



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

March 13, 2015

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 March 12, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33874:

SDG

Fraction

503033/5030424/5030924/5031028 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: March 2 through March 5, 2015
LDC Report Date: March 13, 2015
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 5030333/5030424/5030924/5031028

Sample Identification

OAM 1 (03/02/15)	PAM-1 (03/04/15)
OAM 2 (03/02/15)	PAM-1D (03/04/15)
PAM-1 (03/02/15)	PAM-2 (03/04/15)
PAM-1D (03/02/15)	PAM-3 (03/04/15)
PAM-2 (03/02/15)	PAM-4 (03/04/15)
PAM-3 (03/02/15)	PAM-21 (03/04/15)
PAM-4 (03/02/15)	PAM-31 (03/04/15)
PAM-21 (03/02/15)	PAM-1 (03/05/15)
PAM-31 (03/02/15)	PAM-1D (03/05/15)
OAM 1 (03/03/15)	PAM-3 (03/05/15)
OAM 2 (03/03/15)	PAM-4 (03/05/15)
PAM-1 (03/03/15)	PAM-21 (03/05/15)
PAM-1D (03/03/15)	PAM-31 (03/05/15)
PAM-2 (03/03/15)	PAM-1 (03/02/15)DUP
PAM-3 (03/03/15)	PAM-1D (03/02/15)DUP
PAM-4 (03/03/15)	PAM-1 (03/03/15)DUP
PAM-21 (03/03/15)	PAM-1D (03/03/15)DUP
PAM-31 (03/03/15)	PAM-1 (03/04/15)DUP
OAM 1 (03/04/15)	PAM-1D (03/04/15)DUP
OAM 2 (03/04/15)	PAM-1 (03/05/15)DUP
	PAM-1D (03/05/15)DUP

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

Introduction

This data review covers 41 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 (03/02/15), PAM-31 (03/03/15), PAM-31 (03/04/15), and PAM-31 (03/05/15) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (03/02/15), PAM-21 (03/03/15), PAM-21 (03/04/15), and PAM-21 (03/05/15) 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 (03/02/15) and PAM-1D (03/02/15), samples PAM-1 (03/03/15) and PAM-1D (03/03/15), samples PAM-1 (03/04/15) and PAM-1D (03/04/15), and samples PAM-1 (03/05/15) and PAM-1D (03/05/15) 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 (03/02/15)	PAM-1D (03/02/15)			
Hexavalent chromium	0.0190	0.0227	18 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (03/03/15)	PAM-1D (03/03/15)			
Hexavalent chromium	0.0398	0.0192	70 (≤20)	J (all detects)	A

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (03/04/15)	PAM-1D (03/04/15)			
Hexavalent chromium	0.0924	0.0768	18 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (03/05/15)	PAM-1D (03/05/15)			
Hexavalent chromium	0.114	0.127	11 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG
5030333/5030424/5030924/5031028**

SDG	Sample	Analyte	Flag	A or P	Reason
5030333/ 5030424/ 5030924/ 5031028	OAM 2 (03/03/15) PAM-1 (03/03/15) PAM-1D (03/03/15) PAM-3 (03/03/15) PAM-4 (03/03/15)	Hexavalent chromium	J (all detects)	A	Field duplicates (RPD)

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG
5030333/5030424/5030924/5031028**

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
5030333/5030424/5030924/5031028**

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

LDC #: 33874A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/2/15

SDG #: 5030333/5030424/5030924/5031028

Level IV

Page: 1 of 2

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: al**METHOD: (Analyte) 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.	Sample receipt/Technical holding times	A	03/02-05/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	FB=(8)(17)(23) ⁵⁰ (26)(32) TB=(9)(18)(21) (33)
VI.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS10
IX.	Field duplicates	SW	FD=(3,4)(12,13)(21,22)(28,29)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

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

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	OAM 1 (03/02/15)	5030333-19	Air	03/02/15
2	OAM 2 (03/02/15)	5030333-20	Air	03/02/15
3	PAM-1 (03/02/15)	5030333-21	Air	03/02/15
4	PAM-1D (03/02/15)	5030333-22	Air	03/02/15
5	PAM-2 (03/02/15)	5030333-23	Air	03/02/15
6	PAM-3 (03/02/15)	5030333-24	Air	03/02/15
7	PAM-4 (03/02/15)	5030333-25	Air	03/02/15
8	PAM-21 (03/02/15)	5030333-26	Air	03/02/15
9	PAM-31 (03/02/15)	5030333-27	Air	03/02/15
10	OAM 1 (03/03/15)	5030424-01	Air	03/03/15
11	OAM 2 (03/03/15)	5030424-02	Air	03/03/15
12	PAM-1 (03/03/15)	5030424-03	Air	03/03/15
13	PAM-1D (03/03/15)	5030424-04	Air	03/03/15
14	PAM-2 (03/03/15)	5030424-05	Air	03/03/15
15	PAM-3 (03/03/15)	5030424-06	Air	03/03/15
16	PAM-4 (03/03/15)	5030424-07	Air	03/03/15
17	PAM-21 (03/03/15)	5030424-08	Air	03/03/15

LDC #: 33874A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/12/15

SDG #: 5030333/5030424/5030924/5031028

Level IV

Page: 2 of 2

Laboratory: Eastern Research Group

Reviewer: *SD*

2nd Reviewer: *AV*

METHOD: (Analyte) Hexavalent Chromium (ASTM D7614)

	Client ID	Lab ID	Matrix	Date
18	PAM-31 (03/03/15)	5030424-09	Air	03/03/15
19	OAM 1 (03/04/15)	5030924-01	Air	03/04/15
20	OAM 2 (03/04/15)	5030924-02	Air	03/04/15
21	PAM-1 (03/04/15)	5030924-03	Air	03/04/15
22	PAM-1D (03/04/15)	5030924-04	Air	03/04/15
23	PAM-2 (03/04/15)	5030924-05	Air	03/04/15
24	PAM-3 (03/04/15)	5030924-06	Air	03/04/15
25	PAM-4 (03/04/15)	5030924-07	Air	03/04/15
26	PAM-21 (03/04/15)	5030924-08	Air	03/04/15
27	PAM-31 (03/04/15)	5030924-09	Air	03/04/15
28	PAM-1 (03/05/15)	5031028-03	Air	03/05/15
29	PAM-1D (03/05/15)	5031028-04	Air	03/05/15
30	PAM-3 (03/05/15)	5031028-06	Air	03/05/15
31	PAM-4 (03/05/15)	5031028-07	Air	03/05/15
32	PAM-21 (03/05/15)	5031028-08	Air	03/05/15
33	PAM-31 (03/05/15)	5031028-09	Air	03/05/15
34	PAM-1 (03/02/15)DUP	5030333-21DUP	Air	03/02/15
35	PAM-1D (03/02/15)DUP	5030333-22DUP	Air	03/02/15
36	PAM-1 (03/03/15)DUP	5030424-03DUP	Air	03/03/15
37	PAM-1D (03/03/15)DUP	5030424-04DUP	Air	03/03/15
38	PAM-1 (03/04/15)DUP	5030924-03DUP	Air	03/04/15
39	PAM-1D (03/04/15)DUP	5030924-04DUP	Air	03/04/15
40	PAM-1 (03/05/15)DUP	5031028-03DUP	Air	03/05/15
41	PAM-1D (03/05/15)DUP	5031028-04DUP	Air	03/05/15
42				
43				
44				
45				
46				

Notes:

Method: Inorganics (EPA Method See next)

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

VALIDATION FINDINGS CHECKLIST

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

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	3	4		
Hexavalent Chromium	0.0190	0.0227	18	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual. [*] (11-16)
	12	13		
Hexavalent Chromium	0.0398	0.0192	70	Jdet/A (det)

11-13, 15, 16

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	21	22		
Hexavalent Chromium	0.0924	0.0768	18	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	28	29		
Hexavalent Chromium	0.114	0.127	11	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33874A6.wpd

*qualify all samples on same day that are > 5x MDL

LDC #: 33874 A10

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C⁺¹⁰ was recalculated. Calibration date: 3/11/15

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 ⁺¹⁰	s1	0.05	0.0000284	0.99996	0.99996	Y
		s2	0.1	0.0000671			
		s3	0.2	0.0001424			
		s4	0.5	0.0003674			
		s5	1	0.0007291			
		s6	2	0.001493			
ICV 10:40 Calibration verification	C ⁺¹⁰	<u>Found</u> 0.5258 ng/ml	<u>True</u> 0.5 ng/ml		105.2%R	105.2%R	Y
CCV 11:39 Calibration verification	C ⁺¹⁰	0.5267 ng/ml	0.5 ng/ml		105.3%R	105.4%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 #: 33874A6

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 11:09	Laboratory control sample	Cr ⁺⁶	1.11 ug/ml	1.00 ug/ml	111%R	111%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
DUP 12:10	Duplicate sample	↓	0.0180 ug/l ³	0.0170 ug/l ³	5.41%RPD	5.85%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 (2) Cr⁶⁺ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C$
 $A = 0.0000154$
 $C_0 = -9.36E-6$
 $C = 0.000749$

$V_f = 10 \text{ ml}$
 $m^3 = 21.72$
 $(\text{ng/ml}) / (\text{cf})$
 m^3

Recalculation:
 $\frac{0.0000154 - (-9.36E-6)}{0.000749} = 0.033 \text{ ng/ml}$
 $\frac{(0.033 \text{ ng/ml})(10 \text{ ml})}{21.72 \text{ m}^3} = 0.0152 \text{ ng/l}$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁶⁺	0.0199	0.0199	y
	2		0.0152	0.0152	↓
	3		0.0190	0.0190	↓
	4		0.0227	0.0227	↓
	5		0.0209	0.0208	y*
	6		0.0149	0.0150	y*
	7		0.0262	0.0262	y
	8		ND	ND	↓
	9		ND	ND	↓
	10		0.0169	0.0169	↓
	11		0.0282	0.0282	↓
	12		0.0398	0.0397	y*
	13		0.0192	0.0192	y
	14		0.0184	0.0184	↓
	15		0.0231	0.0231	↓
	16		0.0242	0.0242	↓
	17		ND	ND	↓
	18		ND	ND	↓
	19		0.0574	0.0574	↓
	20	y	0.0817	0.0817	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 (23) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_i$ $V_f = 10 \text{ ml}$ $m^3 = 22.11$ Recalculation: $0.1595093 - (-9.59E-03)$
 $A = 0.1595093$ $C_0 = -9.59E-03$ $C_i = 0.7766611$ $\frac{(0.2177 \text{ ng/ml})(10 \text{ ml})}{22.11 \text{ m}^3} = 0.0985 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	21	Cr ⁺⁶	0.0924	0.0924	Y
	22		0.0768	0.0767	Y*
	23		0.0985	0.0985	Y
	24		0.0890	0.0890	Y
	25		0.0955	0.0955	
	26		ND	ND	
	27		ND	ND	
	28		0.114	0.114	
	29		0.127	0.127	
	30		0.0859	0.0859	
	31		0.110	0.111	Y*
	32		ND	ND	Y
	33		ND	ND	Y

