

LABORATORY DATA CONSULTANTS, INC.

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

October 13, 2014

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

Dear Mr. Boggs,

Enclosed is the final validation report for the fraction listed below. This SDG was received on October 9, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32828:

SDG

Fraction

4100211/4100310

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: October 1 through October 2, 2014
LDC Report Date: October 10, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4100211/4100310

Sample Identification

OAM 1(10/01/14)	PAM-1(10/02/14)DUP
OAM 2(10/01/14)	PAM-1D(10/02/14)DUP
PAM-1(10/01/14)	
PAM-1D(10/01/14)	
PAM-2(10/01/14)	
PAM-3(10/01/14)	
PAM-4(10/01/14)	
PAM-21(10/01/14)	
PAM-31(10/01/14)	
OAM 1(10/02/14)	
OAM 2(10/02/14)	
PAM-1(10/02/14)	
PAM-1D(10/02/14)	
PAM-2(10/02/14)	
PAM-3(10/02/14)	
PAM-4(10/02/14)	
PAM-21(10/02/14)	
PAM-31(10/02/14)	
PAM-1(10/01/14)DUP	
PAM-1D(10/01/14)DUP	

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

Introduction

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

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

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

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

Samples PAM-31(10/01/14) and PAM-31(10/02/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(10/01/14) and PAM-21(10/02/14) were identified as field blanks. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

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

VI. Duplicates

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

VII. Laboratory Control Samples

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

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

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

X. Field Duplicates

Samples PAM-1(10/01/14) and PAM-1D(10/01/14) and samples PAM-1(10/02/14) and PAM-1D(10/02/14) were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/01/14)	PAM-1D(10/01/14)			
Hexavalent chromium	0.0096	0.0096	0 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/02/14)	PAM-1D(10/02/14)			
Hexavalent chromium	0.0146	0.0128	13 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4100211/4100310**

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
4100211/4100310**

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
4100211/4100310**

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: 10/01-02/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD=(3,4) (12,13)
XI	Field blanks	ND	FB=(8),(17) TB=(9)(18)

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet
 ND = No compounds detected
 R = Rinsate
 FB = Field blank
 D = Duplicate
 TB = Trip blank
 EB = Equipment blank

Validated Samples: Airs

1	OAM 1(10/01/14)	11	OAM 2(10/02/14)	21	PAM-1(10/02/14)DUP	31	
2	OAM 2(10/01/14)	12	PAM-1(10/02/14)	22	PAM-1D(10/02/14)DUP	32	
3	PAM-1(10/01/14)	13	PAM-1D(10/02/14)	23		33	
4	PAM-1D(10/01/14)	14	PAM-2(10/02/14)	24		34	
5	PAM-2(10/01/14)	15	PAM-3(10/02/14)	25		35	
6	PAM-3(10/01/14)	16	PAM-4(10/02/14)	26		36	
7	PAM-4(10/01/14)	17	PAM-21(10/02/14)	27		37	
8	PAM-21(10/01/14)	18	PAM-31(10/02/14)	28		38	
9	PAM-31(10/01/14)	19	PAM-1(10/01/14)DUP	29		39	
10	OAM 1(10/02/14)	20	PAM-1D(10/01/14)DUP	30		40	

Notes: Date appended to differentiate between samples

Method: Inorganics (EPA Method ^{See} lower)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 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.			/	
^{Air} Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL (≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	/			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

VALIDATION 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# 32828A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: i of 1
Reviewer: JD
2nd Reviewer: OL

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0096	0.0096	0	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0146	0.0128	13	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic32828A6.wpd

LDC #: 3888AL

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 10/06/14

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

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

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr+6	s1	0.1	0.0000244	0.99998	0.99998	y
		s2	0.1	0.0000406			
		s3	0.2	0.0000771			
		s4	0.5	0.0001922			
		s5	1	0.0003872			
		s6	2	0.0007671			
ICV 11:08 Calibration verification	Cr ⁺⁶	$\frac{\text{Found}}{0.512 \text{ ng/ml}}$	$\frac{\text{True}}{0.5 \text{ ng/ml}}$		102.4%R	102.4%R	↓
CCV 12:07 Calibration verification	Cr ⁺⁶	$\frac{\text{Found}}{0.5185 \text{ ng/ml}}$	$\frac{\text{True}}{0.5 \text{ ng/ml}}$		103.7%R	103.7%R	
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Cover

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

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

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS 11:37	Laboratory control sample	Cr ⁺⁶	1.10 ng/ml	1.00 ng/ml	110%R	110%R	Y
N	Matrix spike sample		(SSR-SR)				
Dup. 12:37	Duplicate sample	Cr ⁺⁶	0.0101	0.0095	6.12%RPD	6.24%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.

* Founding

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

Concentration = $(A - C_0) / C_1$

Recalculation: $\frac{(0.0000147 - (2.7E-06))}{0.0003824} = 0.0313 \text{ ng/ml}$

$\frac{(0.0313 \text{ ng/ml})(10 \text{ ml})}{21.89 \text{ m}^3} = 0.0143 \text{ ng/m}^3$

$A = 0.0000147$
 $C_0 = 2.72E-06$
 $C_1 = 0.0003824$
 $V_f = 10 \text{ ml}$
 $\frac{(\text{ng/ml})(V_f)}{\text{m}^3} = 21.89$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr+6	0.0105	0.0105	Y
	2		0.0359	0.0360	Y*
	3		0.0096	0.0095	Y*
	4		0.0096	0.0096	Y
	5		0.0130	0.0130	↓
	6		0.0089	0.0089	↓
	7		0.0124	0.0123	Y*
	8		ND	ND	Y
	9		ND	ND	↓
	10		0.0091	0.0090	Y*
	11		0.0143	0.0143	Y
	12		0.0146	0.0146	↓
	13		0.0128	0.0128	↓
	14		0.0122	0.0123	Y*
	15		0.0140	0.0140	Y
	16		0.0132	0.0131	Y*
	17		ND	ND	Y
	18		ND	ND	↓

Note: * Rounding



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: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4100211-01

Sampled: 10/01/14 16:22

Matrix: Air

Sample Volume: 21.52 m³

Received: 10/02/14 10:30

Comments: Start Time 9/30/14 16:27

Analysis Date: 10/06/14 13:48

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.0105		0.0036

OCT 10 2014

Initials: *CR*

Eastern Research Group

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4100211-02

Sampled: 10/01/14 16:41

Matrix: Air

Sample Volume: 21.48 m³

Received: 10/02/14 10:30

Comments: Start Time 9/30/14 16:49

Analysis Date: 10/06/14 13:58

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0359		0.0036

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1	Lab ID: 4100211-03	Sampled: 10/01/14 17:47
Matrix: Air	Sample Volume: 21.09 m ³	Received: 10/02/14 10:30
Comments: Col 1 Start Time 9/30/14 18:21		Analysis Date: 10/06/14 12:27

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	0.0096		0.0036

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4100211-04	Sampled: 10/01/14 17:49
Matrix: Air	Sample Volume: 21.14 m ³	Received: 10/02/14 10:30
Comments: Col 2 Start Time 9/30/14 18:20		Analysis Date: 10/06/14 12:47

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	0.0096		0.0036

OCT 10 2014

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4100211-05

Sampled: 10/01/14 17:31

Matrix: Air

Sample Volume: 21.27 m³

Received: 10/02/14 10:30

Comments: Start Time 9/30/14 17:53

Analysis Date: 10/06/14 14:27

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	0.0130		0.0036

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-3	Lab ID: 4100211-06	Sampled: 10/01/14 17:20
Matrix: Air	Sample Volume: 21.32 m ³	Received: 10/02/14 10:30
Comments: Start Time 9/30/14 17:39		Analysis Date: 10/06/14 14:37

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0089		0.0036

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-4	Lab ID: 4100211-07	Sampled: 10/01/14 17:08
Matrix: Air	Sample Volume: 21.35 m ³	Received: 10/02/14 10:30
Comments: Start Time 9/30/14 17:24		Analysis Date: 10/06/14 14:47

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

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Initials: CR

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FILE #: 3926.00

REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21	Lab ID: 4100211-08	Sampled: 10/01/14 00:00
Matrix: Air	Sample Volume: 21.27 m ³	Received: 10/02/14 10:30
Comments:		Analysis Date: 10/06/14 14:57

Hexavalent Chromium

Results

MDL

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

OCT 10 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4100211-09	Sampled: 10/01/14 00:00
Matrix: Air	Sample Volume: 21.32 m ³	Received: 10/02/14 10:30
Comments:		Analysis Date: 10/06/14 15:07

Hexavalent Chromium

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

OCT 10 2014

Initials: *CR*



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: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4100310-01	Sampled: 10/02/14 16:49
Matrix: Air	Sample Volume: 21.93 m ³	Received: 10/03/14 11:01
Comments: Start Time 10/1/14 16:27		Analysis Date: 10/06/14 15:17

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0091		0.0036

OCT 10 2014

Initials: *CR*

Eastern Research Group

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CERTIFICATE OF ANALYSIS

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FILE #: 3926.00

REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4100310-02	Sampled: 10/02/14 17:05
Matrix: Air	Sample Volume: 21.89 m ³	Received: 10/03/14 11:01
Comments: Start Time 10/1/14 16:45		Analysis Date: 10/06/14 15:27

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	0.0143		0.0036

OCT 10 2014

Initials: CR

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4100310-03	Sampled: 10/02/14 18:21
Matrix: Air	Sample Volume: 22.04 m ³	Received: 10/03/14 11:01
Comments: Col 1 Start Time 10/1/14 17:51		Analysis Date: 10/06/14 13:07

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0146		0.0036

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4100310-04

Sampled: 10/02/14 18:21

Matrix: Air

Sample Volume: 22.03 m³

Received: 10/03/14 11:01

Comments: Col 2 Start Time 10/1/14 17:53

Analysis Date: 10/06/14 13:27

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0128		0.0036

OCT 10 2014

Initials: *CR*

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4100310-06

Sampled: 10/02/14 17:44

Matrix: Air

Sample Volume: 21.9 m³

Received: 10/03/14 11:01

Comments: Start Time 10/1/14 17:24

Analysis Date: 10/06/14 15:47

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0140

0.0036

OCT 10 2014

Initials: CR

Eastern Research Group

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FILE #: 3926.00

REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4100310-07	Sampled: 10/02/14 17:31
Matrix: Air	Sample Volume: 21.89 m ³	Received: 10/03/14 11:01
Comments: Start Time 10/1/14 17:12		Analysis Date: 10/06/14 15:57

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0132		0.0036

OCT 10 2014

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FILE #: 3926.00

REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4100310-08	Sampled: 10/02/14 00:00
Matrix: Air	Sample Volume: 21.88 m ³	Received: 10/03/14 11:01
Comments:		Analysis Date: 10/06/14 16:26

Hexavalent Chromium

Results

MDL

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

OCT 10 2014

Initials: *CR*

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REPORTED: 10/09/14 15:37

SUBMITTED: 10/02/14 to 10/03/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4100310-09	Sampled: 10/02/14 00:00
Matrix: Air	Sample Volume: 21.9 m ³	Received: 10/03/14 11:01
Comments:		Analysis Date: 10/06/14 16:36

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	ND	U	0.0036

OCT 10 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

October 15, 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 14, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32848:

SDG

Fraction

4100734

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: October 3 through October 6, 2014
LDC Report Date: October 15, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4100734

Sample Identification

OAM 1(10/03/14) PAM-1D(10/06/14)DUP
OAM 2(10/03/14)
PAM-1(10/03/14)
PAM-1D(10/03/14)
PAM-2(10/03/14)
PAM-3(10/03/14)
PAM-4(10/03/14)
PAM-21(10/03/14)
PAM-31(10/03/14)
OAM 1(10/06/14)
PAM-1(10/06/14)
PAM-1D(10/06/14)
PAM-2(10/06/14)
PAM-3(10/06/14)
PAM-4(10/06/14)
PAM-21(10/06/14)
PAM-31(10/06/14)
PAM-1(10/03/14)DUP
PAM-1D(10/03/14)DUP
PAM-1(10/06/14)DUP

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

Introduction

This data review covers 21 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(10/03/14) and PAM-31(10/06/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(10/03/14) and PAM-21(10/06/14) 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(10/03/14) and PAM-1D(10/03/14) and samples PAM-1(10/06/14) and PAM-1D(10/06/14) 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(10/03/14)	PAM-1D(10/03/14)			
Hexavalent chromium	0.0313	0.0266	16 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/06/14)	PAM-1D(10/06/14)			
Hexavalent chromium	0.0548	0.0508	8 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4100734**

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
4100734**

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 4100734**

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

LDC #: 32848A6

VALIDATION COMPLETENESS WORKSHEET

Date: 10/14/14

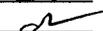
SDG #: 4100734

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: JSO

2nd Reviewer: **METHOD:** Hexavalent Chromium (ASTM D7614)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/03/14, 10/06/14
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	LCSID
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD = (3,4) (11,12)
XI	Field blanks	ND	FD = (8,16) TB = (9)(17)

