 = 21.73}$ Recalculation: $(0.00003 - (-4.59E-06))$
 $A = 0.00003$
 $C_0 = 0.00000459$
 $C_1 = 0.0004051$
 $\frac{(0.0854 \text{ ng/ml})(10 \text{ ml})}{21.73} = 0.0393 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0156	0.0156	Y
	2		0.0171	0.0170	
	3		0.0140	0.0141	
	4		0.0161	0.0161	
	5		0.0213	0.0213	
	6		0.0142	0.0142	
	7		0.0414	0.0414	
	8		ND	ND	
	9		ND	ND	
	10		0.0339	0.0339	
	11		0.0393	0.0393	
	12		0.0325	0.0324	
	13		0.0281	0.0281	
	14		0.0405	0.0405	
	15		0.0319	0.0319	
	16		0.0409	0.0409	
	17		ND	ND	
	18	Y	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: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4091821-01	Sampled: 09/17/14 16:12
Matrix: Air	Sample Volume: 21.31 m ³	Received: 09/18/14 10:46
Comments: Start Time 9/16/14 16:31		Analysis Date: 09/22/14 13:54

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	0.0156		0.0036



kk 9/24/14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4091821-02	Sampled: 09/17/14 16:34
Matrix: Air	Sample Volume: 21.32 m ³	Received: 09/18/14 10:46
Comments: Start Time 9/16/14 16:53		Analysis Date: 09/22/14 14:04

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	0.0171		0.0036

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4091821-03	Sampled: 09/17/14 18:09
Matrix: Air	Sample Volume: 21.38 m ³	Received: 09/18/14 10:46
Comments: Col 1 Start Time 9/16/14 18:23		Analysis Date: 09/22/14 12:28

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	0.0140		0.0036

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4091821-04

Sampled: 09/17/14 18:09

Matrix: Air

Sample Volume: 21.32 m³

Received: 09/18/14 10:46

Comments: Col 2 Start Time 9/16/14 18:28

Analysis Date: 09/22/14 12:48

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	0.0161		0.0036

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4091821-05	Sampled: 09/17/14 17:45
Matrix: Air	Sample Volume: 21.38 m ³	Received: 09/18/14 10:46
Comments: Start Time 9/16/14 18:00		Analysis Date: 09/22/14 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	0.0213		0.0036

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4091821-06	Sampled: 09/17/14 17:31
Matrix: Air	Sample Volume: 21.37 m ³	Received: 09/18/14 10:46
Comments: Start Time 9/16/14 17:46		Analysis Date: 09/22/14 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	0.0142		0.0036

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REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4091821-07

Sampled: 09/17/14 17:10

Matrix: Air

Sample Volume: 21.35 m³

Received: 09/18/14 10:46

Comments: Start Time 9/16/14 17:27

Analysis Date: 09/22/14 14:53

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0414		0.0036

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4091821-08

Sampled: 09/17/14 00:00

Matrix: Air

Sample Volume: 21.38 m³

Received: 09/18/14 10:46

Comments:

Analysis Date: 09/22/14 15:03

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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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4091821-09

Sampled: 09/17/14 00:00

Matrix: Air

Sample Volume: 21.37 m³

Received: 09/18/14 10:46

Comments:

Analysis Date: 09/22/14 15:13

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: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4091909-01	Sampled: 09/18/14 16:18
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/19/14 10:28
Comments: Start Time 9/17/14 16:18		Analysis Date: 09/22/14 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	0.0339		0.0036

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4091909-02	Sampled: 09/18/14 16:48
Matrix: Air	Sample Volume: 21.73 m ³	Received: 09/19/14 10:28
Comments: Start Time 9/17/14 16:44		Analysis Date: 09/22/14 15:33

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	0.0393		0.0036

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4091909-03

Sampled: 09/18/14 18:14

Matrix: Air

Sample Volume: 21.53 m³

Received: 09/19/14 10:28

Comments: Col 1 Start Time 9/17/14 18:19

Analysis Date: 09/22/14 13:08

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0325		0.0036

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4091909-04

Sampled: 09/18/14 18:19

Matrix: Air

Sample Volume: 21.6 m³

Received: 09/19/14 10:28

Comments: Col 2 Start Time 9/17/14 18:19

Analysis Date: 09/22/14 13:27

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0281		0.0036

KE 9/24/14

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4091909-05

Sampled: 09/18/14 17:51

Matrix: Air

Sample Volume: 21.58 m³

Received: 09/19/14 10:28

Comments: Start Time 9/17/14 17:52

Analysis Date: 09/22/14 15:43

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0405		0.0036

KK 9/24/14

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4091909-06	Sampled: 09/18/14 17:39
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/19/14 10:28
Comments: Start Time 9/17/14 17:39		Analysis Date: 09/22/14 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	0.0319		0.0036