Note: * Boundary



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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5030333-19

Sampled: 03/02/15 14:41

Matrix: Air

Sample Volume: 21.64 m³

Received: 03/03/15 10:58

Comments: Start Time 3/1/15 14:38

Analysis Date: 03/11/15 13:30

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0199		0.0038

MAR 13 2015

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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5030333-20

Sampled: 03/02/15 15:02

Matrix: Air

Sample Volume: 21.72 m³

Received: 03/03/15 10:58

Comments: Start Time 3/1/15 14:53

Analysis Date: 03/11/15 13:40

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0152		0.0038

MAR 13 2015

Initials: *CR*

Eastern Research Group

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5030333-21

Sampled: 03/02/15 16:07

Matrix: Air

Sample Volume: 22.05 m³

Received: 03/03/15 10:58

Comments: Col 1 Start Time 3/1/15 15:37

Analysis Date: 03/11/15 12:00

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0190		0.0038

MAR 13 2015

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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5030333-22

Sampled: 03/02/15 16:08

Matrix: Air

Sample Volume: 22.08 m³

Received: 03/03/15 10:58

Comments: Col 2 Start Time 3/1/15 15:36

Analysis Date: 03/11/15 12:20

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0227		0.0038

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Malvern, PA 19355

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5030333-23

Sampled: 03/02/15 15:41

Matrix: Air

Sample Volume: 21.82 m³

Received: 03/03/15 10:58

Comments: Start Time 3/1/15 15:27

Analysis Date: 03/11/15 14:10

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0209		0.0038

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75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5030333-25

Sampled: 03/02/15 15:18

Matrix: Air

Sample Volume: 21.75 m³

Received: 03/03/15 10:58

Comments: Start Time 3/1/15 15:08

Analysis Date: 03/11/15 14:30

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0262		0.0038

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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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5030333-26

Sampled: 03/02/15 00:00

Matrix: Air

Sample Volume: 21.82 m³

Received: 03/03/15 10:58

Comments:

Analysis Date: 03/11/15 14:40

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

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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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5030333-27

Sampled: 03/02/15 00:00

Matrix: Air

Sample Volume: 21.83 m³

Received: 03/03/15 10:58

Comments:

Analysis Date: 03/11/15 14:50

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

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75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5030424-01

Sampled: 03/03/15 14:12

Matrix: Air

Sample Volume: 21.12 m³

Received: 03/04/15 12:13

Comments: Start Time 3/2/15 14:44

Analysis Date: 03/11/15 15:00

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0169		0.0038

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5030424-02

Sampled: 03/03/15 14:29

Matrix: Air

Sample Volume: 21.07 m³

Received: 03/04/15 12:13

Comments: Start Time 3/2/15 15:04

Analysis Date: 03/11/15 15:09

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0282 <i>J</i>		0.0038

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5030424-03

Sampled: 03/03/15 15:35

Matrix: Air

Sample Volume: 21.08 m³

Received: 03/04/15 12:13

Comments: Col 1 Start Time 3/2/15 16:10

Analysis Date: 03/11/15 12:39

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0398 <i>J</i>		0.0038

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5030424-04

Sampled: 03/03/15 15:37

Matrix: Air

Sample Volume: 21.07 m³

Received: 03/04/15 12:13

Comments: Col 2 Start Time 3/2/15 16:12

Analysis Date: 03/11/15 12:59

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0192 <i>J</i>		0.0038

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5030424-05

Sampled: 03/03/15 15:21

Matrix: Air

Sample Volume: 21.25 m³

Received: 03/04/15 12:13

Comments: Start Time 3/2/15 15:45

Analysis Date: 03/11/15 15:19

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0184		0.0038

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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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5030424-06

Sampled: 03/03/15 15:12

Matrix: Air

Sample Volume: 21.23 m³

Received: 03/04/15 12:13

Comments: Start Time 3/2/15 15:37

Analysis Date: 03/11/15 15:29

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0231 <i>J</i>		0.0038

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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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5030424-07

Sampled: 03/03/15 14:43

Matrix: Air

Sample Volume: 21.02 m³

Received: 03/04/15 12:13

Comments: Start Time 3/2/15 15:22

Analysis Date: 03/11/15 15:39

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0242 <i>J</i>		0.0038

MAR 13 2015

Initials: *ER*

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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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5030424-08

Sampled: 03/03/15 00:00

Matrix: Air

Sample Volume: 21.25 m³

Received: 03/04/15 12:13

Comments:

Analysis Date: 03/11/15 16:09

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

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Malvern, PA 19355

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 5030424-09	Sampled: 03/03/15 00:00
Matrix: Air	Sample Volume: 21.23 m ³	Received: 03/04/15 12:13
Comments:		Analysis Date: 03/11/15 16:19

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5030924-01

Sampled: 03/04/15 14:45

Matrix: Air

Sample Volume: 22.05 m³

Received: 03/09/15 11:48

Comments: Start Time 3/3/15 14:15

Analysis Date: 03/11/15 14:41

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0574		0.0038

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ATTN: Mr. Jeff Boggs

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5030924-02

Sampled: 03/04/15 15:08

Matrix: Air

Sample Volume: 22.15 m³

Received: 03/09/15 11:48

Comments: Start Time 3/3/15 14:32

Analysis Date: 03/11/15 14:52

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0877		0.0038

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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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5030924-03

Sampled: 03/04/15 16:18

Matrix: Air

Sample Volume: 22.19 m³

Received: 03/09/15 11:48

Comments: Col 1 Start Time 3/3/15 15:39

Analysis Date: 03/11/15 13:15

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0924		0.0038

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5030924-04

Sampled: 03/04/15 16:20

Matrix: Air

Sample Volume: 22.2 m³

Received: 03/09/15 11:48

Comments: Col 2 Start Time 3/3/15 15:40

Analysis Date: 03/11/15 13:45

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0768		0.0038

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5030924-05

Sampled: 03/04/15 15:59

Matrix: Air

Sample Volume: 22.11 m³

Received: 03/09/15 11:48

Comments: Start Time 3/3/15 15:25

Analysis Date: 03/11/15 15:24

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0985		0.0038

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5030924-06

Sampled: 03/04/15 15:46

Matrix: Air

Sample Volume: 22.07 m³

Received: 03/09/15 11:48

Comments: Start Time 3/3/15 15:15

Analysis Date: 03/11/15 15:35

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0890		0.0038

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5030924-07

Sampled: 03/04/15 15:31

Matrix: Air

Sample Volume: 22.26 m³

Received: 03/09/15 11:48

Comments: Start Time 3/3/15 14:47

Analysis Date: 03/11/15 15:46

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0955		0.0038

MAR 13 2015

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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5030924-08

Sampled: 03/04/15 00:00

Matrix: Air

Sample Volume: 22.11 m³

Received: 03/09/15 11:48

Comments:

Analysis Date: 03/11/15 15:56

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 13 2015

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5030924-09

Sampled: 03/04/15 00:00

Matrix: Air

Sample Volume: 22.07 m³

Received: 03/09/15 11:48

Comments:

Analysis Date: 03/11/15 16:31

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

MAR 13 2015

Initials: *ER*

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5031028-03

Sampled: 03/05/15 15:47

Matrix: Air

Sample Volume: 21.08 m³

Received: 03/10/15 11:23

Comments: Col 1 Start Time 3/4/15 16:21

Analysis Date: 03/11/15 14:04

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.114		0.0038

MAR 13 2015

Initials: *CR*

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Environmental Resources Management, Inc

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5031028-04

Sampled: 03/05/15 15:49

Matrix: Air

Sample Volume: 21.08 m³

Received: 03/10/15 11:23

Comments: Col 2 Start Time 3/4/15 16:24

Analysis Date: 03/11/15 14:22

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.127		0.0038

MAR 13 2015

Initials: ER

Eastern Research Group

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Environmental Resources Management, Inc

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Malvern, PA 19355

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FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5031028-06

Sampled: 03/05/15 15:21

Matrix: Air

Sample Volume: 21.11 m³

Received: 03/10/15 11:23

Comments: Start Time 3/4/15 15:54

Analysis Date: 03/11/15 16:18

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0859		0.0038

MAR 13 2015

Initials: ER



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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5031028-07

Sampled: 03/05/15 15:06

Matrix: Air

Sample Volume: 21.18 m³

Received: 03/10/15 11:23

Comments: Start Time 3/4/15 15:34

Analysis Date: 03/11/15 16:41

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.110		0.0038

MAR 13 2015

Initials: *ER*



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Environmental Resources Management, Inc

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Malvern, PA 19355

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5031028-08

Sampled: 03/05/15 00:00

Matrix: Air

Sample Volume: 21.11 m³

Received: 03/10/15 11:23

Comments:

Analysis Date: 03/11/15 16:52

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 13 2015

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: 03/12/15 14:53

SUBMITTED: 03/03/15 to 03/10/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5031028-09

Sampled: 03/05/15 00:00

Matrix: Air

Sample Volume: 21.11 m³

Received: 03/10/15 11:23

Comments:

Analysis Date: 03/11/15 17:03

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

MAR 13 2015

Initials: *ER*

Eastern Research Group

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

Project/Site Name: Harbor Point, MD, Hexavalent Chromium Monitoring
Collection Date: March 9 through March 10, 2015
LDC Report Date: March 16, 2015
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 5031028/5031123

Sample Identification

OAM 1 (03/09/15)
OAM 2 (03/09/15)
PAM-1 (03/09/15)
PAM-1D (03/09/15)
PAM-2 (03/09/15)
PAM-3 (03/09/15)
PAM-4 (03/09/15)
PAM-21 (03/09/15)
PAM-31 (03/09/15)
OAM 1 (03/10/15)
OAM 2 (03/10/15)
PAM-1 (03/10/15)
PAM-1D (03/10/15)
PAM-2 (03/10/15)
PAM-3 (03/10/15)
PAM-4 (03/10/15)
PAM-21 (03/10/15)
PAM-31 (03/10/15)
PAM-1 (03/09/15) DUP
PAM-1D (03/09/15) DUP
PAM-1 (03/10/15) DUP
PAM-1D (03/10/15) 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(03/09/15) and PAM-31(03/10/15) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(03/09/15) and PAM-21(03/10/15) 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. Results 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(03/09/15) and PAM-1D (03/09/15) and samples PAM-1(03/10/15) and PAM-1D (03/10/15) 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(03/09/15)	PAM-1D (03/09/15)			
Hexavalent chromium	0.0693	0.0724	4 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(03/10/15)	PAM-1D (03/10/15)			
Hexavalent chromium	0.0621	0.0559	11 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 5031028/5031123**