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: *Airs*

1	OAM 1(10/03/14)	11	PAM-1(10/06/14)	21	PAM-1D(10/06/14)DUP	31	
2	OAM 2(10/03/14)	12	PAM-1D(10/06/14)	22		32	
3	PAM-1(10/03/14)	13	PAM-2(10/06/14)	23		33	
4	PAM-1D(10/03/14)	14	PAM-3(10/06/14)	24		34	
5	PAM-2(10/03/14)	15	PAM-4(10/06/14)	25		35	
6	PAM-3(10/03/14)	16	PAM-21(10/06/14)	26		36	
7	PAM-4(10/03/14)	17	PAM-31(10/06/14)	27		37	
8	PAM-21(10/03/14)	18	PAM-1(10/03/14)DUP	28		38	
9	PAM-31(10/03/14)	19	PAM-1D(10/03/14)DUP	29		39	
10	OAM 1(10/06/14)	20	PAM-1(10/06/14)DUP	30		40	

Notes: *Date appended to differentiate between samples.*

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients ≥ 0.995 ?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? <u>85-115</u>	/			JD
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>Ads</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 $\leq 5\text{X}$ the CRDL.	/			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

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# 32848A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	3	4		
Hexavalent Chromium	0.0313	0.0266	16	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	11	12		
Hexavalent Chromium	0.0548	0.0508	8	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32848A6.wpd

LDC #: 32848A6

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: 10/08/14

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

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

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr+6	s1	0.1	0.0000161	0.99993	0.99993	y
		s2	0.1	0.0000354			
		s3	0.2	0.0000728			
		s4	0.5	0.0002037			
		s5	1	0.000398			
		s6	2	0.0007962			
ICV 9:39 Calibration verification	Cr+6	<u>Found</u> 0.5117ng/ml	<u>True</u> 0.5ng/ml		102.3%R	102.3%R	y
CCV 10:38 Calibration verification	↓	0.5117ng/ml	0.5ng/ml		102.3%R	102.3%R	y
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS 10:09	Laboratory control sample	Cr ^{VI}	1.077 ng/ml	1.00 ng/L	108%R	108%R	Y
N	Matrix spike sample		(SSR-SR)				
Dup	Duplicate sample	Cr ^{VI}	0.0309 ng/m ³	0.0313 ng/m ³	1.29%RPD	1.24%RPD	Y*

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

*Rounding

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method See Cover

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

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

Compound (analyte) results for (15) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{[A] - L_0}{L_1}$ $m^3 = 21.96$ Recalculation: $\frac{[(0.0000501 - (-3.32E-06))]}{m^3}$

$A = 0.0000501$ $V_f = 10ml$ $\frac{0.0004005}{m^3} = 0.13338 \text{ ng/ml}$

$L_0 = \text{---} - 3.32E-06$ $\frac{(ng/ml)(V_f)}{m^3}$ $\frac{(0.13338 \text{ ng/ml})(10ml)}{m^3} = 0.0607 \text{ ng/m}^3$

$L_1 = 0.0004005$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0296	0.0296	Y
	2		0.0197	0.0197	↓
	3		0.0313	0.0313	↓
	4		0.0266	0.0267	Y*
	5		0.0303	0.0303	Y
	6		0.0883	0.0884	Y*
	7		0.0266	0.0265	Y*
	8		ND	ND	Y
	9		ND	ND	↓
	10		0.0289	0.0289	↓
	11		0.0548	0.0548	↓
	12		0.0508	0.0509	Y*
	13		0.0664	0.0663	Y*
	14		0.0660	0.0660	Y
	15		0.0607	0.0607	↓
	16		ND	ND	↓
	17		ND	ND	↓

Note: * Rounding



CERTIFICATE OF ANALYSIS

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FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4100734-01

Sampled: 10/03/14 16:20

Matrix: Air

Sample Volume: 21.11 m³

Received: 10/07/14 12:40

Comments: Start Time 10/2/14 16:53

Analysis Date: 10/08/14 12:20

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0296		0.0036

OCT 15 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: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4100734-02

Sampled: 10/03/14 16:34

Matrix: Air

Sample Volume: 21.09 m³

Received: 10/07/14 12:40

Comments: Start Time 10/2/14 17:09

Analysis Date: 10/08/14 12:29

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0197		0.0036

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FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4100734-03	Sampled: 10/03/14 17:29
Matrix: Air	Sample Volume: 20.76 m ³	Received: 10/07/14 12:40
Comments: Col 1 Start Time 10/2/14 18:25		Analysis Date: 10/08/14 10:59

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0313		0.0036

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FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4100734-04	Sampled: 10/03/14 17:27
Matrix: Air	Sample Volume: 20.72 m ³	Received: 10/07/14 12:40
Comments: Col 2 Start Time 10/2/14 18:26		Analysis Date: 10/08/14 11:18

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0266		0.0036

OCT 15 2014

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4100734-05	Sampled: 10/03/14 17:16
Matrix: Air	Sample Volume: 20.94 m ³	Received: 10/07/14 12:40
Comments: Start Time 10/2/14 17:59		Analysis Date: 10/08/14 12:59

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0303		0.0036

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4100734-06

Sampled: 10/03/14 17:10

Matrix: Air

Sample Volume: 21.03 m³

Received: 10/07/14 12:40

Comments: Start Time 10/2/14 17:48

Analysis Date: 10/08/14 13:09

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0883		0.0036

OCT 15 2014

Initials: CR

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FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4100734-08

Sampled: 10/03/14 00:00

Matrix: Air

Sample Volume: 20.94 m³

Received: 10/07/14 12:40

Comments:

Analysis Date: 10/08/14 13:29

Hexavalent Chromium

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

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4100734-09	Sampled: 10/03/14 00:00
Matrix: Air	Sample Volume: 21.03 m ³	Received: 10/07/14 12:40
Comments:		Analysis Date: 10/08/14 13:39

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	ND	U	0.0036

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4100734-10	Sampled: 10/06/14 16:11
Matrix: Air	Sample Volume: 21.63 m ³	Received: 10/07/14 12:40
Comments: Start Time 10/5/14 16:09		Analysis Date: 10/08/14 13:49

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	0.0289		0.0036

OCT 15 2014

Initials: *CR*

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4100734-12

Sampled: 10/06/14 18:11

Matrix: Air

Sample Volume: 22.27 m³

Received: 10/07/14 12:40

Comments: Col 1 Start Time 10/5/14 17:26

Analysis Date: 10/08/14 11:38

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	0.0548		0.0036

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Initials: *ER*

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4100734-13	Sampled: 10/06/14 18:11
Matrix: Air	Sample Volume: 22.29 m ³	Received: 10/07/14 12:40
Comments: Col 2 Start Time 10/5/14 17:25		Analysis Date: 10/08/14 11:58

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0508		0.0036

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FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4100734-14

Sampled: 10/06/14 17:49

Matrix: Air

Sample Volume: 22.14 m³

Received: 10/07/14 12:40

Comments: Start Time 10/5/14 17:13

Analysis Date: 10/08/14 13:59

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0664		0.0036

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Environmental Resources Management, Inc
 75 Valley Stream Parkway, Suite 400
 Malvern, PA 19355
 ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4100734-15	Sampled: 10/06/14 17:30
Matrix: Air	Sample Volume: 21.96 m ³	Received: 10/07/14 12:40
Comments: Start Time 10/5/14 17:06		Analysis Date: 10/08/14 14:08

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0660		0.0036

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4100734-16

Sampled: 10/06/14 17:15

Matrix: Air

Sample Volume: 21.96 m³

Received: 10/07/14 12:40

Comments: Start Time 10/5/14 16:51

Analysis Date: 10/08/14 14:18

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.0607		0.0036

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Initials: *ER*

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ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4100734-17

Sampled: 10/06/14 00:00

Matrix: Air

Sample Volume: 22.14 m³

Received: 10/07/14 12:40

Comments:

Analysis Date: 10/08/14 14:28

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

OCT 15 2014

Initials: *CR*

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ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 10/14/14 13:21

SUBMITTED: 10/07/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4100734-18	Sampled: 10/06/14 00:00
Matrix: Air	Sample Volume: 21.96 m ³	Received: 10/07/14 12:40
Comments:		Analysis Date: 10/08/14 14:58

Hexavalent Chromium

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

OCT 15 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

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

LDC Project #32861:

SDG

Fraction

4100826/4100914

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: October 7 through October 8, 2014
LDC Report Date: October 16, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4100826/4100914

Sample Identification

OAM 1(10/07/14) PAM-1D(10/08/14)DUP
OAM 2(10/07/14)
PAM-1(10/07/14)
PAM-1D(10/07/14)
PAM-2(10/07/14)
PAM-3(10/07/14)
PAM-4(10/07/14)
PAM-21(10/07/14)
PAM-31(10/07/14)
OAM 1(10/08/14)
PAM-1(10/08/14)
PAM-1D(10/08/14)
PAM-2(10/08/14)
PAM-3(10/08/14)
PAM-4(10/08/14)
PAM-21(10/08/14)
PAM-31(10/08/14)
PAM-1(10/07/14)DUP
PAM-1D(10/07/14)DUP
PAM-1(10/08/14)DUP

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

Introduction

This data review covers 21 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(10/07/14) and PAM-31(10/08/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(10/07/14) and PAM-21(10/08/14) 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(10/07/14) and PAM-1D(10/07/14) and samples PAM-1(10/08/14) and PAM-1D(10/08/14) 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(10/07/14)	PAM-1D(10/07/14)			
Hexavalent chromium	0.0319	0.0340	6 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/08/14)	PAM-1D(10/08/14)			
Hexavalent chromium	0.0588	0.606	3 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4100826/4100914**

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
4100826/4100914**

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
4100826/4100914**

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: 10/07/14 - 10/08/14
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	LS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD=(3,4) (11,12)
XI	Field blanks	ND	FB=(8)(16) TB=(9)(17)

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet
 ND = No compounds detected
 R = Rinsate
 FB = Field blank
 D = Duplicate
 TB = Trip blank
 EB = Equipment blank

Validated Samples: Airs

1	OAM 1(10/07/14)	11	PAM-1(10/08/14)	21	PAM-1D(10/08/14)DUP	31
2	OAM 2(10/07/14)	12	PAM-1D(10/08/14)	22		32
3	PAM-1(10/07/14)	13	PAM-2(10/08/14)	23		33
4	PAM-1D(10/07/14)	14	PAM-3(10/08/14)	24		34
5	PAM-2(10/07/14)	15	PAM-4(10/08/14)	25		35
6	PAM-3(10/07/14)	16	PAM-21(10/08/14)	26		36
7	PAM-4(10/07/14)	17	PAM-31(10/08/14)	27		37
8	PAM-21(10/07/14)	18	PAM-1(10/07/14)DUP	28		38
9	PAM-31(10/07/14)	19	PAM-1D(10/07/14)DUP	29		39
10	OAM 1(10/08/14)	20	PAM-1(10/08/14)DUP	30		40

Notes: _____

Method: Inorganics (EPA Method See later)

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

AUG

LDC #: 32861A

VALIDATION FINDINGS CHECKLIST

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

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# 32861A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0319	0.0340	6	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	11	12		
Hexavalent Chromium	0.0588	0.0606	3	

\\LDCFILESERVER\validation\FIELD DUPLICATES\FD_inorganic\32861A6.wpd

LDC #: 32861A6

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 10/13/14

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

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

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.1	0.0000143	0.99974	0.99974	Y
		s2	0.1	0.0000379			
		s3	0.2	0.000077			
		s4	0.5	0.0002049			
		s5	1	0.0003905			
		s6	2	0.0008187			
ICV 10:49 Calibration verification	↓	<u>Found</u> 0.4917ng/ml	<u>True</u> 0.5ng/ml		98.3%R	98.3%R	↓
CCV 11:49 Calibration verification	↓	0.5127ng/ml	0.5ng/ml		102.5%R	102.6%R	Y*
Calibration verification							

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

LDC #: 32861A

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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	C _{x+b}	1.015 ng/ml	1 ng/ml	102%R	102%R	Y
N	Matrix spike sample		(SSR-SR)				
DUP	Duplicate sample	C _{x+b}	0.030 ng/m ³	0.0318 ng/m ³	5.49%RPD	5.92%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.