KE 9/24/14

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4091909-07	Sampled: 09/18/14 17:24
Matrix: Air	Sample Volume: 21.7 m ³	Received: 09/19/14 10:28
Comments: Start Time 9/17/14 17:17		Analysis Date: 09/22/14 16:02

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	0.0409		0.0036

JK 9/24/14

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4091909-08	Sampled: 09/18/14 00:00
Matrix: Air	Sample Volume: 21.58 m ³	Received: 09/19/14 10:28
Comments:		Analysis Date: 09/22/14 16:32

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

Handwritten: KB 9/24/14

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FILE #: 3926.00

REPORTED: 09/23/14 14:02

SUBMITTED: 09/18/14 to 09/19/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4091909-09	Sampled: 09/18/14 00:00
Matrix: Air	Sample Volume: 21.6 m ³	Received: 09/19/14 10:28
Comments:		Analysis Date: 09/22/14 16:42

Hexavalent Chromium

Results

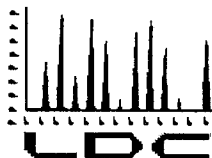
MDL

<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	ND	U	0.0036

KK 9/24/14

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

October 1, 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 30, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32767:

SDG

4092326/4092410

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: September 19 through September 23, 2014
LDC Report Date: October 1, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4092326/4092410

Sample Identification

OAM 1(09/19/14)	PAM-1(09/23/14)
OAM 2(09/19/14)	PAM-1D(09/23/14)
PAM-1(09/19/14)	PAM-2(09/23/14)
PAM-1D(09/19/14)	PAM-3(09/23/14)
PAM-2(09/19/14)	PAM-4(09/23/14)
PAM-3(09/19/14)	PAM-21(09/23/14)
PAM-4(09/19/14)	PAM-31(09/23/14)
PAM-21(09/19/14)	PAM-1(09/19/14)DUP
PAM-31(09/19/14)	PAM-1D(09/19/14)DUP
OAM 1(09/22/14)	PAM-1(09/22/14)DUP
OAM 2(09/22/14)	PAM-1D(09/22/14)DUP
PAM-1(09/22/14)	PAM-1(09/23/14)DUP
PAM-1D(09/22/14)	PAM-1D(09/23/14)DUP
PAM-2(09/22/14)	
PAM-3(09/22/14)	
PAM-4(09/22/14)	
PAM-21(09/22/14)	
PAM-31(09/22/14)	
OAM 1(09/23/14)	
OAM 2(09/23/14)	

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(09/19/14), PAM-31(09/22/14), and PAM-31(09/23/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(09/19/14), PAM-21(09/22/14), and PAM-21(09/23/14) 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(09/19/14) and PAM-1D(09/19/14), samples PAM-1(09/22/14) and PAM-1D(09/22/14), and samples PAM-1(09/23/14) and PAM-1D(09/23/14) 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(09/19/14)	PAM-1D(09/19/14)			
Hexavalent chromium	0.0141	0.0147	4 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(09/22/14)	PAM-1D(09/22/14)			
Hexavalent chromium	0.0553	0.0404	31 (≤20)	J (all detects)	A

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(09/23/14)	PAM-1D(09/23/14)			
Hexavalent chromium	0.0302	0.0272	10 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4092326/4092410**

SDG	Sample	Analyte	Flag	A or P	Reason
4092326/ 4092410	PAM-2(09/19/14) PAM-4(09/19/14) PAM-1(09/22/14) PAM-1D(09/22/14) PAM-4(09/22/14)	Hexavalent chromium	J (all detects)	A	Field duplicates (RPD)

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 4092326/4092410**

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 4092326/4092410**

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

VALIDATION COMPLETENESS WORKSHEET
 Level IV

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: 09/19/14 to 9/22/14 to 9/23/14
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	LSD/D
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: Airs