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
5031028/5031123**

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
5031028/5031123**

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

LDC #: 33882B6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/11/15

SDG #: 5031028/5031123

Level IV

Page: 1 of 2

Laboratory: Eastern Research Group

Reviewer: JD

2nd Reviewer: [Signature]

METHOD: (Analyte) 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.	Sample receipt/Technical holding times	A	03/09/15 - 03/10/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	FB=(8)(17) TB=(9)(18)
VI.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS10
IX.	Field duplicates	SW	FD = (3,4) (12,13)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

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

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	OAM 1 (03/09/15)	5031028-10	Air	03/09/15
2	OAM 2 (03/09/15)	5031028-11	Air	03/09/15
3	PAM-1 (03/09/15)	5031028-12	Air	03/09/15
4	PAM-1D (03/09/15)	5031028-13	Air	03/09/15
5	PAM-2 (03/09/15)	5031028-14	Air	03/09/15
6	PAM-3 (03/09/15)	5031028-15	Air	03/09/15
7	PAM-4 (03/09/15)	5031028-16	Air	03/09/15
8	PAM-21 (03/09/15)	5031028-17	Air	03/09/15
9	PAM-31 (03/09/15)	5031028-18	Air	03/09/15
10	OAM 1 (03/10/15)	5031123-01	Air	03/10/15
11	OAM 2 (03/10/15)	5031123-02	Air	03/10/15
12	PAM-1 (03/10/15)	5031123-03	Air	03/10/15
13	PAM-1D (03/10/15)	5031123-04	Air	03/10/15
14	PAM-2 (03/10/15)	5031123-05	Air	03/10/15
15	PAM-3 (03/10/15)	5031123-06	Air	03/10/15
16	PAM-4 (03/10/15)	5031123-07	Air	03/10/15
17	PAM-21 (03/10/15)	5031123-08	Air	03/10/15

LDC #: 33882B6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/16/15

SDG #: 5031028/5031123

Level IV

Page: 2 of 2

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: [Signature]

METHOD: (Analyte) Hexavalent Chromium (ASTM D7614)

	Client ID	Lab ID	Matrix	Date
18	PAM-31 (03/10/15)	5031123-09	Air	03/10/15
19	PAM-1 (03/09/15) DUP	5031028-12DUP	Air	03/09/15
20	PAM-1D (03/09/15) DUP	5031028-13DUP	Air	03/09/15
21	PAM-1 (03/10/15) DUP	5031123-03DUP	Air	03/10/15
22	PAM-1D (03/10/15) DUP	5031123-04DUP	Air	03/10/15
23				
24				
25				
26				
27				

Notes: _____

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
<i>I. Technical holding times</i>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<i>II. Calibration</i>				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients ≥ 0.995 ?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? <u>85-115</u>	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
<i>III. Blanks</i>				
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.		/		
<i>IV. Matrix spike/Matrix spike duplicates and Duplicates</i>				
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>Air</i> Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\leq 2X$ 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.	/			
<i>V. Laboratory control samples</i>				
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?	/			
<i>VI. Regional Quality Assurance and Quality Control</i>				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC #: 3380286

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: 30
 2nd Reviewer: de

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	0.0693	0.0724	4	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	12	13		
Hexavalent Chromium	0.0621	0.0559	11	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33882B6.wpd

LDC #: 33882RL

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 03/12/15

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	0.0319857	0.99960	0.99960	Y
		s2	0.1	0.0728461			
		s3	0.2	0.1554074			
		s4	0.5	0.3500817			
		s5	1	0.7800158			
		s6	2	1.5875426			
ICV 11:24 Calibration verification	Cr ⁺⁶	<u>False</u> 0.5409 ng/ml	<u>True</u> 0.5 ng/ml		108.2%R	108.2%R	Y
CCV 12:28 Calibration verification	Cr ⁺⁶	0.5323 ng/ml	0.5 ng/ml		106.5%R	106.4%R	
Calibration verification							

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

LDC #: 3582360

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 11:56	Laboratory control sample	C ₅ ²⁺	1.086 ng/ml	1.00 ng/ml	109%R	109%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
DUP B:00	Duplicate sample	↓	0.0711 ng/m ³	0.0693 ng/m ³	2.56%RPD	2.56%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 (1) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A-C_0)/C_1$ $V_A = 10 \text{ ml}$ Recalculation: $\frac{0.1771970 - (-1.56E-02)}{0.7977524} = 0.2417 \text{ ng/ml}$
 $C_0 = -1.56E-02$ $m^3 = 21.09$
 $C_1 = 0.7977524$ $\frac{(\text{ng/ml})(V_A)}{m^3} = \text{ng/m}^3$ $\frac{(0.2417 \text{ ng/ml})(10 \text{ ml})}{21.09 \text{ m}^3} = 0.115 \text{ ng/m}^3$
 $A = 0.1771970$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	Cr ⁺⁶	0.115	0.115	Y	
	2	↓	0.0599	0.0599	↓	
	3		0.0693	0.0693		
	4		0.0724	0.0724		
	5		0.0695	0.0695		
	6		0.115	0.115		
	7		0.0895	0.0895		
	8		ND	ND		
	9		ND	ND		
	10		0.0492	0.0492		
	11		0.0542	0.0542		
	12		0.0621	0.0621		
	13		0.0559	0.0559		
	14		0.0481	0.0481		
	15		0.0516	0.0516		
	16		0.0772	0.0772		
	17		ND	ND		
	18		ND	ND		Y

Note: _____



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5031028-10

Sampled: 03/09/15 14:58

Matrix: Air

Sample Volume: 21.09 m³

Received: 03/10/15 11:23

Comments: Start Time 3/8/15 15:32

Analysis Date: 03/12/15 14:16

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.115		0.0038

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FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 5031028-11	Sampled: 03/09/15 15:19
Matrix: Air	Sample Volume: 21.11 m ³	Received: 03/10/15 11:23
Comments: Start Time 3/8/15 15:51		Analysis Date: 03/12/15 14:27

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0599		0.0038

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REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1	Lab ID: 5031028-12	Sampled: 03/09/15 16:03
Matrix: Air	Sample Volume: 21.11 m ³	Received: 03/10/15 11:23
Comments: Col 1 Start Time 3/8/15 16:36		Analysis Date: 03/12/15 12:50

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0693		0.0038

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1D	Lab ID: 5031028-13	Sampled: 03/09/15 16:05
Matrix: Air	Sample Volume: 21.12 m ³	Received: 03/10/15 11:23
Comments: Col 2 Start Time 3/8/15 16:36		Analysis Date: 03/12/15 13:09

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0724		0.0038

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5031028-14

Sampled: 03/09/15 15:52

Matrix: Air

Sample Volume: 21.11 m³

Received: 03/10/15 11:23

Comments: Start Time 3/8/15 16:25

Analysis Date: 03/12/15 15:22

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0695		0.0038

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FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5031028-15

Sampled: 03/09/15 15:47

Matrix: Air

Sample Volume: 21.2 m³

Received: 03/10/15 11:23

Comments: Start Time 3/8/15 16:14

Analysis Date: 03/12/15 15:10

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.115		0.0038

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FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 5031028-16	Sampled: 03/09/15 15:41
Matrix: Air	Sample Volume: 21.18 m ³	Received: 03/10/15 11:23
Comments: Start Time 3/8/15 16:09		Analysis Date: 03/12/15 15:33

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0895		0.0038

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Initials: ER

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5031028-17

Sampled: 03/09/15 00:00

Matrix: Air

Sample Volume: 21.11 m³

Received: 03/10/15 11:23

Comments:

Analysis Date: 03/12/15 15:43

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 5031028-18	Sampled: 03/09/15 00:00
Matrix: Air	Sample Volume: 21.2 m ³	Received: 03/10/15 11:23
Comments:		Analysis Date: 03/12/15 15:54

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 5031123-01	Sampled: 03/10/15 15:09
Matrix: Air	Sample Volume: 21.71 m ³	Received: 03/11/15 12:49
Comments: Start Time 3/9/15 15:01		Analysis Date: 03/12/15 16:05

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0492		0.0038

MAR 17 2015

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5031123-02

Sampled: 03/10/15 15:27

Matrix: Air

Sample Volume: 21.68 m³

Received: 03/11/15 12:49

Comments: Start Time 3/9/15 15:22

Analysis Date: 03/12/15 16:16

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0542		0.0038

MAR 17 2015

Initials: ER

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 5031123-03	Sampled: 03/10/15 16:09
Matrix: Air	Sample Volume: 21.65 m ³	Received: 03/11/15 12:49
Comments: Col 1 Start Time 3/9/15 16:06		Analysis Date: 03/12/15 13:39

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0621		0.0038

MAR 17 2015

Initials: ER

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5031123-04

Sampled: 03/10/15 16:11

Matrix: Air

Sample Volume: 21.65 m³

Received: 03/11/15 12:49

Comments: Col 2 Start Time 3/9/15 16:08

Analysis Date: 03/12/15 13:57

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0559		0.0038

MAR 17 2015

Initials: *CR*

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

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FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 5031123-05	Sampled: 03/10/15 15:56
Matrix: Air	Sample Volume: 21.61 m ³	Received: 03/11/15 12:49
Comments: Start Time 3/9/15 15:55		Analysis Date: 03/12/15 16:26

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0481		0.0038

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-3	Lab ID: 5031123-06	Sampled: 03/10/15 15:51
Matrix: Air	Sample Volume: 21.61 m ³	Received: 03/11/15 12:49
Comments: Start Time 3/9/15 15:50		Analysis Date: 03/12/15 16:37

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0516		0.0038

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

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

FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 5031123-07	Sampled: 03/10/15 15:48
Matrix: Air	Sample Volume: 21.66 m ³	Received: 03/11/15 12:49
Comments: Start Time 3/9/15 15:44		Analysis Date: 03/12/15 16:48

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0772		0.0038

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Initials: *CR*



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Malvern, PA 19355

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FILE #: 3926.00

REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21

Lab ID: 5031123-08

Sampled: 03/10/15 00:00

Matrix: Air

Sample Volume: 21.61 m³

Received: 03/11/15 12:49

Comments:

Analysis Date: 03/12/15 17:20

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

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REPORTED: 03/16/15 11:24

SUBMITTED: 03/10/15 to 03/11/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-31

Lab ID: 5031123-09

Sampled: 03/10/15 00:00

Matrix: Air

Sample Volume: 21.61 m³

Received: 03/11/15 12:49

Comments:

Analysis Date: 03/12/15 17:30

Hexavalent Chromium by SOP ERG-MOR-063

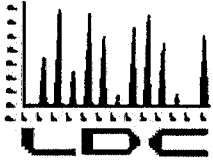
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

MAR 17 2015

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

March 19, 2015

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 March 18, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33906:

<u>SDG</u>	<u>Fraction</u>
5031209/5031313	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: March 11 through March 12, 2014
LDC Report Date: March 19, 2015
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 5031209/5031313