* Boundary

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 C⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1$ $V_f = 10 \text{ ml}$ Recalculation: $(0.0001372 - (-5.61E-06)) / 0.0004096 = 0.3487 \text{ ng/ml}$
 $m^3 = 21.74$

$A = 0.0001372$
 $C_0 = -5.61E-06$
 $C_1 = 0.0004096$

$\frac{(\text{ng/ml})(V_f)}{m^3} = \text{ng/m}^3$ $\frac{(0.3487 \text{ ng/ml})(10 \text{ ml})}{21.74 \text{ m}^3} = 0.160 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	C ⁺⁶	0.0242	0.0241	Y*
	2		0.0279	0.0279	Y
	3		0.0319	0.0318	Y*
	4		0.0340	0.0341	Y*
	5		0.0305	0.0305	Y
	6		0.0365	0.0365	Y
	7		0.105	0.105	↓
	8		ND	ND	↓
	9		ND	ND	↓
	10		0.0256	0.0257	Y*
	11		0.0588	0.0588	Y
	12		0.0606	0.0606	↓
	13		0.0300	0.0300	↓
	14		0.0187	0.0187	↓
	15		0.160	0.160	↓
	16		ND	ND	↓
	17		ND	ND	↓

Note: _____



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FILE #: 3926.00

REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4100826-01

Sampled: 10/07/14 16:28

Matrix: Air

Sample Volume: 21.75 m³

Received: 10/08/14 10:34

Comments: Start Time 10/6/14 16:18

Analysis Date: 10/13/14 13:30

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0242

0.0036

OCT 16 2014

Initials: ER

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AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4100826-02

Sampled: 10/07/14 16:46

Matrix: Air

Sample Volume: 21.62 m³

Received: 10/08/14 10:34

Comments: Start Time 10/6/14 16:45

Analysis Date: 10/13/14 13:40

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0279		0.0036

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SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4100826-03	Sampled: 10/07/14 18:01
Matrix: Air	Sample Volume: 21.27 m ³	Received: 10/08/14 10:34
Comments: Col 1 Start Time 10/6/14 18:23		Analysis Date: 10/13/14 12:09

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0319		0.0036

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SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1D	Lab ID: 4100826-04	Sampled: 10/07/14 18:02
Matrix: Air	Sample Volume: 21.3 m ³	Received: 10/08/14 10:34
Comments: Col 2 Start Time 10/6/14 18:22		Analysis Date: 10/13/14 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	0.0340		0.0036

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REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-2	Lab ID: 4100826-05	Sampled: 10/07/14 17:44
Matrix: Air	Sample Volume: 21.44 m ³	Received: 10/08/14 10:34
Comments: Start Time 10/6/14 17:55		Analysis Date: 10/13/14 14:10

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0305		0.0036

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REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4100826-06	Sampled: 10/07/14 17:35
Matrix: Air	Sample Volume: 21.56 m ³	Received: 10/08/14 10:34
Comments: Start Time 10/6/14 17:38		Analysis Date: 10/13/14 14:19

Hexavalent Chromium

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

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SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-4	Lab ID: 4100826-07	Sampled: 10/07/14 17:15
Matrix: Air	Sample Volume: 21.47 m ³	Received: 10/08/14 10:34
Comments: Start Time 10/6/14 17:24		Analysis Date: 10/13/14 14:29

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.105		0.0036

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REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4100826-08	Sampled: 10/07/14 00:00
Matrix: Air	Sample Volume: 21.44 m ³	Received: 10/08/14 10:34
Comments:		Analysis Date: 10/13/14 14:39

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	ND	U	0.0036

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FILE #: 3926.00

REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4100826-09

Sampled: 10/07/14 00:00

Matrix: Air

Sample Volume: 21.56 m³

Received: 10/08/14 10:34

Comments:

Analysis Date: 10/13/14 14:49

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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SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4100914-01

Sampled: 10/08/14 16:33

Matrix: Air

Sample Volume: 21.61 m³

Received: 10/09/14 10:47

Comments: Start Time 10/7/14 16:32

Analysis Date: 10/13/14 14:59

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0256

0.0036

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REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4100914-03	Sampled: 10/08/14 18:15
Matrix: Air	Sample Volume: 21.75 m ³	Received: 10/09/14 10:47
Comments: Col 1 Start Time 10/7/14 18:05		Analysis Date: 10/13/14 12:48

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	0.0588		0.0036

OCT 16 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4100914-04	Sampled: 10/08/14 18:16
Matrix: Air	Sample Volume: 21.77 m ³	Received: 10/09/14 10:47
Comments: Col 2 Start Time 10/7/14 18:05		Analysis Date: 10/13/14 13:08

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	0.0606		0.0036

OCT 16 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4100914-06	Sampled: 10/08/14 17:43
Matrix: Air	Sample Volume: 21.66 m ³	Received: 10/09/14 10:47
Comments: Start Time 10/7/14 17:39		Analysis Date: 10/13/14 15:29

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0187		0.0036

OCT 16 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4100914-07	Sampled: 10/08/14 17:28
Matrix: Air	Sample Volume: 21.74 m ³	Received: 10/09/14 10:47
Comments: Start Time 10/7/14 17:19		Analysis Date: 10/13/14 15:39

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	0.160		0.0036

OCT 16 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4100914-08

Sampled: 10/08/14 00:00

Matrix: Air

Sample Volume: 21.68 m³

Received: 10/09/14 10:47

Comments:

Analysis Date: 10/13/14 16:42

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

OCT 16 2014

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 10/15/14 15:42

SUBMITTED: 10/08/14 to 10/09/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4100914-09

Sampled: 10/08/14 00:00

Matrix: Air

Sample Volume: 21.66 m³

Received: 10/09/14 10:47

Comments:

Analysis Date: 10/13/14 16:52

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

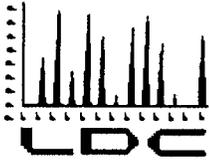
0.0036

OCT 16 2014

Initials: *CR*

Eastern Research Group

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



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 21, 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 17, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32874:

SDG

Fraction

4101012

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: October 9, 2014
LDC Report Date: October 17, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4101012

Sample Identification

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

Introduction

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

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

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

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

Samples PAM-31 were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 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 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	0.08074	0.0642	31 (≤20)	J (all detects)	A

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4101012**

SDG	Sample	Analyte	Flag	A or P	Reason
4101012	OAM 1 OAM 2 PAM-1 PAM-1D PAM-2 PAM-3 PAM-4	Hexavalent chromium	J (all detects)	A	Field duplicates (RPD)

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG
4101012**

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 4101012**

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

LDC #: 32874A6

VALIDATION COMPLETENESS WORKSHEET

Date: 10/17/14

SDG #: 4101012

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: [Signature]

METHOD: Hexavalent Chromium (ASTM D7614)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/09/14
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		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 label)

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

Accs

LDC #: 32874AG

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: SD
 2nd Reviewer: aw

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# 32874A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: SP
2nd Reviewer: AK

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual. (1-7) (1-6)*
	3	4		
Hexavalent Chromium	0.0874	0.0642	31	Jdet/A

* Qual. all samples >5X LOQ MOL
\\LDCFILESERVER\validation\FIELD DUPLICATES\FD_inorganic\wtemp.WPD

LDC #: 32874AG

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

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

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

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$
 Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.1	0.0000125	0.99965	0.99965	y
		s2	0.1	0.0000302			
		s3	0.2	0.0000724			
		s4	0.5	0.0001972			
		s5	1	0.000385			
		s6	2	0.0008213			
Icv 10:17 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.505 ng/ml	<u>True</u> 0.5 ng/ml		101.0%R	101.0%R	↓
Ccv 11:16 Calibration verification	Cr ⁺⁶	0.519 ng/ml	0.5 ng/ml		103.8%R	103.8%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 #: 32874A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 10146	Laboratory control sample	Cr ⁺⁶	1.06 ug/l	1.00 ug/l	106%R	106%R	
N	Matrix spike sample		(SSR-SR)				
Dup	Duplicate sample	Cr ⁺⁶	0.0860 ug/l ³	0.0874 ug/l ³	1.61%RPD	1.59%RPD	Y*

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

** Rounding*

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method See Cover

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

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

Compound (analyte) results for (2) C5+6 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1$ $v_f = 10ml$
 $m^3 = 21.29$ Recalculation: $(0.000104 - (-1.2E-05)) / 0.0004131 = 0.0542 \frac{ng}{ml}$
 $A = 0.000104$
 $C_0 = -1.2E-05$ $(\frac{ng}{ml})(v_f)$
 $C_1 = 0.0004131$ $\frac{m^3}{m^3} = \frac{ng}{m^3}$
 $(0.0542 \frac{ng}{ml})(10ml) / 21.29 m^3 = 0.0255 \frac{ng}{m^3}$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	C5+6	0.0275	0.0276	Y*
	2		0.0255	0.0255	Y
	3		0.0874	0.0874	↓
	4		0.0642	0.0643	Y*
	5		0.0410	0.0411	Y*
	6		0.0278	0.0278	Y
	7		0.147	0.147	Y
	8		ND	ND	Y
	9		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: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4101012-01

Sampled: 10/09/14 16:23

Matrix: Air

Sample Volume: 21.35 m³

Received: 10/10/14 10:26

Comments: Start Time 10/8/14 16:40

Analysis Date: 10/14/14 12:17

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0275 J

0.0036

OCT 20 2014

Initials: CR

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4101012-02	Sampled: 10/09/14 16:42
Matrix: Air	Sample Volume: 21.29 m ³	Received: 10/10/14 10:26
Comments: Start Time 10/8/14 17:03		Analysis Date: 10/14/14 12:27

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	0.0255 <i>S</i>		0.0036

OCT 20 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4101012-03

Sampled: 10/09/14 17:45

Matrix: Air

Sample Volume: 21.08 m³

Received: 10/10/14 10:26

Comments: Col 1 Start Time 10/8/14 18:20

Analysis Date: 10/14/14 11:36

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0874 *5*

0.0036

OCT 20 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4101012-04

Sampled: 10/09/14 17:45

Matrix: Air

Sample Volume: 21.06 m³

Received: 10/10/14 10:26

Comments: Col 2 Start Time 10/8/14 18:21

Analysis Date: 10/14/14 11:56

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0642

J

0.0036

OCT 20 2014

Initials: ER

Eastern Research Group

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75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4101012-05

Sampled: 10/09/14 17:29

Matrix: Air

Sample Volume: 21.17 m³

Received: 10/10/14 10:26

Comments: Start Time 10/8/14 17:58

Analysis Date: 10/14/14 12:37

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0410 *J*

0.0036

OCT 20 2014

Initials: *ER*

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Malvern, PA 19355

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4101012-06

Sampled: 10/09/14 17:21

Matrix: Air

Sample Volume: 21.23 m³

Received: 10/10/14 10:26

Comments: Start Time 10/8/14 17:46

Analysis Date: 10/14/14 12:47

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0278

J

0.0036

OCT 20 2014

Initials: CR

Eastern Research Group

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

ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4101012-07	Sampled: 10/09/14 17:10
Matrix: Air	Sample Volume: 21.26 m ³	Received: 10/10/14 10:26
Comments: Start Time 10/8/14 17:33		Analysis Date: 10/14/14 12:57

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.147 J		0.0036

OCT 20 2014

Initials: ER

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4101012-08

Sampled: 10/09/14 00:00

Matrix: Air

Sample Volume: 21.17 m³

Received: 10/10/14 10:26

Comments:

Analysis Date: 10/14/14 13:06

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

OCT 20 2014

Initials: *ER*

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/17/14 11:44

SUBMITTED: 10/10/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4101012-09

Sampled: 10/09/14 00:00

Matrix: Air

Sample Volume: 21.23 m³

Received: 10/10/14 10:26

Comments:

Analysis Date: 10/14/14 13:36

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

OCT 20 2014

Initials: *ER*

Eastern Research Group

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LABORATORY DATA CONSULTANTS, INC.

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

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

October 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 October 21, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32897:

SDG

4101423

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: October 10 through October 13, 2014
LDC Report Date: October 22, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4101423

Sample Identification

OAM 1(10/10/14) PAM-1D(10/13/14)DUP
OAM 2(10/10/14)
PAM-1(10/10/14)
PAM-1D(10/10/14)
PAM-2(10/10/14)
PAM-3(10/10/14)
PAM-4(10/10/14)
PAM-21(10/10/14)
PAM-31(10/10/14)
OAM 1(10/13/14)
OAM 2(10/13/14)
PAM-1(10/13/14)
PAM-1D(10/13/14)
PAM-3(10/13/14)
PAM-4(10/13/14)
PAM-21(10/13/14)
PAM-31(10/13/14)
PAM-1(10/10/14)DUP
PAM-1D(10/10/14)DUP
PAM-1(10/13/14)DUP

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

Introduction

This data review covers 21 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(10/10/14) and PAM-31(10/13/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(10/10/14) and PAM-21(10/13/14) 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(10/10/14) and PAM-1D(10/10/14) and samples PAM-1(10/13/14) and PAM-1D(10/13/14) 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(10/10/14)	PAM-1D(10/10/14)			
Hexavalent chromium	0.0229	0.0223	3 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/13/14)	PAM-1D(10/13/14)			
Hexavalent chromium	0.0305	0.0311	2 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4101423**

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
4101423**

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 4101423**

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

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: 10/10/14, 10/13/14
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	LS/D
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)(16) TB=(9)(17)

Note: A = Acceptable ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples: Airs

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

Notes: Data appended to IFS

Method: Inorganics (EPA Method See below)

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) ≤ 20% for water and ≤ 35% for soil samples? A control limit of ≤ CRDL (≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	/			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

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

LDC# 32897A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1

Reviewer: SD

2nd Reviewer: AL

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0229	0.0223	3	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0305	0.0311	2	