1	OAM 1(09/19/14)	11	OAM 2(09/22/14)	21	PAM-1(09/23/14)	31	PAM-1D(09/22/14)DUP
2	OAM 2(09/19/14)	12	PAM-1(09/22/14)	22	PAM-1D(09/23/14)	32	PAM-1(09/23/14)DUP
3	PAM-1(09/19/14)	13	PAM-1D(09/22/14)	23	PAM-2(09/23/14)	33	PAM-1D(09/23/14)DUP
4	PAM-1D(09/19/14)	14	PAM-2(09/22/14)	24	PAM-3(09/23/14)	34	
5	PAM-2(09/19/14)	15	PAM-3(09/22/14)	25	PAM-4(09/23/14)	35	
6	PAM-3(09/19/14)	16	PAM-4(09/22/14)	26	PAM-21(09/23/14)	36	
7	PAM-4(09/19/14)	17	PAM-21(09/22/14)	27	PAM-31(09/23/14)	37	
8	PAM-21(09/19/14)	18	PAM-31(09/22/14)	28	PAM-1(09/19/14)DUP	38	
9	PAM-31(09/19/14)	19	OAM 1(09/23/14)	29	PAM-1D(09/19/14)DUP	39	
10	OAM 1(09/22/14)	20	OAM 2(09/23/14)	30	PAM-1(09/22/14)DUP	40	

Notes: _____

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? <u>85-115</u>	/			
Were titrant checks performed as required? (Level IV only)	/		/	SD
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.	/		/	SD
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?			/	

Airs

LDC #: 32767Ab

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: SD
 2nd Reviewer: MG

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/m3)		RPD (≤20)	Qual.
	3	4		
Hexavalent Chromium	0.0141	0.0147	4	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual. (5, 7, 12, 13, 16)
	12	13		
Hexavalent Chromium	0.0553	0.0404	31	Jdet/A

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	21	22		
Hexavalent Chromium	0.0302	0.0272	10	

LDC #: 32171A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

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

$$\%R = \frac{\text{Found X 100}}{\text{True}}$$
 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	0.1	0.0000133	0.99975	0.99975	y
		s2	0.1	0.0000326			
		s3	0.2	0.0000804			
		s4	0.5	0.0001959			
		s5	1	0.0004155			
		s6	2	0.0008047			
ICV 11:06 Calibration verification	Cr+6	<u>Found</u> 0.503ng/ml	<u>True</u> 0.5ng/ml		101%R	101%R	
CCV 12:06 Calibration verification	↓	0.5123ng/ml	0.5ng/ml		102.5%R	102.5%R	
ICV 10:52 Calibration verification	↓	0.5018ng/ml	0.5ng/ml		100.4%R	100.4%R	↓

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 11-36	Laboratory control sample	Cr ⁶⁺	1.10 ng/ml	1 ng/ml	110 %R	110 %R	Y
N	Matrix spike sample	↓	(SSR-SR)				
Dup.	Duplicate sample		0.0163 ng/m ³	0.0141 ng/m ³	14.5 %RPD	14.8 %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 (4) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = (Area - C₀) / C₁ Recalculation: $\frac{(0.0000085 - (-4.21E-06))}{0.0004072} = 0.0312 \text{ ng/ml}$

Area = 0.0000085 $\frac{(\text{ng/ml})(Vf)}{m^3}$ $\frac{(0.0312 \text{ ng/ml})(10 \text{ ml})}{21.24 \text{ m}^3} = 0.0147 \text{ ng/ml}$

C₀ = -4.21 E-06 Vf = 10 ml m³ = 21.24

C₁ = 0.0004072

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0153	0.0153	Y
	2		0.0150	0.0150	
	3		0.0141	0.0141	
	4		0.0147	0.0147	
	5		0.0182	0.0182	
	6		0.0145	0.0145	
	7		0.0193	0.0192	
	8		ND	ND	
	9		ND	ND	
	10		ND	ND	
	11		0.0095	0.0096	*
	12		0.0553	0.0554	*
	13		0.0404	0.0404	
	14		0.0121	0.0121	
	15		ND	ND	
	16		0.0455	0.0456	*
	17		ND	ND	
	18		ND	ND	
	19		0.0142	0.0141	*
	20		0.0138	0.0137	*