Sample Identification

OAM 1 (03/11/15)	PAM-1 (03/12/15)DUP
OAM 2 (03/11/15)	PAM-1D (03/12/15)DUP
PAM-1 (03/11/15)	
PAM-1D (03/11/15)	
PAM-2 (03/11/15)	
PAM-3 (03/11/15)	
PAM-4 (03/11/15)	
PAM-21 (03/11/15)	
PAM-31 (03/11/15)	
OAM 1 (03/12/15)	
OAM 2 (03/12/15)	
PAM-1 (03/12/15)	
PAM-1D (03/12/15)	
PAM-2 (03/12/15)	
PAM-3 (03/12/15)	
PAM-4 (03/12/15)	
PAM-21 (03/12/15)	
PAM-31 (03/12/15)	
PAM-1 (03/11/15)DUP	
PAM-1D (03/11/15)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 (03/11/15) and PAM-31 (03/12/15) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (03/11/15) and PAM-21 (03/12/15) 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 (03/11/15) and PAM-1D (03/11/15) and samples PAM-1 (03/12/15) and PAM-1D (03/12/15) 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)	Flag	A or P
	PAM-1 (03/11/15)	PAM-1D (03/11/15)			
Hexavalent chromium	0.0713	0.0654	9 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flag	A or P
	PAM-1 (03/12/15)	PAM-1D (03/12/15)			
Hexavalent chromium	0.0200	0.0239	18 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 5031209/5031313**

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
5031209/5031313**

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
5031209/5031313**

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

LDC #: 33906A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/18/15

SDG #: 5031209/5031313

Level IV

Page: 2 of 2

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: A

METHOD: (Analyte) Hexavalent Chromium (ASTM D7614)

	Client ID	Lab ID	Matrix	Date
18	PAM-31 (03/12/15)	5031313-09	Air	03/12/15
19	PAM-1 (03/11/15)DUP	5031209-03DUP	Air	03/11/15
20	PAM-1D (03/11/15)DUP	5031209-04DUP	Air	03/11/15
21	PAM-1 (03/12/15)DUP	5031313-03DUP	Air	03/12/15
22	PAM-1D (03/12/15)DUP	5031313-04DUP	Air	03/12/15
23				
24				
25				
26				
27				

Notes: _____

Method: Inorganics (EPA Method Soil (water))

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

LDC #: 33906A

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: SD
 2nd Reviewer: OK

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# 33906A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0713	0.0654	9	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0200	0.0239	18	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33906A6.wpd

LDC #: 35900A10

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C^{xy} was recalculated. Calibration date: 3/16/15

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 ^{xy}	s1	0.05	0.0388126	0.99997	0.99997	Y
		s2	0.1	0.0735122			
		s3	0.2	0.1526063			
		s4	0.5	0.3895493			
		s5	1	0.7718894			
		s6	2	1.5665728			
ICV 11:07 Calibration verification	C ^{xy}	<u>Found</u> 0.5527 ng/mL	<u>True</u> 0.5 ng/mL		110.5%R	110.5%R	↓
CCV 12:05 Calibration verification	C ^{xy}	0.5525 ng/mL	0.5 ng/mL		110.5%R	110.5%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 #: 33906AF

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method See Cover

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

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ 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	C ₅ ⁺	1.069 ng/ml	1.00 ng/ml	107%R	107%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
DUP 12:30	Duplicate sample	↓	0.068 ng/m ³	0.073 ng/m ³	2.13% RPD	2.11% 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 (1) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) C_1$ Recalculation: $\frac{0.056744 - (-3.97E-03)}{0.7835755} = 0.0775 \text{ ng/ml}$

$A = 0.056744$
 $C_0 = -3.97E-03$
 $C_1 = 0.7835755$

$V_f = 10 \text{ ml}$
 $m^3 = 21.11$
 $(\text{ng/ml}) (\text{ml})$
 $m^3 = \text{ng/m}^3$

$(0.0775 \text{ ng/ml}) (10 \text{ ml})$
 $21.11 \text{ m}^3 = 0.0367 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0367	0.0367	Y
	2		0.0696	0.0696	Y
	3		0.0713	0.0713	Y
	4		0.0654	0.0654	Y
	5		0.0845	0.0844	Y*
	6		0.0430	0.0430	Y
	7		0.108	0.108	Y
	8		ND	ND	Y
	9		ND	ND	Y
	10		0.0129	0.0129	Y
	11		0.0194	0.0194	Y
	12		0.0200	0.0200	Y
	13		0.0239	0.0239	Y
	14		0.0461	0.0460	Y*
	15		0.0128	0.0128	Y
	16		0.0321	0.0321	Y
	17		ND	ND	Y
	18		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: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 5031209-01	Sampled: 03/11/15 14:39
Matrix: Air	Sample Volume: 21.11 m ³	Received: 03/12/15 10:40
Comments: Start Time 3/10/15 15:12		Analysis Date: 03/16/15 13:42

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	0.0367		0.0038

MAR 19 2015

Initials: *CR*

DRAFT REPORT

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REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5031209-03

Sampled: 03/11/15 16:01

Matrix: Air

Sample Volume: 21.44 m³

Received: 03/12/15 10:40

Comments: Col 1 Start Time 3/10/15 16:12

Analysis Date: 03/16/15 12:26

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0713		0.0038

MAR 19 2015

Initials: *ER*

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REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5031209-04

Sampled: 03/11/15 16:04

Matrix: Air

Sample Volume: 21.45 m³

Received: 03/12/15 10:40

Comments: Col 2 Start Time 3/10/15 16:14

Analysis Date: 03/16/15 12:45

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0654		0.0038

MAR 19 2015

Initials: ER

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REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5031209-05

Sampled: 03/11/15 15:40

Matrix: Air

Sample Volume: 21.31 m³

Received: 03/12/15 10:40

Comments: Start Time 3/10/15 15:59

Analysis Date: 03/16/15 14:25

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0845		0.0038

MAR 19 2015

Initials: *ER*

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REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5031209-06

Sampled: 03/11/15 00:00

Matrix: Air

Sample Volume: 21.3 m³

Received: 03/12/15 10:40

Comments: Start Time 3/10/15 15:55

Analysis Date: 03/16/15 14:35

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0430		0.0038

MAR 19 2015

Initials: ER

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5031209-07

Sampled: 03/11/15 15:25

Matrix: Air

Sample Volume: 21.22 m³

Received: 03/12/15 10:40

Comments: Start Time 3/10/15 15:51

Analysis Date: 03/16/15 14:46

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.108		0.0038

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Initials: ER

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5031209-08

Sampled: 03/11/15 00:00

Matrix: Air

Sample Volume: 21.31 m³

Received: 03/12/15 10:40

Comments:

Analysis Date: 03/16/15 14:57

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 19 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5031209-09

Sampled: 03/11/15 00:00

Matrix: Air

Sample Volume: 21.3 m³

Received: 03/12/15 10:40

Comments:

Analysis Date: 03/16/15 15:07

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

MAR 19 2015

Initials: *ER*

DRAFT REPORT

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 5031313-01	Sampled: 03/12/15 14:41
Matrix: Air	Sample Volume: 21.58 m ³	Received: 03/13/15 11:44
Comments: Start Time 3/11/15 14:42		Analysis Date: 03/16/15 15:18

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0129		0.0038

MAR 19 2015

Initials: *CR*

DRAFT REPORT

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5031313-02

Sampled: 03/12/15 14:58

Matrix: Air

Sample Volume: 21.43 m³

Received: 03/13/15 11:44

Comments: Start Time 3/11/15 15:10

Analysis Date: 03/16/15 15:29

Hexavalent Chromium by SOP ERG-MOR-063

<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		0.0038

MAR 19 2015

Initials: *ER*

DRAFT REPORT

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5031313-03

Sampled: 03/12/15 16:11

Matrix: Air

Sample Volume: 21.69 m³

Received: 03/13/15 11:44

Comments: Col 1 Start Time 3/11/15 16:05

Analysis Date: 03/16/15 13:04

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0200		0.0038

MAR 19 2015

Initials: *CR*

DRAFT REPORT

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5031313-04

Sampled: 03/12/15 16:13

Matrix: Air

Sample Volume: 21.7 m³

Received: 03/13/15 11:44

Comments: Col 2 Start Time 3/11/15 16:06

Analysis Date: 03/16/15 13:23

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0239		0.0038

MAR 19 2015

Initials: ER

DRAFT REPORT

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5031313-05

Sampled: 03/12/15 15:57

Matrix: Air

Sample Volume: 21.8 m³

Received: 03/13/15 11:44

Comments: Start Time 3/11/15 15:44

Analysis Date: 03/16/15 15:39

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0461		0.0038

MAR 19 2015

Initials: *CR*

DRAFT REPORT

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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: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5031313-06

Sampled: 03/12/15 15:52

Matrix: Air

Sample Volume: 21.84 m³

Received: 03/13/15 11:44

Comments: Start Time 3/11/15 15:36

Analysis Date: 03/16/15 16:54

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0128		0.0038

MAR 19 2015

Initials: CR

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5031313-07

Sampled: 03/12/15 15:46

Matrix: Air

Sample Volume: 21.86 m³

Received: 03/13/15 11:44

Comments: Start Time 3/11/15 15:29

Analysis Date: 03/16/15 16:01

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0321		0.0038

MAR 19 2015

Initials: ER

DRAFT REPORT

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5031313-08

Sampled: 03/12/15 00:00

Matrix: Air

Sample Volume: 21.8 m³

Received: 03/13/15 11:44

Comments:

Analysis Date: 03/16/15 16:33

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 19 2015

Initials: *CR*

DRAFT REPORT

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FILE #: 3926.00

REPORTED: 03/18/15 11:04

SUBMITTED: 03/12/15 to 03/13/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5031313-09

Sampled: 03/12/15 00:00

Matrix: Air

Sample Volume: 21.84 m³

Received: 03/13/15 11:44

Comments:

Analysis Date: 03/16/15 16:44

Hexavalent Chromium by SOP ERG-MOR-063

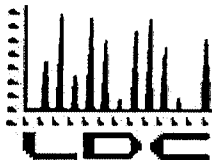
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

MAR 19 2015

Initials: *ER*

DRAFT REPORT

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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

March 31, 2015

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 March 20, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33938:

SDG

Fraction

5031727

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: March 13 through March 16, 2015
LDC Report Date: March 24, 2015
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 5031727

Sample Identification

OAM 1 (03/13/15)
OAM 2 (03/13/15)
PAM-1D (03/13/15)
PAM-2 (03/13/15)
PAM-3 (03/13/15)
PAM-4 (03/13/15)
PAM-21 (03/13/15)
PAM-31 (03/13/15)
PAM-1 (03/16/15)
PAM-1D (03/16/15)
PAM-2 (03/16/15)
PAM-3 (03/16/15)
PAM-4 (03/16/15)
PAM-21 (03/16/15)
PAM-31 (03/16/15)
PAM-1D (03/13/15)DUP
PAM-1 (03/16/15)DUP
PAM-1D (03/16/15)DUP

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

Introduction

This data review covers 18 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 (03/13/15) and PAM-31 (03/16/15) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (03/13/15) and PAM-21 (03/16/15) 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

Sample PAM-1(3/13/15) was received by the laboratory torn; therefore, the sample was not reported.