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LDC #: 3287160

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

Page: 1 of 1

Reviewer: SO

2nd Reviewer: CL

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 10/15/14

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

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

Where,

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

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

Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.1	0.0000137	0.99994	0.99994	Y
		s2	0.1	0.0000316			
		s3	0.2	0.0000753			
		s4	0.5	0.0001891			
		s5	1	0.0003897			
		s6	2	0.000771			
ICV 10:47 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.510 ng/ml	<u>True</u> 0.5 ng/ml		102.0%R	102.0%R	↓
CCV 11:46 Calibration verification	Cr ⁺⁶	0.51398 ng/ml	0.5 ng/ml		102.8%R	102.8%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 11:16	Laboratory control sample	Cr ⁺⁶	1.07 ug/ml	1 ug/ml	107%R	107%R	Y
N	Matrix spike sample		(SSR-SR)				
DUP	Duplicate sample	Cr ⁺⁶	0.0231 ug/ml ³	0.0225 ug/ml ³	0.870%RPD	0.813%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

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

Concentration = $(A - C_0) / C_1$ $V_f = 10 \text{ ml}$ $m^3 = 21.47$ Recalculation: $(0.0000216 - (-4.54E-06)) / 0.000389 = 0.672 \text{ ng/ml}$

$A = 0.0000216$ $C_0 = -4.54E-06$ $C_1 = 0.000389$ $(\text{ng/ml})(\text{ml}) / m^3 = \text{ng/m}^3$ $(0.672 \text{ ng/ml})(10 \text{ ml}) / 21.47 m^3 = 0.0313 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0224	0.0223	y*
	2		0.0187	0.0186	y*
	3		0.0229	0.0229	y
	4		0.0223	0.0223	↓
	5		0.0313	0.0312	y*
	6		0.0213	0.0213	y
	7		0.0225	0.0225	
	8		ND	ND	
	9		ND	ND	
	10		0.0540	0.0540	
	11		0.0570	0.0570	↓
	12		0.0305	0.0306	y*
	13		0.0311	0.0311	y
	14		0.0332	0.0332	
	15		0.0313	0.0313	
	16		ND	ND	
	17		ND	ND	↓

Note: *Rounding



CERTIFICATE OF ANALYSIS

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4101423-01	Sampled: 10/10/14 16:33
Matrix: Air	Sample Volume: 21.68 m ³	Received: 10/14/14 10:49
Comments: Start Time 10/9/14 16:28		Analysis Date: 10/15/14 13:26

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	0.0224		0.0036

OCT 23 2014

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4101423-02

Sampled: 10/10/14 16:45

Matrix: Air

Sample Volume: 21.57 m³

Received: 10/14/14 10:49

Comments: Start Time 10/9/14 16:46

Analysis Date: 10/15/14 13:36

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.0187		0.0036

OCT 23 2014

Initials: ER

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REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4101423-03

Sampled: 10/10/14 17:35

Matrix: Air

Sample Volume: 21.39 m³

Received: 10/14/14 10:49

Comments: Col 1 Start Time 10/9/14 17:49

Analysis Date: 10/15/14 12:06

Hexavalent Chromium

Results

MDL

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

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D **Lab ID:** 4101423-04 **Sampled:** 10/10/14 17:32

Matrix: Air **Sample Volume:** 21.36 m³ **Received:** 10/14/14 10:49

Comments: Col 2 Start Time 10/9/14 17:48 **Analysis Date:** 10/15/14 12:26

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

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4101423-05

Sampled: 10/10/14 17:24

Matrix: Air

Sample Volume: 21.43 m³

Received: 10/14/14 10:49

Comments: Start Time 10/9/14 17:35

Analysis Date: 10/15/14 14:06

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0313		0.0036

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REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4101423-06	Sampled: 10/10/14 17:18
Matrix: Air	Sample Volume: 21.51 m ³	Received: 10/14/14 10:49
Comments: Start Time 10/9/14 17:24		Analysis Date: 10/15/14 14:16

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0213		0.0036

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Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4101423-07	Sampled: 10/10/14 17:08
Matrix: Air	Sample Volume: 21.51 m ³	Received: 10/14/14 10:49
Comments: Start Time 10/9/14 17:14		Analysis Date: 10/15/14 14:26

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	0.0225		0.0036

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4101423-08

Sampled: 10/10/14 00:00

Matrix: Air

Sample Volume: 21.43 m³

Received: 10/14/14 10:49

Comments:

Analysis Date: 10/15/14 14:36

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

OCT 23 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4101423-09

Sampled: 10/10/14 00:00

Matrix: Air

Sample Volume: 21.51 m³

Received: 10/14/14 10:49

Comments:

Analysis Date: 10/15/14 14:45

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

OCT 23 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4101423-10

Sampled: 10/13/14 16:13

Matrix: Air

Sample Volume: 21.3 m³

Received: 10/14/14 10:49

Comments: Start Time 10/12/14 16:33

Analysis Date: 10/15/14 14:55

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	0.0540		0.0036

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Initials: *ER*

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4101423-11

Sampled: 10/13/14 16:40

Matrix: Air

Sample Volume: 21.42 m³

Received: 10/14/14 10:49

Comments: Start Time 10/12/14 16:52

Analysis Date: 10/15/14 15:05

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0570		0.0036

OCT 23 2014

Initials: ER

Eastern Research Group

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CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4101423-12

Sampled: 10/13/14 18:16

Matrix: Air

Sample Volume: 21.82 m³

Received: 10/14/14 10:49

Comments: Col 1 Start Time 10/12/14 18:01

Analysis Date: 10/15/14 12:46

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0305		0.0036

OCT 23 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4101423-13

Sampled: 10/13/14 18:19

Matrix: Air

Sample Volume: 21.85 m³

Received: 10/14/14 10:49

Comments: Col 2 Start Time 10/12/14 18:02

Analysis Date: 10/15/14 13:06

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0311		0.0036

OCT 23 2014

Initials: ER

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4101423-15

Sampled: 10/13/14 17:29

Matrix: Air

Sample Volume: 21.49 m³

Received: 10/14/14 10:49

Comments: Start Time 10/12/14 17:36

Analysis Date: 10/15/14 15:25

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	0.0332		0.0036

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Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4101423-16

Sampled: 10/13/14 17:10

Matrix: Air

Sample Volume: 21.47 m³

Received: 10/14/14 10:49

Comments: Start Time 10/12/14 17:18

Analysis Date: 10/15/14 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	0.0313		0.0036

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Initials: ER

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21	Lab ID: 4101423-17	Sampled: 10/13/14 00:00
Matrix: Air	Sample Volume: 21.67 m ³	Received: 10/14/14 10:49
Comments:		Analysis Date: 10/15/14 16:05

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	ND	U	0.0036

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Initials: ER

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FILE #: 3926.00

REPORTED: 10/21/14 12:17

SUBMITTED: 10/14/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4101423-18

Sampled: 10/13/14 00:00

Matrix: Air

Sample Volume: 21.49 m³

Received: 10/14/14 10:49

Comments:

Analysis Date: 10/15/14 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

OCT 23 2014

Initials: ER

Eastern Research Group

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LABORATORY DATA CONSULTANTS, INC.

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

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

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

LDC Project #32905:

SDG

Fraction

4101521

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: October 14, 2014
LDC Report Date: October 22, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4101521

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	0.0158	0.0158	0 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4101521**

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
4101521**

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 4101521**

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

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: 10/14/14
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)
XI	Field blanks	ND	FB=8 TB=9

Note: A = Acceptable ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field 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 Cover)

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

LDC #: 32505A6

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# 32905A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0158	0.0158	0	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32905A6.wpd

LDC #: 3210SP16

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1

Reviewer: SP

2nd Reviewer: EL

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: See Cover

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

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

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.1	0.0000137	0.99978	0.99978	y
		s2	0.1	0.0000346			
		s3	0.2	0.0000754			
		s4	0.5	0.0002142			
		s5	1	0.0004054			
		s6	2	0.0008416			
ICV 10:57 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5013 ng/ml	<u>True</u> 0.5 ng/ml		100.3%R	100.3%R	↓
CCV 11:56 Calibration verification	Cr ⁺⁶	0.5122 ng/ml	0.5 ng/ml		102.4%R	102.5%R	y*
Calibration verification							

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

LDC #: 32905AL0

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method See Cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	Cr ⁺⁶	1.0505 ng/l	1 ng/l	105%R	105%R	Y
N	Matrix spike sample		(SSR-SR)				
DUP	Duplicate sample	Cr ⁺⁶	0.0132 ng/m ³	0.0158 ng/m ³	17.9%RPD	18.2%RPD	Y*

Comments: *Rounding

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 = $(A - C_0) / C_1$ $V_f = 10 \text{ ml}$ Recalculation: $(0.0000124 - (-7.27E-06))$
 $A = 0.0000124$ $m^3 = 21.27$ $\frac{0.000423}{0.000423} = 0.465 \text{ ng/ml}$
 $C_0 = -7.27E-06$ $\frac{(ng/ml)(\mu l)}{m^3}$ $\frac{(0.465 \text{ ng/ml} \times 10 \text{ ml})}{21.27 \text{ m}^3} = 0.0219 \text{ ng/m}^3$
 $C_1 = 0.000423$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0285	0.0284	Y
	2	↓	0.0176	0.0176	↓
	3		0.0158	0.0158	
	4		0.0158	0.0157	
	5		0.0189	0.0189	
	6		0.0315	0.0315	
	7		0.0219	0.0219	
	8		ND	ND	
	9		ND	ND	

Note: _____



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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/22/14 14:04

SUBMITTED: 10/15/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4101521-01	Sampled: 10/14/14 16:10
Matrix: Air	Sample Volume: 21.44 m ³	Received: 10/15/14 10:47
Comments: Start Time 10/13/14 16:21		Analysis Date: 10/16/14 12:59

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0285		0.0036

OCT 23 2014

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 10/22/14 14:04

SUBMITTED: 10/15/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4101521-02

Sampled: 10/14/14 16:27

Matrix: Air

Sample Volume: 21.35 m³

Received: 10/15/14 10:47

Comments: Start Time 10/13/14 16:43

Analysis Date: 10/16/14 13:09

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0176		0.0036

OCT 23 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/22/14 14:04

SUBMITTED: 10/15/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4101521-03

Sampled: 10/14/14 17:26

Matrix: Air

Sample Volume: 20.79 m³

Received: 10/15/14 10:47

Comments: Col 1 Start Time 10/13/14 18:20

Analysis Date: 10/16/14 12:17

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	0.0158		0.0036

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FILE #: 3926.00

REPORTED: 10/22/14 14:04

SUBMITTED: 10/15/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4101521-04

Sampled: 10/14/14 17:25

Matrix: Air

Sample Volume: 20.74 m³

Received: 10/15/14 10:47

Comments: Col 2 Start Time 10/13/14 18:23

Analysis Date: 10/16/14 12:37

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0158		0.0036

OCT 23 2014

Initials: CR

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FILE #: 3926.00

REPORTED: 10/22/14 14:04

SUBMITTED: 10/15/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-3	Lab ID: 4101521-06	Sampled: 10/14/14 17:01
Matrix: Air	Sample Volume: 21.12 m ³	Received: 10/15/14 10:47
Comments: Start Time 10/13/14 17:33		Analysis Date: 10/16/14 13:28

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0315		0.0036

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Initials: *CR*

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FILE #: 3926.00

REPORTED: 10/22/14 14:04

SUBMITTED: 10/15/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4101521-07

Sampled: 10/14/14 16:52

Matrix: Air

Sample Volume: 21.27 m³

Received: 10/15/14 10:47

Comments: Start Time 10/13/14 17:14

Analysis Date: 10/16/14 13:38

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0219		0.0036

OCT 23 2014

Initials: CR

Eastern Research Group

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



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: 10/22/14 14:04

SUBMITTED: 10/15/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4101521-08

Sampled: 10/14/14 00:00

Matrix: Air

Sample Volume: 20.96 m³

Received: 10/15/14 10:47

Comments:

Analysis Date: 10/16/14 13:48

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

OCT 23 2014

Initials: *ER*

Eastern Research Group

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CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/22/14 14:04

SUBMITTED: 10/15/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4101521-09	Sampled: 10/14/14 00:00
Matrix: Air	Sample Volume: 21.12 m ³	Received: 10/15/14 10:47
Comments:		Analysis Date: 10/16/14 14:18

Hexavalent Chromium

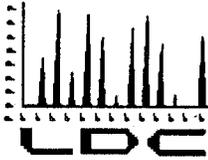
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

OCT 23 2014

Initials: ER

Eastern Research Group

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LABORATORY DATA CONSULTANTS, INC.