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

Concentration = $(Area - L_0) / C_1 \times V_f = 10 \text{ ml}$ Recalculation: $(0.0000188 - (-8.79E-06)) / 0.000445 = 0.6656 \text{ ng/ml}$
 $m^3 = 22.03$

Area = 0.0000188 (ng/ml)(ul)
 $L_0 = -8.79E-06$
 $C_1 = 0.000445$

$(0.6656 \text{ ng/ml})(10 \text{ ml}) / 22.03 \text{ m}^3 = 0.0302 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	21	Cr ⁺⁶	0.0302	0.0302	Y
	22	↓	0.0272	0.0273	N *
	23		0.0367	0.0367	
	24		0.0229	0.0229	
	25		0.0375	0.0375	
	26		ND	ND	
	27		ND	ND	N ↓

Note: * Founding



CERTIFICATE OF ANALYSIS

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

FILE #: 3926.00
 REPORTED: 09/30/14 14:09
 SUBMITTED: 09/23/14 to 09/24/14
 AQS SITE CODE:
 SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4092326-01	Sampled: 09/19/14 16:14
Matrix: Air	Sample Volume: 21.39 m ³	Received: 09/23/14 10:47
Comments: Start Time 9/18/14 16:28		Analysis Date: 09/24/14 14:28

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	0.0153		0.0036

12K 10.1.14



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FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4092326-02

Sampled: 09/19/14 16:34

Matrix: Air

Sample Volume: 21.33 m³

Received: 09/23/14 10:47

Comments: Start Time 9/18/14 16:52

Analysis Date: 09/24/14 14:38

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	0.0150		0.0036

KK 10.1.14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4092326-03	Sampled: 09/19/14 17:58
Matrix: Air	Sample Volume: 21.29 m ³	Received: 09/23/14 10:47
Comments: Col 1 Start Time 9/18/14 18:19		Analysis Date: 09/24/14 12:26

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0141		0.0036

KK 10-1-14

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FILE #: 3926.00
 REPORTED: 09/30/14 14:09
 SUBMITTED: 09/23/14 to 09/24/14
 AQS SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4092326-04	Sampled: 09/19/14 18:00
Matrix: Air	Sample Volume: 21.24 m ³	Received: 09/23/14 10:47
Comments: Col 2 Start Time 9/18/14 18:24		Analysis Date: 09/24/14 12:46

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	0.0147		0.0036

KK 10.1.14

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FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4092326-05	Sampled: 09/19/14 17:40
Matrix: Air	Sample Volume: 21.35 m ³	Received: 09/23/14 10:47
Comments: Start Time 9/18/14 17:57		Analysis Date: 09/24/14 14:48

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	0.0182 J		0.0036

KK 10.1.14

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FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-3	Lab ID: 4092326-06	Sampled: 09/19/14 17:27
Matrix: Air	Sample Volume: 21.36 m ³	Received: 09/23/14 10:47
Comments: Start Time 9/18/14 17:43		Analysis Date: 09/24/14 14:58

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	0.0145		0.0036

kk 10.1.14

Eastern Research Group

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Environmental Resources Management, Inc

FILE #: 3926.00

75 Valley Stream Parkway, Suite 400

REPORTED: 09/30/14 14:09

Malvern, PA 19355

SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

FAX: (410) 266-8912

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4092326-07

Sampled: 09/19/14 17:12

Matrix: Air

Sample Volume: 21.33 m³

Received: 09/23/14 10:47

Comments: Start Time 9/18/14 17:30

Analysis Date: 09/24/14 15:08

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	0.0193 J		0.0036

KC 10-1-14

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FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4092326-08

Sampled: 09/19/14 00:00

Matrix: Air

Sample Volume: 21.35 m³

Received: 09/23/14 10:47

Comments:

Analysis Date: 09/24/14 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>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

KK 10.1.14

Eastern Research Group

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CERTIFICATE OF ANALYSIS

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4092326-09

Sampled: 09/19/14 00:00

Matrix: Air

Sample Volume: 21.36 m³

Received: 09/23/14 10:47

Comments:

Analysis Date: 09/24/14 15:28

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

KK 10-1-14

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: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4092326-10

Sampled: 09/22/14 16:17

Matrix: Air

Sample Volume: 21.41 m³

Received: 09/23/14 10:47

Comments: Start Time 9/21/14 16:29

Analysis Date: 09/24/14 15:38

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

KK 10.1.14

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FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4092326-11