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

X. Field Duplicates

Samples PAM-1 (03/16/15) and PAM-1D (03/16/15) 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)	Flag	A or P
	PAM-1 (03/16/15)	PAM-1D (03/16/15)			
Hexavalent chromium	0.0183	0.0211	14 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 5031727**

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
5031727**

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 5031727**

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

LDC #: 33938A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/23/15

SDG #: 5031727

Level IV

Page: 1 of 2

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: CR

METHOD: (Analyte) 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.	Sample receipt/Technical holding times	A	3/13-16/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	FB=(7)(14) TB=(8)(15)
VI.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LS1g
IX.	Field duplicates	SW	FD=(9,10)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

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

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	OAM 1 (03/13/15)	5031727-01	Air	03/13/15
2	OAM 2 (03/13/15)	5031727-02	Air	03/13/15
3	PAM-1D (03/13/15)	5031727-04	Air	03/13/15
4	PAM-2 (03/13/15)	5031727-05	Air	03/13/15
5	PAM-3 (03/13/15)	5031727-06	Air	03/13/15
6	PAM-4 (03/13/15)	5031727-07	Air	03/13/15
7	PAM-21 (03/13/15)	5031727-08	Air	03/13/15
8	PAM-31 (03/13/15)	5031727-09	Air	03/13/15
9	PAM-1 (03/16/15)	5031727-12	Air	03/16/15
10	PAM-1D (03/16/15)	5031727-13	Air	03/16/15
11	PAM-2 (03/16/15)	5031727-14	Air	03/16/15
12	PAM-3 (03/16/15)	5031727-15	Air	03/16/15
13	PAM-4 (03/16/15)	5031727-16	Air	03/16/15
14	PAM-21 (03/16/15)	5031727-17	Air	03/16/15
15	PAM-31 (03/16/15)	5031727-18	Air	03/16/15
16	PAM-1D (03/13/15)DUP	5031727-04DUP	Air	03/13/15
17	PAM-1 (03/16/15)DUP	5031727-12DUP	Air	03/16/15

LDC #: 33938A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/23/15

SDG #: 5031727

Level IV

Page: 2 of 2

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: [Signature]

METHOD: (Analyte) Hexavalent Chromium (ASTM D7614)

	Client ID	Lab ID	Matrix	Date
18	PAM-1D (03/16/15)DUP	5031727-13DUP	Air	03/16/15
19				
20				
21				
22				
23				
24				
25				
26				
27				

Notes: _____

Method: Inorganics (EPA Method See Context)

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 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# 33938A6

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.
	9	10		
Hexavalent Chromium	0.0183	0.0211	14	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33938A6.wpd

LDC #: 33938AP

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 3/18/15

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	0.0346333	0.99996	0.99996	y ↓
		s2	0.1	0.0709481			
		s3	0.2	0.1500043			
		s4	0.5	0.388163			
		s5	1	0.7655741			
		s6	2	1.5642397			
<u>ICV 10:45</u> Calibration verification	<u>Cr⁺⁶</u>	<u>Found</u> 0.5533ng/ml	<u>True</u> 0.5ng/ml		110.7%R	110.7%R	
<u>CCV 12:00</u> Calibration verification	<u>Cr⁺⁶</u>	0.5562ng/ml	0.5ng/ml		111.2%R	111.2%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 #: 33938A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 11/17	Laboratory control sample	C ²⁺	1.07 mg/ml	1 mg/ml	107%R	107%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
DUP 12/5/1	Duplicate sample	↓	0.0397 mg/l ³	0.0372 mg/l ³	6.50%RPD	6.49%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 (1) Cr⁶⁺ 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: $(0.0391033 - (-7.15E-03)) / 0.7834961 \approx 0.0590 \text{ ng/ml}$
 $m^3 = 22.11$
 $A = 0.0391033$
 $C_0 = -7.15E-03$
 $C_1 = 0.7834961$
 $\frac{(\text{ng/ml})(V_f)}{m^3} = \text{ng/m}^3$ $\frac{(0.0590 \text{ ng/ml})(10 \text{ ml})}{22.11 \text{ m}^3} = 0.0267 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	Cr ⁶⁺	0.0267	0.0267	Y	
	2	↓	0.0324	0.0324	↓	
	3		0.0372	0.0372		
	4		0.0511	0.0511		
	5		0.0287	0.0287		
	6		0.0400	0.0400		
	7		ND	ND		
	8		ND	ND		
	9		0.0183	0.0183		
	10		0.0211	0.0211		
	11		0.0240	0.0240		Y
	12		0.0160	0.0161		Y*
	13		0.0385	0.0385		Y
	14		ND	ND		↓
	15		ND	ND		

Note: * Rounding



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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5031727-01

Sampled: 03/13/15 15:18

Matrix: Air

Sample Volume: 22.11 m³

Received: 03/17/15 11:56

Comments: Start Time 3/12/15 14:44

Analysis Date: 03/18/15 13:37

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0267		0.0038

MAR 31 2015

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5031727-02

Sampled: 03/13/15 15:42

Matrix: Air

Sample Volume: 22.22 m³

Received: 03/17/15 11:56

Comments: Start Time 3/12/15 15:01

Analysis Date: 03/18/15 13:48

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0324		0.0038

MAR 31 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5031727-04

Sampled: 03/13/15 16:47

Matrix: Air

Sample Volume: 22.06 m³

Received: 03/17/15 11:56

Comments: Col 2 Start Time 3/12/15 16:16

Analysis Date: 03/18/15 12:41

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0372		0.0038

MAR 31 2015

Initials: *CR*

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5031727-05

Sampled: 03/13/15 16:16

Matrix: Air

Sample Volume: 21.84 m³

Received: 03/17/15 11:56

Comments: Start Time 3/12/15 16:00

Analysis Date: 03/18/15 14:32

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0511		0.0038

MAR 31 2015

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: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5031727-06

Sampled: 03/13/15 16:07

Matrix: Air

Sample Volume: 21.78 m³

Received: 03/17/15 11:56

Comments: Start Time 3/12/15 15:55

Analysis Date: 03/18/15 14:43

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0287		0.0038

MAR 31 2015

Initials: ER

Eastern Research Group

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5031727-07

Sampled: 03/13/15 16:03

Matrix: Air

Sample Volume: 21.81 m³

Received: 03/17/15 11:56

Comments: Start Time 3/12/15 15:49

Analysis Date: 03/18/15 14:54

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0400		0.0038

MAR 31 2015

Initials: *CR*

Eastern Research Group

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Environmental Resources Management, Inc

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5031727-08

Sampled: 03/13/15 00:00

Matrix: Air

Sample Volume: 21.84 m³

Received: 03/17/15 11:56

Comments:

Analysis Date: 03/18/15 15:04

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 31 2015

Initials: ER

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5031727-09

Sampled: 03/13/15 00:00

Matrix: Air

Sample Volume: 21.78 m³

Received: 03/17/15 11:56

Comments:

Analysis Date: 03/18/15 15:15

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 31 2015

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: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5031727-12

Sampled: 03/16/15 18:06

Matrix: Air

Sample Volume: 22.23 m³

Received: 03/17/15 11:56

Comments: Col 1 Start Time 3/15/15 17:24

Analysis Date: 03/18/15 12:59

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0183		0.0038

MAR 31 2015

Initials: ER

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5031727-13

Sampled: 03/16/15 18:10

Matrix: Air

Sample Volume: 22.26 m³

Received: 03/17/15 11:56

Comments: Col 2 Start Time 3/15/15 17:26

Analysis Date: 03/18/15 13:18

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0211		0.0038

MAR 31 2015

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: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5031727-14

Sampled: 03/16/15 17:36

Matrix: Air

Sample Volume: 22.02 m³

Received: 03/17/15 11:56

Comments: Start Time 3/15/15 17:08

Analysis Date: 03/18/15 15:26

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0240		0.0038

MAR 31 2015

Initials: ER

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5031727-15

Sampled: 03/16/15 17:17

Matrix: Air

Sample Volume: 21.81 m³

Received: 03/17/15 11:56

Comments: Start Time 3/15/15 17:03

Analysis Date: 03/18/15 15:36

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0160		0.0038

MAR 31 2015

Initials: ER

Eastern Research Group

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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5031727-16

Sampled: 03/16/15 16:52

Matrix: Air

Sample Volume: 21.48 m³

Received: 03/17/15 11:56

Comments: Start Time 3/15/15 17:00

Analysis Date: 03/18/15 15:59

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0385		0.0038

MAR 31 2015

Initials: *CR*

Eastern Research Group

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Environmental Resources Management, Inc

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5031727-17

Sampled: 03/16/15 00:00

Matrix: Air

Sample Volume: 22.02 m³

Received: 03/17/15 11:56

Comments:

Analysis Date: 03/18/15 16:09

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 31 2015

Initials: *CR*

Eastern Research Group

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75 Valley Stream Parkway, Suite 400

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ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/20/15 13:44

SUBMITTED: 03/17/15

AQS SITE CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5031727-18

Sampled: 03/16/15 00:00

Matrix: Air

Sample Volume: 21.81 m³

Received: 03/17/15 11:56

Comments:

Analysis Date: 03/18/15 16:20

Hexavalent Chromium by SOP ERG-MOR-063

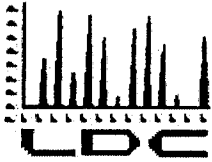
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

MAR 31 2015

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

March 31, 2015

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 March 27, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33967:

<u>SDG</u>	<u>Fraction</u>
5031822	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: March 17, 2015
LDC Report Date: March 29, 2015
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 5031822

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. Results 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	0.0626	0.0727	15 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 5031822**

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
5031822**

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 5031822**

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

LDC #: 33967A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/17/15

SDG #: 5031822

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: JSD

2nd Reviewer: [Signature]

METHOD: (Analyte) 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.	Sample receipt/Technical holding times	A	3/17/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	FB=(8) TB=(9)
VI.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS10
IX.	Field duplicates	SW	FD=(3.4)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

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

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	OAM 1	5031822-01	Air	03/17/15
2	OAM 2	5031822-02	Air	03/17/15
3	PAM-1	5031822-03	Air	03/17/15
4	PAM-1D	5031822-04	Air	03/17/15
5	PAM-2	5031822-05	Air	03/17/15
6	PAM-3	5031822-06	Air	03/17/15
7	PAM-4	5031822-07	Air	03/17/15
8	PAM-21	5031822-08	Air	03/17/15
9	PAM-31	5031822-09	Air	03/17/15
10	PAM-1DUP	5031822-03DUP	Air	03/17/15
11	PAM-1DDUP	5031822-04DUP	Air	03/17/15
12				
13				
14				
15				