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

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

October 28, 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 24, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32924:

SDG

4101712

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: October 16, 2014
LDC Report Date: October 28, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4101712

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) 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	0.0604	0.0619	2 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4101712**

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
4101712**

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 4101712**

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

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: 10/16/14
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	LS
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.			/	
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for <u>As</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?			/	

LDC #: 32524AD

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: SD
2nd Reviewer: L

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# 32924A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	3	4		
Hexavalent Chromium	0.0604	0.0619	2	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\32924A4.wpd

LDC #: 3292406

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C_{Cr+6} was recalculated. Calibration date: 10/20/14

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

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

Where,

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

Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	C _{Cr+6}	s1	0.1	0.0000146	0.99965	0.99965	Y
		s2	0.1	0.0000318			
		s3	0.2	0.00007			
		s4	0.5	0.0001829			
		s5	1	0.0003589			
		s6	2	0.0007624			
ICV 11:17 Calibration verification	C _{Cr+6}	<u>Found</u> 0.515 ng/ml	<u>True</u> 0.5 ng/ml		103.0%R	103.0%R	Y
CCV 12:17 Calibration verification	C _{Cr+6}	0.520 ng/ml	0.5 ng/ml		104.1%R	104.1%R	N
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>LLS</u> <u>11:47</u>	Laboratory control sample	<u>Cr²⁶</u>	<u>1.066 ng/ml</u>	<u>1.00 ng/ml</u>	<u>107%R</u>	<u>107%R</u>	<u>Y</u>
	Matrix spike sample		(SSR-SR)				
<u>Dup</u> <u>12:47</u>	Duplicate sample	<u>Cr²⁶</u>	<u>0.0593 ng/m³</u>	<u>0.0603 ng/m³</u>	<u>1.67% RPD</u>	<u>1.77% 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.

**Rounding*

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

Concentration = $(a - C_0) / C_1 \times V_f \times 10ml$ Recalculation: $(0.000604 - (-8.26E-06)) / 0.0003819 = 0.1798 \text{ ng/ml}$

$A = 0.000604$
 $C_0 = -8.26E-06$
 $C_1 = 0.0003819$

$V_f = 10ml$
 $m^3 = 21.79$
 $(\text{ng/ml} \times 10ml) / m^3 = \text{ng/m}^3$

$(0.1798 \text{ ng/ml}) (10ml) / 21.79 \text{ m}^3 = 0.0825 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0734	0.0733	Y*
	2		0.0839	0.0839	Y
	3		0.0604	0.0603	Y*
	4		0.0619	0.0620	Y*
	5		0.0528	0.0529	Y*
	6		0.0633	0.0633	Y
	7		0.0825	0.0825	Y
	8		ND	ND	Y
	9		ND	ND	Y

Note: * Rounding



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: 10/24/14 13:56

SUBMITTED: 10/17/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4101712-02	Sampled: 10/16/14 16:36
Matrix: Air	Sample Volume: 21.78 m ³	Received: 10/17/14 10:22
Comments: Start Time 10/15/14 16:24		Analysis Date: 10/20/14 15:30

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0839		0.0036

KK
10-28-14

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: 10/24/14 13:56

SUBMITTED: 10/17/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4101712-03	Sampled: 10/16/14 17:35
Matrix: Air	Sample Volume: 21.68 m ³	Received: 10/17/14 10:22
Comments: Col 1 Start Time 10/15/14 17:29		Analysis Date: 10/20/14 12:37

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	0.0604		0.0036

KK
10-28-14

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: 10/24/14 13:56

SUBMITTED: 10/17/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4101712-04	Sampled: 10/16/14 17:36
Matrix: Air	Sample Volume: 21.73 m ³	Received: 10/17/14 10:22
Comments: Col 2 Start Time 10/15/14 17:27		Analysis Date: 10/20/14 12:57

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0619		0.0036

KK
10-28-14



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: 10/24/14 13:56

SUBMITTED: 10/17/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4101712-05	Sampled: 10/16/14 17:17
Matrix: Air	Sample Volume: 21.78 m ³	Received: 10/17/14 10:22
Comments: Start Time 10/15/14 17:05		Analysis Date: 10/20/14 15:40

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0528		0.0036

KK
10-28-14

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: 10/24/14 13:56

SUBMITTED: 10/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4101712-06

Sampled: 10/16/14 17:10

Matrix: Air

Sample Volume: 21.78 m³

Received: 10/17/14 10:22

Comments: Start Time 10/15/14 16:58

Analysis Date: 10/20/14 15:50

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0633		0.0036

KK
10-28-14

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: 10/24/14 13:56

SUBMITTED: 10/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4101712-07

Sampled: 10/16/14 17:03

Matrix: Air

Sample Volume: 21.79 m³

Received: 10/17/14 10:22

Comments: Start Time 10/15/14 16:50

Analysis Date: 10/20/14 16:00

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0825		0.0036

KK
10-28-14

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: 10/24/14 13:56

SUBMITTED: 10/17/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4101712-09

Sampled: 10/16/14 00:00

Matrix: Air

Sample Volume: 21.78 m³

Received: 10/17/14 10:22

Comments:

Analysis Date: 10/20/14 16:40

Hexavalent Chromium

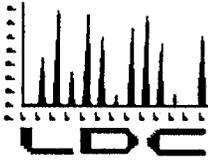
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

JK

10-28-14

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 30, 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 28, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32944:

SDG

Fraction

4102118/4102232

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: October 17 through October 21, 2014
LDC Report Date: October 29, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4102118/4102232

Sample Identification

OAM 1(10/17/14)	PAM-1(10/20/14)
OAM 2(10/17/14)	PAM-2(10/20/14)
PAM-1(10/17/14)	PAM-3(10/20/14)
PAM-1D(10/17/14)	PAM-4(10/20/14)
PAM-2(10/17/14)	PAM-21(10/20/14)
PAM-3(10/17/14)	PAM-31(10/20/14)
PAM-4(10/17/14)	OAM 1(10/21/14)
PAM-21(10/17/14)	OAM 2(10/21/14)
PAM-31(10/17/14)	PAM-1(10/21/14)
OAM 1(10/18/14)	PAM-1D(10/21/14)
OAM 2(10/18/14)	PAM-2(10/21/14)
PAM-1(10/18/14)	PAM-3(10/21/14)
PAM-1D(10/18/14)	PAM-4(10/21/14)
PAM-2(10/18/14)	PAM-21(10/21/14)
PAM-3(10/18/14)	PAM-31(10/21/14)
PAM-4(10/18/14)	PAM-1(10/17/14)DUP
PAM-21(10/18/14)	PAM-1D(10/17/14)DUP
PAM-31(10/18/14)	PAM-1(10/18/14)DUP
OAM 1(10/20/14)	PAM-1D(10/18/14)DUP
OAM 2(10/20/14)	PAM-1(10/20/14)DUP
	PAM-1(10/21/14)DUP
	PAM-1D(10/21/14)DUP

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

Introduction

This data review covers 42 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per ASTM D7614 for Hexavalent Chromium.

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

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

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

Samples PAM-31(10/17/14), PAM-31(10/18/14), PAM-31(10/20/14), and PAM-31(10/21/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(10/17/14), PAM-21(10/18/14), PAM-21(10/20/14), and PAM-21(10/21/14) were identified as field blanks. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

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

VI. Duplicates

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

VII. Laboratory Control Samples

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

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

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

X. Field Duplicates

Samples PAM-1(10/17/14) and PAM-1D(10/17/14), samples PAM-1(10/18/14) and PAM-1D(10/18/14), and samples PAM-1(10/21/14) and PAM-1D(10/21/14) were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/17/14)	PAM-1D(10/17/14)			
Hexavalent chromium	0.0216	0.0194	11 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/18/14)	PAM-1D(10/18/14)			
Hexavalent chromium	0.0241	0.0243	1 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/21/14)	PAM-1D(10/21/14)			
Hexavalent chromium	0.0718	0.0833	15 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4102118/4102232**

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
4102118/4102232**

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
4102118/4102232**

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

LDC #: 32944A6

VALIDATION COMPLETENESS WORKSHEET

Date: 10/28/14

SDG #: 4102118/4102232

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: JD

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: 10/17-21/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCSD
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD=(3.4) (12.13) (29.30)
XI	Field blanks	ND	FB=(8)(11)(25)(34) TB=(9)(18)(20)(35)

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

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

Air

LDC #: 32944AC

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: SD
 2nd Reviewer: W

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	0.0216	0.0194	11	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	12	13		
Hexavalent Chromium	0.0241	0.0243	1	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	29	30		
Hexavalent Chromium	0.0718	0.0833	15	

LDC #: 32944A

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 10/22/14

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. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.05	0.0000124	0.99973	0.99973	y
		s2	0.1	0.0000305			
		s3	0.2	0.0000719			
		s4	0.5	0.0002025			
		s5	1	0.0003913			
		s6	2	0.0008274			
ICV 10:45 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.497 ng/ml	<u>True</u> 0.5 ng/ml		99.4%R	99.4%R	↓
CCV 11:44 Calibration verification	Cr ⁺⁶	0.5012 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 #: 3294426

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 11:15	Laboratory control sample	Cr ⁺⁶	1.099 ng/ml	1 ng/ml	110%R	110%R	Y
	Matrix spike sample		(SSR-SR)				
12:46 Dup.	Duplicate sample	Cr ⁺⁶	0.0221 ng/ml ³	0.0216 ng/ml ³	2.29% RPD	2.41% RPD	Y*

Comments: * 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 (20) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1$ $VF = 10 \text{ ml}$ Recalculation: $\frac{(0.0000066 - (-7.40E-06))}{0.0003768} = 0.0372 \text{ ng/ml}$
 $m^3 = 21.86$
 $C_0 = -7.40E-06$ $\frac{(ng/ml)(VF)}{m^3}$ $\frac{(0.0372 \text{ ng/ml})(10 \text{ ml})}{21.86 \text{ m}^3} = 0.0170 \text{ ng/ml}$
 $C_1 = 0.0003768$
 $A = 0.0000066$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0182	0.0182	Y
	2		ND	ND	↓
	3		0.0216	0.0216	↓
	4		0.0194	0.0193	Y*
	5		0.0189	0.0188	Y*
	6		0.0185	0.0185	Y
	7		0.160	0.160	↓
	8		ND	ND	↓
	9		ND	ND	↓
	10		0.0195	0.0195	↓
	11		0.0206	0.0206	↓
	12		0.0241	0.0241	↓
	13		0.0243	0.0242	Y*
	14		0.0222	0.0222 0.0230	Y
	15		0.0167	0.0166	Y*
	16		0.0349	0.0348	Y*
	17		ND	ND	Y
	18		ND	ND	↓
	19		0.0175	0.0174	Y*
	20		0.0170	0.0170	Y

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

Concentration = $(A - C_0) / C_1$
 $C_0 = -7.40E-06$
 $C_1 = 0.0003768$
 $A = 0.0000221$

Recalculation: $\frac{(0.0000221) - (-7.40E-06)}{0.0003768} = 0.0783 \text{ ng/ml}$

$\frac{(0.0783 \text{ ng/ml} (10 \text{ ml}))}{21.92 \text{ m}^3} = 0.0357 \text{ ng/m}^3$

Handwritten notes: V_f = 10 ml, m³ = 21.92, (ng/ml) (V_f), m³, +ng, SD

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	21	Cr ⁺⁶	0.0357	0.0357	Y	
	22	↓	0.0337	0.0337	↓	
	23		0.0258	0.0258		
	24		0.0597	0.0597		
	25		ND	ND		
	26		ND	ND		
	27		0.0238	0.0238		
	28		0.0330	0.0330		
	29		0.0718	0.0718		↓
	30		0.0833	0.0832		Y*
	31		0.0291	0.0291		Y
	32		0.0372	0.0371		Y*
	33		0.151	0.151		Y
	34		ND	ND		↓
	35		ND	ND		

Note: *Rounding



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: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4102118-01

Sampled: 10/17/14 15:43

Matrix: Air

Sample Volume: 21.02 m³

Received: 10/21/14 10:57

Comments: Start Time 10/16/14 16:21

Analysis Date: 10/22/14 13:27

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	0.0182		0.0036

KK
10/29/14

Eastern Research Group

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REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4102118-02

Sampled: 10/17/14 15:57

Matrix: Air

Sample Volume: 20.96 m³

Received: 10/21/14 10:57

Comments: Start Time 10/16/14 16:40

Analysis Date: 10/22/14 13:37

Hexavalent Chromium

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

KK
10/29/14

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4102118-03	Sampled: 10/17/14 16:51
Matrix: Air	Sample Volume: 20.88 m ³	Received: 10/21/14 10:57
Comments: Col 1 Start Time 10/16/14 17:38		Analysis Date: 10/22/14 12:06

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	0.0216		0.0036

kk
10/29/14



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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4102118-04

Sampled: 10/17/14 16:51

Matrix: Air

Sample Volume: 20.87 m³

Received: 10/21/14 10:57

Comments: Col 2 Start Time 10/16/14 17:39

Analysis Date: 10/22/14 12:26

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	0.0194		0.0036

lek
10/29/14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4102118-05	Sampled: 10/17/14 16:38
Matrix: Air	Sample Volume: 20.94 m ³	Received: 10/21/14 10:57
Comments: Start Time 10/16/14 17:21		Analysis Date: 10/22/14 14:07

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0189		0.0036

KK
10/29/14

Eastern Research Group

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CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4102118-06

Sampled: 10/17/14 16:30

Matrix: Air

Sample Volume: 20.94 m³

Received: 10/21/14 10:57

Comments: Start Time 10/16/14 17:14

Analysis Date: 10/22/14 14:17

Hexavalent Chromium

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

JK
10/29/14

Eastern Research Group

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Environmental Resources Management, Inc

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4102118-07

Sampled: 10/17/14 16:22

Matrix: Air

Sample Volume: 20.93 m³

Received: 10/21/14 10:57

Comments: Start Time 10/16/14 17:06

Analysis Date: 10/22/14 14:27

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.160		0.0036

JK
10/29/14

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CERTIFICATE OF ANALYSIS

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

FILE #: 3926.00
REPORTED: 10/28/14 11:43
SUBMITTED: 10/21/14 to 10/22/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