Sampled: 09/22/14 16:34

Matrix: Air

Sample Volume: 21.49 m³

Received: 09/23/14 10:47

Comments: Start Time 9/21/14 16:41

Analysis Date: 09/24/14 15:48

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	0.0095		0.0036

KK 10.1.14

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

FILE #: 3926.00
REPORTED: 09/30/14 14:09
SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

Description: PAM-1	Lab ID: 4092326-12	Sampled: 09/22/14 17:34
Matrix: Air	Sample Volume: 21.78 m ³	Received: 09/23/14 10:47
Comments: Col 1 Start Time 9/21/14 17:22		Analysis Date: 09/24/14 13:05

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	0.0553 J		0.0036

KK 10.1.14

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75 Valley Stream Parkway, Suite 400
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FILE #: 3926.00
REPORTED: 09/30/14 14:09
SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

Description: PAM-1D	Lab ID: 4092326-13	Sampled: 09/22/14 17:36
Matrix: Air	Sample Volume: 21.84 m ³	Received: 09/23/14 10:47
Comments: Col 2 Start Time 9/21/14 17:20		Analysis Date: 09/24/14 13:48

Hexavalent Chromium

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

KE 10.1.14

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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: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4092326-14	Sampled: 09/22/14 17:18
Matrix: Air	Sample Volume: 21.67 m ³	Received: 09/23/14 10:47
Comments: Start Time 9/21/14 17:13		Analysis Date: 09/24/14 15:58

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	0.0121		0.0036

KK 10.1.14

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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: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4092326-15	Sampled: 09/22/14 17:08
Matrix: Air	Sample Volume: 21.59 m ³	Received: 09/23/14 10:47
Comments: Start Time 9/21/14 17:08		Analysis Date: 09/24/14 16:27

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

126 10-1-14

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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: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4092326-16	Sampled: 09/22/14 16:58
Matrix: Air	Sample Volume: 21.56 m ³	Received: 09/23/14 10:47
Comments: Start Time 9/21/14 17:00		Analysis Date: 09/24/14 16:37

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	0.0455 J		0.0036

KK 10-1-14

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Malvern, PA 19355

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

FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4092326-17	Sampled: 09/22/14 00:00
Matrix: Air	Sample Volume: 21.67 m ³	Received: 09/23/14 10:47
Comments:		Analysis Date: 09/24/14 16:47

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	ND	U	0.0036

kk 10-1-14

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4092326-18	Sampled: 09/22/14 00:00
Matrix: Air	Sample Volume: 21.59 m ³	Received: 09/23/14 10:47
Comments:		Analysis Date: 09/24/14 16:57

Hexavalent Chromium

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

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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: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4092410-01	Sampled: 09/23/14 16:17
Matrix: Air	Sample Volume: 21.54 m ³	Received: 09/24/14 11:13
Comments: Start Time 9/22/14 16:21		Analysis Date: 09/25/14 13:00

Hexavalent Chromium

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

KK 10-1-14

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

FILE #: 3926.00
 REPORTED: 09/30/14 14:09
 SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE
 CODE:
 SITE CODE: Honeywell Hex Chrome Study

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

Description: OAM 2	Lab ID: 4092410-02	Sampled: 09/23/14 16:38
Matrix: Air	Sample Volume: 21.59 m ³	Received: 09/24/14 11:13
Comments: Start Time 9/22/14 16:38		Analysis Date: 09/25/14 13:10

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	0.0138		0.0036

KK 10-1-14

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

FILE #: 3926.00
REPORTED: 09/30/14 14:09
SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

Description: PAM-1	Lab ID: 4092410-03	Sampled: 09/23/14 18:02
Matrix: Air	Sample Volume: 22.03 m ³	Received: 09/24/14 11:13
Comments: Col 1 Start Time 9/22/14 17:34		Analysis Date: 09/25/14 12:19

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	0.0302		0.0036

KK 10-1-14



CERTIFICATE OF ANALYSIS

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

ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4092410-04	Sampled: 09/23/14 18:09
Matrix: Air	Sample Volume: 22.02 m ³	Received: 09/24/14 11:13
Comments: Col 2 Start Time 9/22/14 17:40		Analysis Date: 09/25/14 12:39