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

VALIDATION FINDINGS CHECKLIST

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

LDC# 33967A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	3	4		
Hexavalent Chromium	0.0626	0.0727	15	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33967A6.wpd

LDC #: 33967AY

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 3/19/15

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	0.0342059	0.99996	0.99998	Y
		s2	0.1	0.0703652			
		s3	0.2	0.1451847			
		s4	0.5	0.3810375			
		s5	1	0.7642907			
		s6	2	1.5617175			
ICV 11:23 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5863ng/ml	<u>True</u> 0.5ng/ml		111.3%R	111.3%R	
CCV 12:38 Calibration verification	Cr ⁺⁶	0.5541ng/ml	0.5ng/ml		110.8%R	110.8%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 #: 336746

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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	
LCSD 12:28	Laboratory control sample	Cr ⁶⁺	1.07 ng/ml	1.00 ng/ml	107%R	107%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
DUP 13:10	Duplicate sample	↓	0.0769 ng/m ³	0.0727 ng/m ³	5.62%RPD	5.61%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 (1) C₅+₆ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A \cdot C_0) / C_1$

$A = 0.0663984$
 $C_0 = -9.9E-03$
 $C_1 = 0.7834329$

$V_f = 10 \text{ ml}$
 $m^3 = 21.31$

Recalculation: $(0.0663984 - (-9.9E-03)) / 0.7834329 = 0.0974 \text{ ng/ml}$

$(0.0974 \text{ ng/ml}) \cdot (10 \text{ ml}) / 21.31 \text{ m}^3 = 0.0457 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	C ₅ + ₆	0.0457	0.0457	Y	
	2	↓	0.0626	0.0626	↓	
	3		0.0727	0.0727		
	4		0.0708	0.0708		
	5		0.0548	0.0548		
	6		0.0462	0.0462		
	7		0.123	0.123		
	8		ND	ND		
	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: 03/25/15 13:58

SUBMITTED: 03/18/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5031822-01

Sampled: 03/17/15 14:59

Matrix: Air

Sample Volume: 21.31 m³

Received: 03/18/15 13:01

Comments: Start Time 3/16/15 15:19

Analysis Date: 03/19/15 13:37

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0457		0.0038

MAR 30 2015

Initials: ER

Eastern Research Group

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

ATTN: Mr. Jeff Boggs
PHONE: (443) 803-8495 FAX: (410) 266-8912

FILE #: 3926.00
REPORTED: 03/25/15 13:58
SUBMITTED: 03/18/15
AQS SITE
CODE:
SITE CODE: Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 5031822-02	Sampled: 03/17/15 15:42
Matrix: Air	Sample Volume: 21.11 m ³	Received: 03/18/15 13:01
Comments: Start Time 3/16/15 16:15		Analysis Date: 03/19/15 13:48

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0626		0.0038

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

FILE #: 3926.00

REPORTED: 03/25/15 13:58

SUBMITTED: 03/18/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 5031822-03	Sampled: 03/17/15 17:38
Matrix: Air	Sample Volume: 20.99 m ³	Received: 03/18/15 13:01
Comments: Col 1 Start Time 3/16/15 18:19		Analysis Date: 03/19/15 13:00

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0727		0.0038

MAR 30 2015

Initials: *ER*



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

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FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 03/25/15 13:58

SUBMITTED: 03/18/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5031822-04

Sampled: 03/17/15 17:37

Matrix: Air

Sample Volume: 20.78 m³

Received: 03/18/15 13:01

Comments: Col 2 Start Time 3/16/15 18:32

Analysis Date: 03/19/15 13:18

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0708		0.0038

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Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/25/15 13:58

SUBMITTED: 03/18/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5031822-05

Sampled: 03/17/15 17:12

Matrix: Air

Sample Volume: 21.07 m³

Received: 03/18/15 13:01

Comments: Start Time 3/16/15 17:47

Analysis Date: 03/19/15 13:59

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0548		0.0038

MAR 30 2015

Initials: CR



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: 03/25/15 13:58

SUBMITTED: 03/18/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 5031822-06	Sampled: 03/17/15 16:52
Matrix: Air	Sample Volume: 21.06 m ³	Received: 03/18/15 13:01
Comments: Start Time 3/16/15 17:28		Analysis Date: 03/19/15 14:09

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0462		0.0038

MAR 30 2015

Initials: *ER*

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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: 03/25/15 13:58

SUBMITTED: 03/18/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5031822-07

Sampled: 03/17/15 16:11

Matrix: Air

Sample Volume: 20.79 m³

Received: 03/18/15 13:01

Comments: Start Time 3/16/15 17:05

Analysis Date: 03/19/15 14:20

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.123		0.0038

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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: 03/25/15 13:58

SUBMITTED: 03/18/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5031822-08

Sampled: 03/17/15 00:00

Matrix: Air

Sample Volume: 21.07 m³

Received: 03/18/15 13:01

Comments:

Analysis Date: 03/19/15 14:31

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 30 2015

Initials: ER



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: 03/25/15 13:58

SUBMITTED: 03/18/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 5031822-09	Sampled: 03/17/15 00:00
Matrix: Air	Sample Volume: 21.06 m ³	Received: 03/18/15 13:01
Comments:		Analysis Date: 03/19/15 15:03

Hexavalent Chromium by SOP ERG-MOR-063

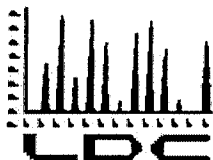
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	ND	U	0.0038

MAR 30 2015

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

March 31, 2015

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 March 27, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33968:

<u>SDG</u>	<u>Fraction</u>
5031911/5032011	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: March 18 through March 19, 2015
LDC Report Date: March 29, 2015
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 5031911/5032011

Sample Identification

OAM 1 (03/18/15)
OAM 2 (03/18/15)
PAM-1 (03/18/15)
PAM-1D (03/18/15)
PAM-2 (03/18/15)
PAM-3 (03/18/15)
PAM-4 (03/18/15)
PAM-21 (03/18/15)
PAM-31 (03/18/15)
OAM 1 (03/19/15)
OAM 2 (03/19/15)
PAM-1 (03/19/15)
PAM-1D (03/19/15)
PAM-2 (03/19/15)
PAM-3 (03/19/15)
PAM-4 (03/19/15)
PAM-21 (03/19/15)
PAM-31 (03/19/15)
PAM-1 (03/18/15) DUP
PAM-1D (03/18/15) DUP
PAM-1 (03/19/15) DUP
PAM-1D (03/19/15) 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(03/18/15) and PAM-31(03/19/15) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21(03/18/15) and PAM-21(03/19/15) 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. Results 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(03/18/15) and PAM-1D (03/18/15) and samples PAM-1(03/19/15) and PAM-1D (03/19/15) 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(03/18/15)	PAM-1D (03/18/15)			
Hexavalent chromium	0.0348	0.0412	17 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(03/19/15)	PAM-1D (03/19/15)			
Hexavalent chromium	0.0468	0.0500	7 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 5031911/5032011**

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
5031911/5032011**

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
5031911/5032011**

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

LDC #: 33968A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/27/15

SDG #: 5031911/5032011

Level IV

Page: 1 of 2

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: [Signature]

METHOD: (Analyte) 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.	Sample receipt/Technical holding times	A	3/18/15 - 3/19/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	FB=(8)(7) TB=(9)(18)
VI.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	SW	FD=(3.4)(12.13)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

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

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	OAM 1 (03/18/15)	5031911-01	Air	03/18/15
2	OAM 2 (03/18/15)	5031911-02	Air	03/18/15
3	PAM-1 (03/18/15)	5031911-03	Air	03/18/15
4	PAM-1D (03/18/15)	5031911-04	Air	03/18/15
5	PAM-2 (03/18/15)	5031911-05	Air	03/18/15
6	PAM-3 (03/18/15)	5031911-06	Air	03/18/15
7	PAM-4 (03/18/15)	5031911-07	Air	03/18/15
8	PAM-21 (03/18/15)	5031911-08	Air	03/18/15
9	PAM-31 (03/18/15)	5031911-09	Air	03/18/15
10	OAM 1 (03/19/15)	5032011-01	Air	03/19/15
11	OAM 2 (03/19/15)	5032011-02	Air	03/19/15
12	PAM-1 (03/19/15)	5032011-03	Air	03/19/15
13	PAM-1D (03/19/15)	5032011-04	Air	03/19/15
14	PAM-2 (03/19/15)	5032011-05	Air	03/19/15
15	PAM-3 (03/19/15)	5032011-06	Air	03/19/15
16	PAM-4 (03/19/15)	5032011-07	Air	03/19/15
17	PAM-21 (03/19/15)	5032011-08	Air	03/19/15

LDC #: 33968A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/21/15

SDG #: 5031911/5032011

Level IV

Page: 2 of 2

Laboratory: Eastern Research Group

Reviewer: SS

2nd Reviewer: AK

METHOD: (Analyte) Hexavalent Chromium (ASTM D7614)

	Client ID	Lab ID	Matrix	Date
18	PAM-31 (03/19/15)	5032011-09	Air	03/19/15
19	PAM-1 (03/18/15)DUP	5031911-03 DUP	Air	03/18/15
20	PAM-1D (03/18/15)DUP	5031911-04 DUP	Air	03/18/15
21	PAM-1 (03/19/15)DUP	5032011-03 DUP	Air	03/19/15
22	PAM-1D (03/19/15)DUP	5032011-04 DUP	Air	03/19/15
23				
24				
25				
26				
27				

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.			/	
<u>Air</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# 33968A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	3	4		
Hexavalent Chromium	0.0348	0.0412	17	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	12	13		
Hexavalent Chromium	0.0468	0.0500	7	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\33968A6.wpd

LDC #: 33968AP

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 3/23/15

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	0.0377155	0.99998	0.99998	Y
		s2	0.1	0.0761473			
		s3	0.2	0.1498522			
		s4	0.5	0.3941322			
		s5	1	0.7777418			
		s6	2	1.570445			
ICV 11:35 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5212ng/ml	<u>True</u> 0.5ng/ml		105.4%R	105.4%R	Y
CCV 12:40 Calibration verification	Cr ⁺⁶	0.5308ng/ml	0.5ng/ml		106.2%R	106.2%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.