Description: PAM-21	Lab ID: 4102118-08	Sampled: 10/17/14 00:00
Matrix: Air	Sample Volume: 20.94 m ³	Received: 10/21/14 10:57
Comments:		Analysis Date: 10/22/14 14:37

Hexavalent Chromium

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

PK
10/29/14



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4102118-09

Sampled: 10/17/14 00:00

Matrix: Air

Sample Volume: 20.94 m³

Received: 10/21/14 10:57

Comments:

Analysis Date: 10/22/14 14:46

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

1cc
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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: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 4102118-10	Sampled: 10/18/14 15:43
Matrix: Air	Sample Volume: 21.56 m ³	Received: 10/21/14 10:57
Comments: Start Time 10/17/14 15:46		Analysis Date: 10/22/14 14:56

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0195		0.0036

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Malvern, PA 19355

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4102118-11

Sampled: 10/18/14 16:15

Matrix: Air

Sample Volume: 21.81 m³

Received: 10/21/14 10:57

Comments: Start Time 10/17/14 16:01

Analysis Date: 10/22/14 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	0.0206		0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1

Lab ID: 4102118-12

Sampled: 10/18/14 17:33

Matrix: Air

Sample Volume: 22.18 m³

Received: 10/21/14 10:57

Comments: Col 1 Start Time 10/17/14 16:54

Analysis Date: 10/22/14 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	0.0241		0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4102118-13	Sampled: 10/18/14 17:35
Matrix: Air	Sample Volume: 22.21 m ³	Received: 10/21/14 10:57
Comments: Col 2 Start Time 10/17/14 16:54		Analysis Date: 10/22/14 13:06

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	0.0243		0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4102118-14	Sampled: 10/18/14 17:13
Matrix: Air	Sample Volume: 22.07 m ³	Received: 10/21/14 10:57
Comments: Start Time 10/17/14 16:41		Analysis Date: 10/22/14 15:16

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	0.0222		0.0036

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

FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4102118-15	Sampled: 10/18/14 16:59
Matrix: Air	Sample Volume: 21.97 m ³	Received: 10/21/14 10:57
Comments: Start Time 10/17/14 16:33		Analysis Date: 10/22/14 15:26

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0167		0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-4	Lab ID: 4102118-16	Sampled: 10/18/14 16:42
Matrix: Air	Sample Volume: 21.86 m ³	Received: 10/21/14 10:57
Comments: Start Time 10/17/14 16:25		Analysis Date: 10/22/14 15:36

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	0.0349		0.0036

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REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21	Lab ID: 4102118-17	Sampled: 10/18/14 00:00
Matrix: Air	Sample Volume: 22.07 m ³	Received: 10/21/14 10:57
Comments:		Analysis Date: 10/22/14 16:06

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	ND	U	0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4102118-18	Sampled: 10/18/14 00:00
Matrix: Air	Sample Volume: 21.97 m ³	Received: 10/21/14 10:57
Comments:		Analysis Date: 10/22/14 16:16

Hexavalent Chromium

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

KK
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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4102118-19	Sampled: 10/20/14 16:11
Matrix: Air	Sample Volume: 21.65 m ³	Received: 10/21/14 10:57
Comments: Start Time 10/19/14 16:08		Analysis Date: 10/23/14 13:15

Hexavalent Chromium

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

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4102118-20	Sampled: 10/20/14 16:39
Matrix: Air	Sample Volume: 21.86 m ³	Received: 10/21/14 10:57
Comments: Start Time 10/19/14 16:22		Analysis Date: 10/23/14 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	0.0170		0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4102118-21	Sampled: 10/20/14 17:47
Matrix: Air	Sample Volume: 21.92 m ³	Received: 10/21/14 10:57
Comments: Col 1 Start Time 10/19/14 17:26		Analysis Date: 10/23/14 12:13

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	0.0357		0.0036

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FILE #: 3926.00

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REPORTED: 10/28/14 11:43

Malvern, PA 19355

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ATTN: Mr. Jeff Boggs

AQS SITE

PHONE: (443) 803-8495

FAX: (410) 266-8912

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4102118-23

Sampled: 10/20/14 17:29

Matrix: Air

Sample Volume: 21.91 m³

Received: 10/21/14 10:57

Comments: Start Time 10/19/14 17:08

Analysis Date: 10/23/14 13:35

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	0.0337		0.0036

JK 10/29/14



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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4102118-24

Sampled: 10/20/14 17:14

Matrix: Air

Sample Volume: 21.92 m³

Received: 10/21/14 10:57

Comments: Start Time 10/19/14 16:52

Analysis Date: 10/23/14 13:45

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>		<u>MDL</u>
		<u>ng/m³ Air</u>	<u>Flag</u>	
Hexavalent Chromium	1854-02-99	0.0258		0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4102118-25

Sampled: 10/20/14 16:57

Matrix: Air

Sample Volume: 21.82 m³

Received: 10/21/14 10:57

Comments: Start Time 10/19/14 16:42

Analysis Date: 10/23/14 14:14

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	0.0597		0.0036

kk
10/29/14

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4102118-26

Sampled: 10/20/14 00:00

Matrix: Air

Sample Volume: 21.91 m³

Received: 10/21/14 10:57

Comments:

Analysis Date: 10/23/14 14:24

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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10/29/14

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SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4102118-27

Sampled: 10/20/14 00:00

Matrix: Air

Sample Volume: 21.92 m³

Received: 10/21/14 10:57

Comments:

Analysis Date: 10/23/14 14:34

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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REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4102232-01

Sampled: 10/21/14 16:03

Matrix: Air

Sample Volume: 21.34 m³

Received: 10/22/14 10:58

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

Analysis Date: 10/23/14 14:44

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0238		0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4102232-02	Sampled: 10/21/14 16:23
Matrix: Air	Sample Volume: 21.28 m ³	Received: 10/22/14 10:58
Comments: Start Time 10/20/14 16:44		Analysis Date: 10/23/14 14:54

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0330		0.0036

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PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4102232-03	Sampled: 10/21/14 17:06
Matrix: Air	Sample Volume: 20.93 m ³	Received: 10/22/14 10:58
Comments: Col 1 Start Time 10/20/14 17:51		Analysis Date: 10/23/14 12:33

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	0.0718		0.0036

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REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4102232-04

Sampled: 10/21/14 17:11

Matrix: Air

Sample Volume: 20.85 m³

Received: 10/22/14 10:58

Comments: Col 2 Start Time 10/20/14 18:01

Analysis Date: 10/23/14 12:53

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	0.0833		0.0036

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FILE #: 3926.00
REPORTED: 10/28/14 11:43
SUBMITTED: 10/21/14 to 10/22/14

ATTN: Mr. Jeff Boggs

AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

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

Description: PAM-2	Lab ID: 4102232-05	Sampled: 10/21/14 16:56
Matrix: Air	Sample Volume: 21.05 m ³	Received: 10/22/14 10:58
Comments: Start Time 10/20/14 17:33		Analysis Date: 10/23/14 15:04

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	0.0291		0.0036

KT
10/29/14



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4102232-06

Sampled: 10/21/14 16:45

Matrix: Air

Sample Volume: 21.1 m³

Received: 10/22/14 10:58

Comments: Start Time 10/20/14 17:18

Analysis Date: 10/23/14 15:14

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0372		0.0036

lk
10/29/14

Eastern Research Group

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4102232-07

Sampled: 10/21/14 16:36

Matrix: Air

Sample Volume: 21.23 m³

Received: 10/22/14 10:58

Comments: Start Time 10/20/14 17:01

Analysis Date: 10/23/14 15:24

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	0.151		0.0036

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10/29/14

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4102232-08	Sampled: 10/21/14 00:00
Matrix: Air	Sample Volume: 21.05 m ³	Received: 10/22/14 10:58
Comments:		Analysis Date: 10/23/14 15:34

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	ND	U	0.0036

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FILE #: 3926.00

REPORTED: 10/28/14 11:43

SUBMITTED: 10/21/14 to 10/22/14

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4102232-09

Sampled: 10/21/14 00:00

Matrix: Air

Sample Volume: 21.1 m³

Received: 10/22/14 10:58

Comments:

Analysis Date: 10/23/14 15:43

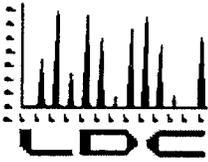
Hexavalent Chromium

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

kk
10/29/14

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 31, 2014

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

Dear Mr. Boggs,

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

LDC Project #32961:

SDG

4102421

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: October 23, 2014
LDC Report Date: October 30, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4102421

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	0.0507	0.0461	10 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4102421**

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
4102421**

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 4102421**

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

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: 10/23/14
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	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 ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field 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 Case)

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

Air

LDC #: 32961AE

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: SO
 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.	/	✓	SD	(yes)
Target analytes were detected in the field blanks.		/		

LDC# 32961A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0507	0.0461	10	

\\LDCFILESERVER\validation\FIELD DUPLICATES\FD_inorganic\32961A6.wpd

LDC #: 3296AC

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

Page: 1 of 1

Reviewer: JD

2nd Reviewer: MG

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 10/27/14

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

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

Where,

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

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

Type of analysis	Analyte	Standard	Conc. (ng/mL)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	<u>Cr⁺⁶</u>	s1	0.05	0.000017	0.99994	0.99994	Y
		s2	0.1	0.0000363			
		s3	0.2	0.000079			
		s4	0.5	0.0002057			
		s5	1	0.0004097			
		s6	2	0.0008423			
<u>ICV 11:25</u> Calibration verification	<u>Cr⁺⁶</u>	<u>Found</u> 0.5105ng/ml	<u>True</u> 0.5ng/ml		102.1%R	102.1%R	↓
<u>CCV 12:24</u> Calibration verification	<u>Cr⁺⁶</u>	0.5091ng/ml	0.5ng/ml		101.8%R	101.8%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 11:54	Laboratory control sample	Cr ⁺⁶	1.07 ng/ml	1 ng/ml	107%R	107%R	y
	Matrix spike sample		(SSR-SR)				
Dup 12:57	Duplicate sample	Cr ⁺⁶	0.0546 ng/ml ³	0.0507 ng/ml ³	7.41 %RPD	7.45 %RPD	y

Comments: _____

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method see cover

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

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

Compound (analyte) results for Cr⁺⁶ (4) reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1$
 $C_0 = -6.2E-06$
 $C_1 = 0.0004227$
 $A = 0.0000366$

$V = 10 \text{ ml}$
 $m^3 = 21.96$
 $(\text{ng/ml})(\text{L})$
 m^3

Recalculation: $(0.0000366 - (-6.2E-06)) / 0.0004227 = 0.1013 \text{ ng/ml}$
 $(0.1013 \text{ ng/ml})(10 \text{ ml}) / 21.96 \text{ m}^3 = 0.0461 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0113	0.0113	Y
	2	↓	ND	ND	↓
	3		0.0507	0.0507	↓
	4		0.0461	0.0461	↓
	5		0.0348	0.0347	Y*
	6		ND	ND	Y
	7		0.0367	0.0366	Y*
	8		ND	ND	Y
	9		ND	ND	↓

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: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4102421-01

Sampled: 10/23/14 16:00

Matrix: Air

Sample Volume: 21.72 m³

Received: 10/24/14 11:40

Comments: Start Time 10/22/14 15:52

Analysis Date: 10/27/14 13:29

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	0.0113		0.0036

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FILE #: 3926.00

REPORTED: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4102421-02	Sampled: 10/23/14 16:18
Matrix: Air	Sample Volume: 21.7 m ³	Received: 10/24/14 11:40
Comments: Start Time 10/22/14 16:11		Analysis Date: 10/27/14 13:39

Hexavalent Chromium

Results

MDL

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

pk
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REPORTED: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4102421-03

Sampled: 10/23/14 17:10

Matrix: Air

Sample Volume: 21.93 m³

Received: 10/24/14 11:40

Comments: Col 1 Start Time 10/22/14 16:48

Analysis Date: 10/27/14 12:47

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	0.0507		0.0036

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FILE #: 3926.00

REPORTED: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4102421-04	Sampled: 10/23/14 17:15
Matrix: Air	Sample Volume: 21.96 m ³	Received: 10/24/14 11:40
Comments: Col 2 Start Time 10/22/14 16:51		Analysis Date: 10/27/14 13:07

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0461		0.0036

KK
10/30/14



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FILE #: 3926.00

REPORTED: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4102421-05	Sampled: 10/23/14 16:58
Matrix: Air	Sample Volume: 21.87 m ³	Received: 10/24/14 11:40
Comments: Start Time 10/22/14 16:40		Analysis Date: 10/27/14 13:49

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	0.0348		0.0036

kk
10/30/14



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FILE #: 3926.00

REPORTED: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4102421-06	Sampled: 10/23/14 16:48
Matrix: Air	Sample Volume: 21.84 m ³	Received: 10/24/14 11:40
Comments: Start Time 10/22/14 16:32		Analysis Date: 10/27/14 13:59