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	0.0272		0.0036

KK 10.1.14

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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: 09/30/14 14:09

SUBMITTED: 09/23/14 to 09/24/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4092410-05	Sampled: 09/23/14 17:46
Matrix: Air	Sample Volume: 21.95 m ³	Received: 09/24/14 11:13
Comments: Start Time 9/22/14 17:22		Analysis Date: 09/25/14 13:20

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	0.0367		0.0036

KK 10.1.14

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

FILE #: 3926.00
REPORTED: 09/30/14 14:09
SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

Description: PAM-3	Lab ID: 4092410-06	Sampled: 09/23/14 17:33
Matrix: Air	Sample Volume: 21.9 m ³	Received: 09/24/14 11:13
Comments: Start Time 9/22/14 17:13		Analysis Date: 09/25/14 13:30

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0229		0.0036

KL 10.1.14

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

FILE #: 3926.00
REPORTED: 09/30/14 14:09
SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

Description: PAM-4	Lab ID: 4092410-07	Sampled: 09/23/14 17:17
Matrix: Air	Sample Volume: 21.82 m ³	Received: 09/24/14 11:13
Comments: Start Time 9/22/14 17:03		Analysis Date: 09/25/14 13:39

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	0.0375		0.0036

KL 10-1-14

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Malvern, PA 19355

FILE #: 3926.00
REPORTED: 09/30/14 14:09
SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

Description: PAM-21	Lab ID: 4092410-08	Sampled: 09/23/14 00:00
Matrix: Air	Sample Volume: 21.95 m ³	Received: 09/24/14 11:13
Comments:		Analysis Date: 09/25/14 13:49

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

KK 10-1-14

Eastern Research Group	<p>The results in this report apply only to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.</p> <p style="text-align: right;">Page 29 of 32</p>
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75 Valley Stream Parkway, Suite 400
Malvern, PA 19355

FILE #: 3926.00
REPORTED: 09/30/14 14:09
SUBMITTED: 09/23/14 to 09/24/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

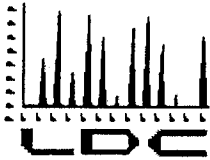
Description: PAM-31	Lab ID: 4092410-09	Sampled: 09/23/14 00:00
Matrix: Air	Sample Volume: 21.9 m ³	Received: 09/24/14 11:13
Comments:		Analysis Date: 09/25/14 14:19

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

JK 10-1-14

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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

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

LDC Project #32782:

SDG

Fraction

4092508


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: September 24, 2014
LDC Report Date: October 3, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4092508

Sample Identification

OAM 1
OAM 2
PAM-1
PAM-1D
PAM-2
PAM-3
PAM-4
PAM-21
PAM-31
PAM-1DUP
PAM-1DDUP

Introduction

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

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

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

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

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

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

V. Matrix Spike/Matrix Spike Duplicates

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

VI. Duplicates

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

VII. Laboratory Control Samples

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

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

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

X. Field Duplicates

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

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1	PAM-1D			
Hexavalent chromium	0.0334	0.0284	16 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4092508**

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

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG
4092508**

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 4092508**

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



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: 10/02/14 14:54

SUBMITTED: 09/25/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 4092508-01	Sampled: 09/24/14 16:24
Matrix: Air	Sample Volume: 21.59 m ³	Received: 09/25/14 10:38
Comments: Start Time 9/23/14 16:25		Analysis Date: 09/29/14 12:55

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	0.0146		0.0036

KK 10-3-14

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: 10/02/14 14:54

SUBMITTED: 09/25/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4092508-02	Sampled: 09/24/14 16:39
Matrix: Air	Sample Volume: 21.42 m ³	Received: 09/25/14 10:38
Comments: Start Time 9/23/14 16:50		Analysis Date: 09/29/14 13:05

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	0.0203		0.0036

KK 10.3.14

Eastern Research Group

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AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4092508-03	Sampled: 09/24/14 17:52
Matrix: Air	Sample Volume: 21.19 m ³	Received: 09/25/14 10:38
Comments: Col 1 Start Time 9/23/14 18:19		Analysis Date: 09/29/14 12:15

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	0.0334		0.0036

KK 10.3.14

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AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4092508-04	Sampled: 09/24/14 17:55
Matrix: Air	Sample Volume: 21.24 m ³	Received: 09/25/14 10:38
Comments: Col 2 Start Time 9/23/14 18:19		Analysis Date: 09/29/14 12:35