LDC #: 33968A10

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 12:08	Laboratory control sample	C ⁵⁺ b	1.08ng/ml	1.00ng/ml	108%R	108%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
DUP 13:11	Duplicate sample	↓	0.0440 ng/m ³	0.0468 ng/m ³	6.17%RPD	6.06%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 (10) C₅+^b reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A \times C) / C_1$

Recalculation: $\frac{(0.0557159 - (-3.41E-03))}{0.7860987} = 0.0765 \text{ ng/ml}$

$A = 0.0557159$
 $C_0 = -3.41E-03$
 $C_1 = 0.7860987$

$\frac{(0.0765 \text{ ng/ml})(10 \text{ ml})}{21.53 \text{ m}^3} = 0.0355 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)	
	1	C ₅ + ^b	0.0289	0.0289	Y	
	2	↓	0.0096	0.0096	↓	
	3		0.0348	0.0348		
	4		0.0412	0.0412		
	5		0.0284	0.0284		
	6		0.0055	0.0055		
	7		0.0634	0.0634		
	8		ND	ND		
	9		ND	ND		
	10		0.0355	0.0355		
	11		0.0285	0.0285		
	12		0.0468	0.0468		
	13		0.0500	0.0500		
	14		0.0897	0.0897		↓
	15		0.0312	0.0313		Y*
	16		0.0683	0.0683		Y
	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: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 5031911-01	Sampled: 03/18/15 15:00
Matrix: Air	Sample Volume: 21.34 m ³	Received: 03/19/15 10:53
Comments: Start Time 3/17/15 15:17		Analysis Date: 03/23/15 15:53

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0289		0.0038

MAR 30 2015

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 5031911-02	Sampled: 03/18/15 15:34
Matrix: Air	Sample Volume: 21.3 m ³	Received: 03/19/15 10:53
Comments: Start Time 3/17/15 15:54		Analysis Date: 03/23/15 16:04

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0096		0.0038

MAR 30 2015

Initials: *ER*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE-
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5031911-03

Sampled: 03/18/15 17:10

Matrix: Air

Sample Volume: 20.75 m³

Received: 03/19/15 10:53

Comments: Col 1 Start Time 3/17/15 18:01

Analysis Date: 03/23/15 13:39

Hexavalent Chromium by SOP ERG-MOR-063

<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		0.0038

MAR 30 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:

SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 5031911-04	Sampled: 03/18/15 16:53
Matrix: Air	Sample Volume: 20.18 m ³	Received: 03/19/15 10:53
Comments: Col 2 Start Time 3/17/15 17:52		Analysis Date: 03/23/15 13:58

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0412		0.0041

MAR 30 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-2	Lab ID: 5031911-05	Sampled: 03/18/15 16:27
Matrix: Air	Sample Volume: 20.64 m ³	Received: 03/19/15 10:53
Comments: Start Time 3/17/15 17:22		Analysis Date: 03/23/15 16:14

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0284		0.0038

MAR 30 2015

Initials: *ER*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 5031911-06	Sampled: 03/18/15 16:11
Matrix: Air	Sample Volume: 20.8 m ³	Received: 03/19/15 10:53
Comments: Start Time 3/17/15 17:04		Analysis Date: 03/23/15 16:25

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0055		0.0038

MAR 30 2015

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5031911-07

Sampled: 03/18/15 16:00

Matrix: Air

Sample Volume: 21.18 m³

Received: 03/19/15 10:53

Comments: Start Time 3/17/15 16:28

Analysis Date: 03/23/15 16:36

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0634		0.0038

MAR 30 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21	Lab ID: 5031911-08	Sampled: 03/18/15 00:00
Matrix: Air	Sample Volume: 20.64 m ³	Received: 03/19/15 10:53
Comments:		Analysis Date: 03/23/15 17:08

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 30 2015

Initials: *ER*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-31

Lab ID: 5031911-09

Sampled: 03/18/15 00:00

Matrix: Air

Sample Volume: 20.8 m³

Received: 03/19/15 10:53

Comments:

Analysis Date: 03/23/15 17:18

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 30 2015

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5032011-01

Sampled: 03/19/15 15:04

Matrix: Air

Sample Volume: 21.53 m³

Received: 03/20/15 11:10

Comments: Start Time 3/18/15 15:11

Analysis Date: 03/23/15 14:17

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0355		0.0038

MAR 30 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 5032011-02	Sampled: 03/19/15 15:28
Matrix: Air	Sample Volume: 21.11 m ³	Received: 03/20/15 11:10
Comments: Start Time 3/18/15 15:39		Analysis Date: 03/23/15 14:27

Hexavalent Chromium by SOP ERG-MOR-063

<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		0.0038

MAR 30 2015

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 5032011-03	Sampled: 03/19/15 16:48
Matrix: Air	Sample Volume: 21.09 m ³	Received: 03/20/15 11:10
Comments: Col 1 Start Time 3/18/15 17:17		Analysis Date: 03/23/15 13:01

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0468		0.0038

MAR 30 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5032011-04

Sampled: 03/19/15 16:55

Matrix: Air

Sample Volume: 21.26 m³

Received: 03/20/15 11:10

Comments: Col 2 Start Time 3/18/15 17:05

Analysis Date: 03/23/15 13:20

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0500		0.0038

MAR 30 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-2	Lab ID: 5032011-05	Sampled: 03/19/15 16:25
Matrix: Air	Sample Volume: 21.2 m ³	Received: 03/20/15 11:10
Comments: Start Time 3/18/15 16:29		Analysis Date: 03/23/15 14:59

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0897		0.0038

MAR 30 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5032011-06

Sampled: 03/19/15 16:12

Matrix: Air

Sample Volume: 21.35 m³

Received: 03/20/15 11:10

Comments: Start Time 3/18/15 16:17

Analysis Date: 03/23/15 15:10

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0312		0.0038

MAR 30 2015

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 5032011-07	Sampled: 03/19/15 16:03
Matrix: Air	Sample Volume: 21.37 m ³	Received: 03/20/15 11:10
Comments: Start Time 3/18/15 16:06		Analysis Date: 03/23/15 15:21

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0683		0.0038

MAR 30 2015

Initials: *ER*

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 5032011-08	Sampled: 03/19/15 00:00
Matrix: Air	Sample Volume: 21.2 m ³	Received: 03/20/15 11:10
Comments:		Analysis Date: 03/23/15 15:31

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

MAR 30 2015

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FILE #: 3926.00

REPORTED: 03/27/15 09:38

SUBMITTED: 03/19/15 to 03/20/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-31	Lab ID: 5032011-09	Sampled: 03/19/15 00:00
Matrix: Air	Sample Volume: 21.35 m ³	Received: 03/20/15 11:10
Comments:		Analysis Date: 03/23/15 15:42

Hexavalent Chromium by SOP ERG-MOR-063

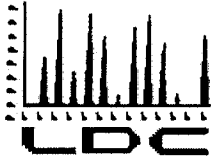
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

MAR 30 2015

Initials: *CR*

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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

April 2, 2015

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 March 31, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #33991:

<u>SDG</u>	<u>Fraction</u>
5032434/5032522	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: March 20 through March 24, 2015
LDC Report Date: April 2, 2015
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 5032434/5032522

Sample Identification

OAM 1 (03/20/15)	PAM-1D (03/24/15)
OAM 2 (03/20/15)	PAM-2 (03/24/15)
PAM-1 (03/20/15)	PAM-3 (03/24/15)
PAM-1D (03/20/15)	PAM-4 (03/24/15)
PAM-3 (03/20/15)	PAM-21 (03/24/15)
PAM-4 (03/20/15)	PAM-31 (03/24/15)
PAM-21 (03/20/15)	PAM-1 (03/20/15)DUP
PAM-31 (03/20/15)	PAM-1D (03/20/15)DUP
OAM 1 (03/23/15)	PAM-1 (03/23/15)DUP
OAM 2 (03/23/15)	PAM-1D (03/23/15)DUP
PAM-1 (03/23/15)	PAM-1 (03/24/15)DUP
PAM-1D (03/23/15)	PAM-1D (03/24/15)DUP
PAM-2 (03/23/15)	
PAM-3 (03/23/15)	
PAM-4 (03/23/15)	
PAM-21 (03/23/15)	
PAM-31 (03/23/15)	
OAM 1 (03/24/15)	
OAM 2 (03/24/15)	
PAM-1 (03/24/15)	

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

Introduction

This data review covers 32 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 (03/20/15), PAM-31 (03/23/15), and PAM-31 (03/24/15) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (03/20/15), PAM-21 (03/23/15), and PAM-21 (03/24/15) 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 (03/20/15) and PAM-1D (03/20/15), samples PAM-1 (03/23/15) and PAM-1D (03/23/15), samples PAM-1 (03/24/15) and PAM-1D (03/24/15), and samples PAM-1 (03/05/15) and PAM-1D (03/05/15) 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 (03/20/15)	PAM-1D (03/20/15)			
Hexavalent chromium	0.103	0.109	6 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (03/23/15)	PAM-1D (03/23/15)			
Hexavalent chromium	0.0139	0.0132	5 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1 (03/24/15)	PAM-1D (03/24/15)			
Hexavalent chromium	0.0426	0.0431	1 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 5032434/5032522**

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
5032434/5032522**

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
5032434/5032522**

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

LDC #: 33991A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/31/15

SDG #: 5032434/5032522

Level IV

Page: 1 of 2

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: a

METHOD: (Analyte) 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.	Sample receipt/Technical holding times	A	3/20-24/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	FB=(7)(16)(25) TB=(8)(17)(26)
VI.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCSID
IX.	Field duplicates	SW	FD=(3,4)(11,12)(20,21)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

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

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	OAM 1 (03/20/15)	5032434-01	Air	03/20/15
2	OAM 2 (03/20/15)	5032434-02	Air	03/20/15
3	PAM-1 (03/20/15)	5032434-03	Air	03/20/15
4	PAM-1D (03/20/15)	5032434-04	Air	03/20/15
5	PAM-3 (03/20/15)	5032434-06	Air	03/20/15
6	PAM-4 (03/20/15)	5032434-07	Air	03/20/15
7	PAM-21 (03/20/15)	5032434-08	Air	03/20/15
8	PAM-31 (03/20/15)	5032434-09	Air	03/20/15
9	OAM 1 (03/23/15)	5032434-10	Air	03/23/15
10	OAM 2 (03/23/15)	5032434-11	Air	03/23/15
11	PAM-1 (03/23/15)	5032434-12	Air	03/23/15
12	PAM-1D (03/23/15)	5032434-13	Air	03/23/15
13	PAM-2 (03/23/15)	5032434-14	Air	03/23/15
14	PAM-3 (03/23/15)	5032434-15	Air	03/23/15
15	PAM-4 (03/23/15)	5032434-16	Air	03/23/15
16	PAM-21 (03/23/15)	5032434-17	Air	03/23/15
17	PAM-31 (03/23/15)	5032434-18	Air	03/23/15

LDC #: 33991A6

VALIDATION COMPLETENESS WORKSHEET

Date: 3/31/15

SDG #: 5032434/5032522

Level IV

Page: 2 of 2

Laboratory: Eastern Research Group

Reviewer: *[Signature]*

2nd Reviewer: *[Signature]*

METHOD: (Analyte) Hexavalent Chromium (ASTM D7614)