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
10/30/14

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FILE #: 3926.00

REPORTED: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4102421-07	Sampled: 10/23/14 16:28
Matrix: Air	Sample Volume: 21.65 m ³	Received: 10/24/14 11:40
Comments: Start Time 10/22/14 16:25		Analysis Date: 10/27/14 14:09

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0367		0.0036

PK
10-23-14

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FILE #: 3926.00

REPORTED: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4102421-08	Sampled: 10/23/14 00:00
Matrix: Air	Sample Volume: 21.87 m ³	Received: 10/24/14 11:40
Comments:		Analysis Date: 10/27/14 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

kk
10/30/14

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: 10/30/14 12:39

SUBMITTED: 10/24/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4102421-09	Sampled: 10/23/14 00:00
Matrix: Air	Sample Volume: 21.84 m ³	Received: 10/24/14 11:40
Comments:		Analysis Date: 10/27/14 14:49

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

KB
10/30/14

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

November 11, 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 November 10, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33053:

SDG

Fraction

4102826

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: October 24 through October 27, 2014
LDC Report Date: November 10, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4102826

Sample Identification

OAM 1(10/24/14) PAM-1(10/27/14)DUP
OAM 2(10/24/14) PAM-1D(10/27/14)DUP
PAM-1(10/24/14)
PAM-1D(10/24/14)
PAM-2(10/24/14)
PAM-3(10/24/14)
PAM-4(10/24/14)
PAM-21(10/24/14)
PAM-31(10/24/14)
OAM 1(10/27/14)
OAM 2(10/27/14)
PAM-1(10/27/14)
PAM-1D(10/27/14)
PAM-2(10/27/14)
PAM-3(10/27/14)
PAM-4(10/27/14)
PAM-21(10/27/14)
PAM-31(10/27/14)
PAM-1(10/24/14)DUP
PAM-1D(10/24/14)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(10/24/14) and PAM-31(10/27/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(10/24/14) and PAM-21(10/27/14) 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(10/24/14) and PAM-1D(10/24/14) and samples PAM-1(10/27/14) and PAM-1D(10/27/14) 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(10/24/14)	PAM-1D(10/24/14)			
Hexavalent chromium	0.0229	0.0190	19 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/27/14)	PAM-1D(10/27/14)			
Hexavalent chromium	0.0843	0.101	18 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4102826**

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
4102826**

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 4102826**

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

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: 10/24/14, 10/27/14
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 ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples: *Airs*

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

Notes: _____

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? <u>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 waters and ≤ 35% for soil samples? A control limit of ≤ CRDL (≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	/			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

VALIDATION FINDINGS CHECKLIST

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

LDC# 33053A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0229	0.0190	19	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0843	0.101	18	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33053A6.wpd

LDC #: 33053A6

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 10/29/14

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

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

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	Cr ⁺⁶	s1	0.50	0.0000157	1.00000	1.00000	Y
		s2	0.10	0.0000372			
		s3	0.20	0.0000787			
		s4	0.50	0.0002074			
		s5	1.00	0.0004191			
		s6	2.00	0.0008443			
ICV 11:05 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5116 ng/ml	<u>True</u> 0.5 ng/ml		102.3%R	102.3%R	↓
CCV 12:05 Calibration verification	Cr ⁺⁶	0.5116 ng/ml	0.5 ng/ml		102.3%R	102.3%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.

LDC #: 33053A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 11:35	Laboratory control sample	Cr ²⁺	1.11 ng/ml	1 ng/ml	111%R	111%R	Y
	Matrix spike sample		(SSR-SR)				
DUP	Duplicate sample	Cr ²⁺	0.0233 ng/ml ³	0.0229 ng/ml ³	1.73%RPD	2.05%RPD	Y

Comments: _____

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method See Cover

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

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

Compound (analyte) results for (16) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1 \times V_f$ $m^3 = 20.93$ Recalculation: $(0.0001231 - (-5.58E-06)) / 0.0004249 = 0.3028 \text{ ng/ml}$

$A = 0.0001231$
 $C_0 = -5.58E-06$
 $C_1 = 0.0004249$

$\text{ng/ml} = \frac{(\text{ng/ml})(10 \text{ ml})}{m^3}$ $(0.3028 \text{ ng/ml})(10 \text{ ml}) / 20.93 m^3 = 0.145 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	ND	ND	Y
	2		ND	ND	↓
	3		0.0229	0.0229	↓
	4		0.0190	0.0190	↓
	5		0.0140	0.0141	Y*
	6		0.0107	0.0107	Y
	7		0.0605	0.0604	Y*
	8		ND	ND	Y
	9		ND	ND	↓
	10		0.0202	0.0202	↓
	11		0.0314	0.0315	Y*
	12		0.0843	0.0843	Y
	13		0.101	0.101	↓
	14		0.0616	0.0616	↓
	15		0.0277	0.0278	Y*
	16		0.145	0.145	Y
	17		ND	ND	↓
	18		ND	ND	↓

Note: *Rounding



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ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4102826-01

Sampled: 10/24/14 15:45

Matrix: Air

Sample Volume: 21.31 m³

Received: 10/28/14 10:51

Comments: Start Time 10/23/14 16:05

Analysis Date: 10/29/14 13:45

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	ND	U	0.0036

NOV 10 2014

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4102826-02

Sampled: 10/24/14 15:59

Matrix: Air

Sample Volume: 21.25 m³

Received: 10/28/14 10:51

Comments: Start Time 10/23/14 16:22

Analysis Date: 10/29/14 13:55

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

NOV 10 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4102826-03	Sampled: 10/24/14 16:37
Matrix: Air	Sample Volume: 21.06 m ³	Received: 10/28/14 10:51
Comments: Col 1 Start Time 10/23/14 17:13		Analysis Date: 10/29/14 12:25

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	0.0229		0.0036

NOV 10 2014

Initials: *CR*



CERTIFICATE OF ANALYSIS

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FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4102826-04	Sampled: 10/24/14 16:41
Matrix: Air	Sample Volume: 21.04 m ³	Received: 10/28/14 10:51
Comments: Col 2 Start Time 10/23/14 17:18		Analysis Date: 10/29/14 12:44

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	0.0190		0.0036

NOV 10 2014

Initials: *CR*

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FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4102826-05	Sampled: 10/24/14 16:27
Matrix: Air	Sample Volume: 21.07 m ³	Received: 10/28/14 10:51
Comments: Start Time 10/23/14 17:02		Analysis Date: 10/29/14 14:24

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	0.0140		0.0036

NOV 10 2014

Initials: *CR*



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FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4102826-06

Sampled: 10/24/14 16:18

Matrix: Air

Sample Volume: 21.09 m³

Received: 10/28/14 10:51

Comments: Start Time 10/23/14 16:51

Analysis Date: 10/29/14 14:34

Hexavalent Chromium

Results

MDL

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

NOV 10 2014

Initials: *CR*

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4102826-07

Sampled: 10/24/14 16:11

Matrix: Air

Sample Volume: 21.29 m³

Received: 10/28/14 10:51

Comments: Start Time 10/23/14 16:32

Analysis Date: 10/29/14 14:44

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	0.0605		0.0036

NOV 10 2014

Initials: *CR*

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4102826-08

Sampled: 10/24/14 00:00

Matrix: Air

Sample Volume: 21.07 m³

Received: 10/28/14 10:51

Comments:

Analysis Date: 10/29/14 14:54

Hexavalent Chromium

Results

MDL

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

NOV 10 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: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4102826-09

Sampled: 10/24/14 00:00

Matrix: Air

Sample Volume: 21.09 m³

Received: 10/28/14 10:51

Comments:

Analysis Date: 10/29/14 15:04

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

ND

U

0.0036

NOV 10 2014

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4102826-10	Sampled: 10/27/14 15:55
Matrix: Air	Sample Volume: 20.86 m ³	Received: 10/28/14 10:51
Comments: Start Time 10/26/14 16:44		Analysis Date: 10/29/14 15:14

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	0.0202		0.0036

NOV 10 2014

Initials: *CR*

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

ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4102826-11	Sampled: 10/27/14 16:12
Matrix: Air	Sample Volume: 20.86 m ³	Received: 10/28/14 10:51
Comments: Start Time 10/26/14 17:02		Analysis Date: 10/29/14 15:24

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	0.0314		0.0036

NOV 10 2014

Initials: CR

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4102826-12

Sampled: 10/27/14 17:22

Matrix: Air

Sample Volume: 21.04 m³

Received: 10/28/14 10:51

Comments: Col 1 Start Time 10/26/14 17:59

Analysis Date: 10/29/14 13:04

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0843		0.0036

NOV 10 2014

Initials: *CR*

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4102826-13

Sampled: 10/27/14 17:27

Matrix: Air

Sample Volume: 20.88 m³

Received: 10/28/14 10:51

Comments: Col 2 Start Time 10/26/14 18:15

Analysis Date: 10/29/14 13:24

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.101		0.0036

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

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4102826-14	Sampled: 10/27/14 17:06
Matrix: Air	Sample Volume: 21.04 m ³	Received: 10/28/14 10:51
Comments: Start Time 10/26/14 17:43		Analysis Date: 10/29/14 15:34

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	0.0616		0.0036

NOV 10 2014

Initials: CR

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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: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4102826-15	Sampled: 10/27/14 16:54
Matrix: Air	Sample Volume: 21.01 m ³	Received: 10/28/14 10:51
Comments: Start Time 10/26/14 17:33		Analysis Date: 10/29/14 15:44

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	0.0277		0.0036

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Initials: *CR*

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4102826-16

Sampled: 10/27/14 16:32

Matrix: Air

Sample Volume: 20.93 m³

Received: 10/28/14 10:51

Comments: Start Time 10/26/14 17:17

Analysis Date: 10/29/14 15:54

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.145		0.0036

NOV 10 2014

Initials: *CR*

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4102826-17

Sampled: 10/27/14 00:00

Matrix: Air

Sample Volume: 21.04 m³

Received: 10/28/14 10:51

Comments:

Analysis Date: 10/29/14 16:23

Hexavalent Chromium

Results

MDL

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

NOV 10 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: 11/04/14 10:07

SUBMITTED: 10/28/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4102826-18

Sampled: 10/27/14 00:00

Matrix: Air

Sample Volume: 21.01 m³

Received: 10/28/14 10:51

Comments:

Analysis Date: 10/29/14 16:33

Hexavalent Chromium

Results

MDL

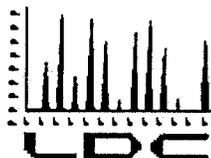
<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0036

NOV 10 2014

Initials: *ER*

Eastern Research Group

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LABORATORY DATA CONSULTANTS, INC.

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

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

November 7, 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 November 6, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33026:

SDG

Fraction

4103006

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: October 28 through October 29, 2014
LDC Report Date: November 6, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4103006

Sample Identification

OAM 1(10/28/14)	PAM-1(10/29/14)DUP
OAM 2(10/28/14)	PAM-1D(10/29/14)DUP
PAM-1(10/28/14)	
PAM-1D(10/28/14)	
PAM-2(10/28/14)	
PAM-3(10/28/14)	
PAM-4(10/28/14)	
PAM-21(10/28/14)	
PAM-31(10/28/14)	
OAM 1(10/29/14)	
OAM 2(10/29/14)	
PAM-1(10/29/14)	
PAM-1D(10/29/14)	
PAM-2(10/29/14)	
PAM-3(10/29/14)	
PAM-4(10/29/14)	
PAM-21(10/29/14)	
PAM-31(10/29/14)	
PAM-1(10/28/14)DUP	
PAM-1D(10/28/14)DUP	

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

Introduction

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

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

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Blanks

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

Samples PAM-31(10/28/14) and PAM-31(10/29/14) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(10/28/14) and PAM-21(10/29/14) were identified as field blanks. No hexavalent chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

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

VI. Duplicates

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

VII. Laboratory Control Samples

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

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

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

X. Field Duplicates

Samples PAM-1(10/28/14) and PAM-1D(10/28/14) and samples PAM-1(10/29/14) and PAM-1D(10/29/14) were identified as field duplicates. No hexavalent chromium was detected in any of the samples with the following exceptions:

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/28/14)	PAM-1D(10/28/14)			
Hexavalent chromium	0.0623	0.0606	3 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(10/29/14)	PAM-1D(10/29/14)			
Hexavalent chromium	0.0506	0.0603	17 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4103006**

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
4103006**

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 4103006**

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

LDC #: 33026A6

VALIDATION COMPLETENESS WORKSHEET

Date: 11/6/14

SDG #: 4103006

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: [Signature]

METHOD: Hexavalent Chromium (ASTM D7614)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/28-29/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	FD=(3,4) (12,13)
XI	Field blanks	ND	FB=(8)(17) TB=(9)(18)

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Airs

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

Notes: _____

Method: Inorganics (EPA Method see later)

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

VALIDATION 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were detection limits < RL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field duplicates.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
X. Field blanks				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field blanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

LDC# 33026A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0623	0.0606	3	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0506	0.0603	17	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33026A6.wpd