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	0.0284		0.0036

KK 10.3.14

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AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4092508-05

Sampled: 09/24/14 17:36

Matrix: Air

Sample Volume: 21.36 m³

Received: 09/25/14 10:38

Comments: Start Time 9/23/14 17:52

Analysis Date: 09/29/14 13:15

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	0.0319		0.0036

KK 10.3.14

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AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-3	Lab ID: 4092508-06	Sampled: 09/24/14 17:27
Matrix: Air	Sample Volume: 21.42 m ³	Received: 09/25/14 10:38
Comments: Start Time 9/23/14 17:39		Analysis Date: 09/29/14 13:25

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	0.0223		0.0036

KK 10-3-14

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SUBMITTED: 09/25/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4092508-07	Sampled: 09/24/14 17:05
Matrix: Air	Sample Volume: 21.3 m ³	Received: 09/25/14 10:38
Comments: Start Time 9/23/14 17:25		Analysis Date: 09/29/14 13:35

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	0.0273		0.0036

KK 10.3.14

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REPORTED: 10/02/14 14:54

SUBMITTED: 09/25/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4092508-08	Sampled: 09/24/14 00:00
Matrix: Air	Sample Volume: 21.36 m ³	Received: 09/25/14 10:38
Comments:		Analysis Date: 09/29/14 13:45

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

Kk 10.3.14

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REPORTED: 10/02/14 14:54

SUBMITTED: 09/25/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4092508-09

Sampled: 09/24/14 00:00

Matrix: Air

Sample Volume: 21.42 m³

Received: 09/25/14 10:38

Comments:

Analysis Date: 09/29/14 14:14

Hexavalent Chromium

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

10-3-14

Eastern Research Group

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LDC #: 32782A6

VALIDATION COMPLETENESS WORKSHEET

Date: 10/2/14

SDG #: 4092508

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: JD

2nd Reviewer: MG

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: 09/24/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VI.	Duplicates	A	Dup.
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD = (3,4)
XI	Field blanks	ND	FB = 8 TB = 9

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

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

Validated Samples: *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.	/			
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>Airs</i> Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of \leq CRDL ($\leq 2X$ CRDL for soil) was used for samples that were $\leq 5X$ the CRDL, including when only one of the duplicate sample values were $\leq 5X$ the CRDL.	/			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

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

LDC# 32782A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0334	0.0284	16	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32782A6.wpd

LDC #: 32782A6

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 9/29/14

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

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

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	0.1	0.000016	0.99998	0.99998	y
		s2	0.1	0.0000368			
		s3	0.2	0.0000789			
		s4	0.5	0.0002017			
		s5	1	0.0003975			
		s6	2	0.0008028			
ICV 10:49 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5075ng/ml	<u>True</u> 0.5ng/ml		101.5%R	101.5%R	↓
CCV 11:49 Calibration verification	↓	0.5217ng/ml	0.5ng/ml		104.3%R	104.3%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 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}	1.06 ng/ml	1.00 ng/ml	106%R	106%R	Y
N	Matrix spike sample		(SSR-SR)				
Dup	Duplicate sample	Cr^{+6}	0.0324 ng/m ³	0.0333 ng/m ³	2.74%RPD	2.87%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.

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

Concentration = $(A - C_0) / C_1$ $V_f = 10 \text{ ml}$ $m^3 = 21.3$ Recalculation: $(0.0000207 - (-2.72E-06)) / 0.0004026 = 0.05817 \text{ ng/ml}$

$A = 0.0000207$ $(\text{ng/ml})(\text{ul})$ $(0.05817)(10 \text{ ml})$
 $C_0 = -2.72E-06$ $\frac{\hspace{1.5cm}}{m^3}$ $\frac{\hspace{1.5cm}}{21.3 m^3} = 0.0273 \text{ ng/m}^3$
 $C_1 = 0.0004026$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0146	0.0145	Y
	2		0.0203	0.0203	
	3		0.0334	0.0333	
	4		0.0284	0.0283	
	5		0.0319	0.0319	
	6		0.0223	0.0223	
	7		0.0273	0.0273	
	8		ND	ND	
	9		ND	ND	

Note: _____