LDC #: 3302016

**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 C_{Cr+6} was recalculated. Calibration date: 11/03/14

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

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$
 Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	C _{Cr+6}	s1	0.05	0.0000158	0.99968	0.99968	Y ↓
		s2	0.1	0.0000363			
		s3	0.2	0.0000733			
		s4	0.5	0.0001973			
		s5	1	0.000388			
		s6	2	0.0008219			
ICV 11:18 Calibration verification	C _{Cr+6}	<u>Found</u> 0.4727 ng/ml	<u>True</u> 0.5 ng/ml		94.5%R	94.5%R	
CCV 12:18 Calibration verification	C _{Cr+6}	0.4897 ng/ml	0.5 ng/ml		97.9%R	97.9%R	
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See lower

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
<u>LS</u> <u>11-48</u>	Laboratory control sample	<u>Cr⁺⁶</u>	<u>1.07 ng/ml</u>	<u>1 ng/ml</u>	<u>107%R</u>	<u>107</u> <u>105%R</u> <u>30</u>	<u>Y</u>
<u>N</u>	Matrix spike sample		(SSR-SR)				
<u>Dup</u>	Duplicate sample	<u>Cr⁺⁶</u>	<u>0.0694 ng/m³</u>	<u>0.0623 ng/m³</u>	<u>10.8%RPD</u>	<u>10.8%RPD</u>	<u>Y</u>

Comments: _____

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method See Cover

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

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

Compound (analyte) results for (1) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1$ VA = 10 ml Recalculation: $(0.0000516 - (-8.76E-6)) / 0.0004118 = 0.1466 \text{ ng/ml}$
m³ = 21.68 $(0.1446 \text{ ng/ml})(10 \text{ ml}) / 21.68 \text{ m}^3 = 0.0676 \text{ ng/m}^3$
 $C_0 = -8.76E-6$ $(\text{ng/ml})(\text{ul}) / \text{m}^3 = \text{ng/m}^3$
 $C_1 = 0.0004118$
 $A = 0.0000516$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0676	0.0676	Y
	2	↓	0.0436	0.0435	Y*
	3		0.0623	0.0623	Y
	4		0.0606	0.0605	Y*
	5		0.0712	0.0712	Y
	6		0.0668	0.0668	↓
	7		0.0795	0.0795	↓
	8		ND	ND	↓
	9		ND	ND	↓
	10		0.0339	0.0338	Y*
	11		0.0402	0.0402	Y
	12		0.0506	0.0506	↓
	13		0.0603	0.0603	↓
	14		0.0412	0.0412	↓
	15		0.0342	0.0342	↓
	16		0.0910	0.0910	↓
	17		ND	ND	↓
	18		ND	ND	↓

Note: *Rounding



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: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 4103006-01

Sampled: 10/28/14 16:04

Matrix: Air

Sample Volume: 21.68 m³

Received: 10/30/14 10:21

Comments: Start Time 10/27/14 15:59

Analysis Date: 11/03/14 13:58

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0676		0.0036

NOV 06 2014

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 4103006-02	Sampled: 10/28/14 16:22
Matrix: Air	Sample Volume: 21.67 m ³	Received: 10/30/14 10:21
Comments: Start Time 10/27/14 16:16		Analysis Date: 11/03/14 14:08

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0436		0.0036

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4103006-03

Sampled: 10/28/14 17:14

Matrix: Air

Sample Volume: 21.42 m³

Received: 10/30/14 10:21

Comments: Col 1 Start Time 10/27/14 17:26

Analysis Date: 11/03/14 12:38

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0623		0.0036

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4103006-04	Sampled: 10/28/14 17:19
Matrix: Air	Sample Volume: 21.42 m ³	Received: 10/30/14 10:21
Comments: Col 2 Start Time 10/27/14 17:31		Analysis Date: 11/03/14 12:58

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	0.0606		0.0036

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Initials: *CR*



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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4103006-05

Sampled: 10/28/14 16:58

Matrix: Air

Sample Volume: 21.4 m³

Received: 10/30/14 10:21

Comments: Start Time 10/27/14 17:11

Analysis Date: 11/03/14 14:38

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0712		0.0036

NOV 06 2014

Initials: *ER*

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4103006-06

Sampled: 10/28/14 16:44

Matrix: Air

Sample Volume: 21.39 m³

Received: 10/30/14 10:21

Comments: Start Time 10/27/14 16:57

Analysis Date: 11/03/14 16:57

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0668		0.0036

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4103006-07

Sampled: 10/28/14 16:35

Matrix: Air

Sample Volume: 21.59 m³

Received: 10/30/14 10:21

Comments: Start Time 10/27/14 16:36

Analysis Date: 11/03/14 14:58

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0795		0.0036

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4103006-08

Sampled: 10/28/14 00:00

Matrix: Air

Sample Volume: 21.4 m³

Received: 10/30/14 10:21

Comments:

Analysis Date: 11/03/14 15:08

Hexavalent Chromium

Results

MDL

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

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4103006-09

Sampled: 10/28/14 00:00

Matrix: Air

Sample Volume: 21.39 m³

Received: 10/30/14 10:21

Comments:

Analysis Date: 11/03/14 15:18

Hexavalent Chromium

Results

MDL

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

NOV 06 2014

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4103006-10	Sampled: 10/29/14 16:10
Matrix: Air	Sample Volume: 21.65 m ³	Received: 10/30/14 10:21
Comments: Start Time 10/28/14 16:07		Analysis Date: 11/03/14 15:28

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	0.0339		0.0036

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Initials: ER



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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4103006-11

Sampled: 10/29/14 16:25

Matrix: Air

Sample Volume: 21.6 m³

Received: 10/30/14 10:21

Comments: Start Time 10/28/14 16:25

Analysis Date: 11/03/14 15:37

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0402		0.0036

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Initials: CR

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 4103006-12

Sampled: 10/29/14 17:29

Matrix: Air

Sample Volume: 21.77 m³

Received: 10/30/14 10:21

Comments: Col 1 Start Time 10/28/14 17:18

Analysis Date: 11/03/14 13:18

Hexavalent Chromium

Results

MDL

<u>Analyte</u>	<u>CAS Number</u>	<u>ng/m³ Air</u>	<u>Flag</u>	<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0506		0.0036

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Initials: *CR*

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 4103006-13

Sampled: 10/29/14 17:34

Matrix: Air

Sample Volume: 21.77 m³

Received: 10/30/14 10:21

Comments: Col 2 Start Time 10/28/14 17:22

Analysis Date: 11/03/14 13:37

Hexavalent Chromium

Results

MDL

Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0603		0.0036

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 4103006-14

Sampled: 10/29/14 17:14

Matrix: Air

Sample Volume: 21.78 m³

Received: 10/30/14 10:21

Comments: Start Time 10/28/14 17:01

Analysis Date: 11/03/14 15:47

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0412

0.0036

NOV 06 2014

Initials: *CR*

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ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 4103006-15

Sampled: 10/29/14 16:58

Matrix: Air

Sample Volume: 21.76 m³

Received: 10/30/14 10:21

Comments: Start Time 10/28/14 16:47

Analysis Date: 11/03/14 15:57

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	0.0342		0.0036

NOV 06 2014

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 4103006-16	Sampled: 10/29/14 16:43
Matrix: Air	Sample Volume: 21.66 m ³	Received: 10/30/14 10:21
Comments: Start Time 10/28/14 16:39		Analysis Date: 11/03/14 16:07

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0910		0.0036

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 4103006-17

Sampled: 10/29/14 00:00

Matrix: Air

Sample Volume: 21.78 m³

Received: 10/30/14 10:21

Comments:

Analysis Date: 11/03/14 16:37

Hexavalent Chromium

Results

MDL

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

NOV 06 2014

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FILE #: 3926.00

REPORTED: 11/06/14 07:11

SUBMITTED: 10/30/14

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 4103006-18

Sampled: 10/29/14 00:00

Matrix: Air

Sample Volume: 21.76 m³

Received: 10/30/14 10:21

Comments:

Analysis Date: 11/03/14 16:47

Hexavalent Chromium

Results

MDL

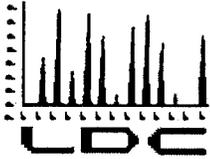
Analyte	CAS Number	ng/m ³ Air	Flag	ng/m ³ Air
Hexavalent Chromium	1854-02-99	ND	U	0.0036

NOV 06 2014

Initials: ER

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LABORATORY DATA CONSULTANTS, INC.

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

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

November 11, 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 November 7, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33039:

SDG

4103112

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: October 30, 2014
LDC Report Date: November 10, 2014
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 4103112

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) 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	0.0217	0.0218	0 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 4103112**

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
4103112**

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 4103112**

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

LDC #: 33039A6

VALIDATION COMPLETENESS WORKSHEET

SDG #: 4103112

Level IV

Laboratory: Eastern Research Group

Date: 11/7/14

Page: 1 of 1

Reviewer: JD

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: 10/30/14
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: Aurs

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.			/	
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# 33039A6

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	0.0217	0.0218	0	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33039A6.wpd

LDC #: 3353A16

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

Page: 1 of 1

Reviewer: SD

2nd Reviewer: SE

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C⁺⁶ was recalculated. Calibration date: 11/4/14

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

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

Where,

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

Type of analysis	Analyte	Standard	Conc. (ng/ml)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	C ⁺⁶	s1	0.50	0.0000139	0.99988	0.99989	y
		s2	0.10	0.0000321			
		s3	0.20	0.0000723			
		s4	0.50	0.0001953			
		s5	1.00	0.0004103			
		s6	2.00	0.0008056			
ICV 11:03 Calibration verification	C ⁺⁶	<u>Found</u> 0.5157ng/ml	<u>True</u> 0.5ng/ml		103.1%R	103.1%R	↓
CCV 12:17 Calibration verification	C ⁺⁶	0.5287ng/ml	0.5ng/ml		105.7%R	105.7%R	
Calibration verification							

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

LDC #: 33039A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 11:33	Laboratory control sample	Cr^{+6}	1.087 ng/ml	1.00 ng/ml	109%R	109%R	Y
N	Matrix spike sample		(SSR-SR)				
Dup 12:47	Duplicate sample	Cr^{+6}	0.0236 ng/ml ³	0.0218 ng/ml ³	7.93%RPD	8.41%RPD	Y

Comments: *Ranking



CERTIFICATE OF ANALYSIS

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: 11/07/14 09:59

SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 4103112-01	Sampled: 10/30/14 16:11
Matrix: Air	Sample Volume: 21.56 m ³	Received: 10/31/14 10:46
Comments: Start Time 10/29/14 16:14		Analysis Date: 11/04/14 14:05

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	0.0166		0.0036

NOV 10 2014

Initials: *ER*

Eastern Research Group

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SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 4103112-02

Sampled: 10/30/14 16:31

Matrix: Air

Sample Volume: 21.63 m³

Received: 10/31/14 10:46

Comments: Start Time 10/29/14 16:29

Analysis Date: 11/04/14 14:15

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	0.0204		0.0036

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SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 4103112-03	Sampled: 10/30/14 17:27
Matrix: Air	Sample Volume: 21.51 m ³	Received: 10/31/14 10:46
Comments: Col 1 Start Time 10/29/14 17:33		Analysis Date: 11/04/14 12:37

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0217		0.0036

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SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 4103112-04	Sampled: 10/30/14 17:32
Matrix: Air	Sample Volume: 21.53 m ³	Received: 10/31/14 10:46
Comments: Col 2 Start Time 10/29/14 17:37		Analysis Date: 11/04/14 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	0.0218		0.0036

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REPORTED: 11/07/14 09:59

SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 4103112-05	Sampled: 10/30/14 17:14
Matrix: Air	Sample Volume: 21.55 m ³	Received: 10/31/14 10:46
Comments: Start Time 10/29/14 17:18		Analysis Date: 11/04/14 14:25

Hexavalent Chromium

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0324		0.0036

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REPORTED: 11/07/14 09:59

SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 4103112-06	Sampled: 10/30/14 17:04
Matrix: Air	Sample Volume: 21.64 m ³	Received: 10/31/14 10:46
Comments: Start Time 10/29/14 17:01		Analysis Date: 11/04/14 14:34

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	0.0156		0.0036

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REPORTED: 11/07/14 09:59

SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 4103112-07

Sampled: 10/30/14 16:48

Matrix: Air

Sample Volume: 21.62 m³

Received: 10/31/14 10:46

Comments: Start Time 10/29/14 16:47

Analysis Date: 11/04/14 14:44

Hexavalent Chromium

Results

MDL

Analyte

CAS Number

ng/m³ Air

Flag

ng/m³ Air

Hexavalent Chromium

1854-02-99

0.0232

0.0036

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FILE #: 3926.00

REPORTED: 11/07/14 09:59

SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 4103112-08	Sampled: 10/30/14 00:00
Matrix: Air	Sample Volume: 21.55 m ³	Received: 10/31/14 10:46
Comments:		Analysis Date: 11/04/14 14:54

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

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FILE #: 3926.00

REPORTED: 11/07/14 09:59

SUBMITTED: 10/31/14

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 4103112-09	Sampled: 10/30/14 00:00
Matrix: Air	Sample Volume: 21.64 m ³	Received: 10/31/14 10:46
Comments:		Analysis Date: 11/04/14 15:24

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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