	Client ID	Lab ID	Matrix	Date
18	OAM 1 (03/24/15)	5032522-01	Air	03/24/15
19	OAM 2 (03/24/15)	5032522-02	Air	03/24/15
20	PAM-1 (03/24/15)	5032522-03	Air	03/24/15
21	PAM-1D (03/24/15)	5032522-04	Air	03/24/15
22	PAM-2 (03/24/15)	5032522-05	Air	03/24/15
23	PAM-3 (03/24/15)	5032522-06	Air	03/24/15
24	PAM-4 (03/24/15)	5032522-07	Air	03/24/15
25	PAM-21 (03/24/15)	5032522-08	Air	03/24/15
26	PAM-31 (03/24/15)	5032522-09	Air	03/24/15
27	PAM-1 (03/20/15)DUP	5032434-03DUP	Air	03/20/15
28	PAM-1D (03/20/15)DUP	5032434-04DUP	Air	03/20/15
29	PAM-1 (03/23/15)DUP	5032434-12DUP	Air	03/23/15
30	PAM-1D (03/23/15)DUP	5032434-13DUP	Air	03/23/15
31	PAM-1 (03/24/15)DUP	5032522-03DUP	Air	03/24/15
32	PAM-1D (03/24/15)DUP	5032522-04DUP	Air	03/24/15
33				
34				
35				

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

VALIDATION FINDINGS CHECKLIST

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

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	3	4		
Hexavalent Chromium	0.103	0.109	6	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	11	12		
Hexavalent Chromium	0.0139	0.0132	5	

Analyte	Concentration (ng/m3)		RPD (≤20)	Qual.
	20	21		
Hexavalent Chromium	0.0426	0.0431	1	

LDC #: 3391A6

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⁺⁶ was recalculated. Calibration date: 03/25/15

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	0.05	0.0338194	0.99998	0.99998	Y
		s2	0.1	0.0687896			
		s3	0.2	0.1470135			
		s4	0.5	0.3882267			
		s5	1	0.7727523			
		s6	2	1.5669104			
ICV 10:52 Calibration verification	C ⁺⁶	<u>Found</u> 0.5282ng/ml	<u>True</u> 0.5ng/ml		105.6%R	105.6%R	↓
CCV 11:56 Calibration verification	C ⁺⁶	0.5255ng/ml	0.5ng/ml		105.1%R	105.1%R	
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS 11:24	Laboratory control sample	Cr ²⁺	1.07 ng/ml	1.00 ng/ml	107%R	107%R	Y
MS n/a	Matrix spike sample	↓	(SSR-SR)				
DUP 12:42	Duplicate sample	↓	0.1060 ng/m ³	0.1026 ng/m ³	3.26%RPD	3.29%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 (11) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1 \times \frac{V_f \times 1000}{m^3}$ Recalculation: $\frac{(0.0147342 - (-8.57E-03))}{0.7867314} = 0.02962 \text{ ng/ml}$
 $A = 0.0147342$
 $C_0 = -8.57E-03$
 $C_1 = 0.7867314$
 $\frac{(0.02962 \text{ ng/ml})(10 \text{ ml})}{21.36 \text{ m}^3} = 0.0139 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.124	0.124	Y
	2		0.506	0.506	
	3		0.103	0.103	
	4		0.109	0.109	
	5		0.102	0.102	
	6		0.0977	0.0977	
	7		ND	ND	
	8		ND	ND	
	9		ND	ND	
	10		0.0108	0.0108	
	11		0.0139	0.0139	Y
	12		0.0132	0.0132	
	13		0.0298	0.0298	
	14		0.0091	0.0091	
	15		0.0303	0.0303	
	16		ND	ND	
	17		ND	ND	
	18		0.0278	0.0278	
	19		0.0362	0.0362	
	20		0.0426	0.0426	Y

Note: _____

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: Inorganics, Method See Cover

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

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

Compound (analyte) results for (21) C_5^{+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: $(0.0673628 - (-6.59E-03)) / 0.733335 = 0.0932 \text{ ng/ml}$
 $m^3 = 21.63$
 $A = 0.0673628$
 $C_0 = -6.59E-03$
 $C_1 = 0.733335$
 $(\text{ng/ml})(V_f) / m^3 = \text{ng/m}^3$
 $(0.0932 \text{ ng/ml})(10 \text{ ml}) / 21.63 \text{ m}^3 = 0.0431 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	21	C_5^{+6}	0.0431	0.0431	Y
	22	↓	0.0820	0.0820	↓
	23		0.0424	0.0424	
	24		0.0559	0.0559	
	25		ND	ND	
	26		ND	ND	
	27				

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: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 1	Lab ID: 5032434-01	Sampled: 03/20/15 14:39
Matrix: Air	Sample Volume: 21.4 m ³	Received: 03/24/15 11:40
Comments: Start Time 3/19/15 15:08		Analysis Date: 03/25/15 13:48

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.124		0.0038

APR 02 2015

Initials: *ER*



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ATTN: Mr. Jeff Boggs

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REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 2	Lab ID: 5032434-02	Sampled: 03/20/15 15:08
Matrix: Air	Sample Volume: 21.24 m ³	Received: 03/24/15 11:40
Comments: Start Time 3/19/15 15:36		Analysis Date: 03/25/15 13:58

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.506		0.0038

APR 02 2015

Initials: ER

Eastern Research Group

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 5032434-03	Sampled: 03/20/15 16:12
Matrix: Air	Sample Volume: 21.27 m ³	Received: 03/24/15 11:40
Comments: Col 1 Start Time 3/19/15 16:51		Analysis Date: 03/25/15 12:32

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.103		0.0038

APR 02 2015

Initials: ER

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D	Lab ID: 5032434-04	Sampled: 03/20/15 16:12
Matrix: Air	Sample Volume: 21.03 m ³	Received: 03/24/15 11:40
Comments: Col 2 Start Time 3/19/15 16:57		Analysis Date: 03/25/15 12:51

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.109		0.0038

APR 02 2015

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: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5032434-06

Sampled: 03/20/15 15:39

Matrix: Air

Sample Volume: 21.02 m³

Received: 03/24/15 11:40

Comments: Start Time 3/19/15 16:17

Analysis Date: 03/25/15 14:30

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.102		0.0038

APR 02 2015

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: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-4	Lab ID: 5032434-07	Sampled: 03/20/15 15:33
Matrix: Air	Sample Volume: 21.07 m ³	Received: 03/24/15 11:40
Comments: Start Time 3/19/15 16:06		Analysis Date: 03/25/15 14:53

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0977		0.0038

APR 02 2015

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: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21	Lab ID: 5032434-08	Sampled: 03/20/15 00:00
Matrix: Air	Sample Volume: 21.02 m ³	Received: 03/24/15 11:40
Comments:		Analysis Date: 03/25/15 15:04

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

APR 02 2015

Initials: CR

Eastern Research Group

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REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-31

Lab ID: 5032434-09

Sampled: 03/20/15 00:00

Matrix: Air

Sample Volume: 21.02 m³

Received: 03/24/15 11:40

Comments:

Analysis Date: 03/25/15 15:14

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

APR 02 2015

Initials: *ER*

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REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 5032434-10	Sampled: 03/23/15 14:50
Matrix: Air	Sample Volume: 21.63 m ³	Received: 03/24/15 11:40
Comments: Start Time 3/22/15 14:48		Analysis Date: 03/25/15 15:25

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

APR 02 2015

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REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2	Lab ID: 5032434-11	Sampled: 03/23/15 15:13
Matrix: Air	Sample Volume: 21.53 m ³	Received: 03/24/15 11:40
Comments: Start Time 3/22/15 15:18		Analysis Date: 03/25/15 15:36

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0108		0.0038

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 5032434-12	Sampled: 03/23/15 16:16
Matrix: Air	Sample Volume: 21.36 m ³	Received: 03/24/15 11:40
Comments: Col 1 Start Time 3/22/15 16:32		Analysis Date: 03/25/15 13:10

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> <u>ng/m³ Air</u>	<u>Flag</u>	<u>MDL</u> <u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0139		0.0038

APR 02 2015

Initials: ER

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1D

Lab ID: 5032434-13

Sampled: 03/23/15 16:17

Matrix: Air

Sample Volume: 21.39 m³

Received: 03/24/15 11:40

Comments: Col 2 Start Time 3/22/15 16:31

Analysis Date: 03/25/15 13:29

Hexavalent Chromium by SOP ERG-MOR-063

<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		0.0038

APR 02 2015

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REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-2	Lab ID: 5032434-14	Sampled: 03/23/15 15:53
Matrix: Air	Sample Volume: 21.36 m ³	Received: 03/24/15 11:40
Comments: Start Time 3/22/15 16:09		Analysis Date: 03/25/15 15:47

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0298		0.0038

APR 02 2015

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3	Lab ID: 5032434-15	Sampled: 03/23/15 15:45
Matrix: Air	Sample Volume: 21.48 m ³	Received: 03/24/15 11:40
Comments: Start Time 3/22/15 15:53		Analysis Date: 03/25/15 15:57

Hexavalent Chromium by SOP ERG-MOR-063

<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		0.0038

APR 02 2015

Initials: *ER*

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4	Lab ID: 5032434-16	Sampled: 03/23/15 15:34
Matrix: Air	Sample Volume: 21.49 m ³	Received: 03/24/15 11:40
Comments: Start Time 3/22/15 15:41		Analysis Date: 03/25/15 16:08

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0303		0.0038

APR 02 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21

Lab ID: 5032434-17

Sampled: 03/23/15 00:00

Matrix: Air

Sample Volume: 21.36 m³

Received: 03/24/15 11:40

Comments:

Analysis Date: 03/25/15 16:19

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

APR 02 2015

Initials: *ER*

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REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 5032434-18	Sampled: 03/23/15 00:00
Matrix: Air	Sample Volume: 21.48 m ³	Received: 03/24/15 11:40
Comments:		Analysis Date: 03/25/15 16:51

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

APR 02 2015

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: OAM 1	Lab ID: 5032522-01	Sampled: 03/24/15 14:51
Matrix: Air	Sample Volume: 21.56 m ³	Received: 03/25/15 11:06
Comments: Start Time 3/23/15 14:53		Analysis Date: 03/26/15 13:13

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0278		0.0038

APR 02 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5032522-02

Sampled: 03/24/15 15:15

Matrix: Air

Sample Volume: 21.59 m³

Received: 03/25/15 11:06

Comments: Start Time 3/23/15 15:16

Analysis Date: 03/26/15 13:24

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0362		0.0038

APR 02 2015

Initials: CR

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1	Lab ID: 5032522-03	Sampled: 03/24/15 16:21
Matrix: Air	Sample Volume: 21.63 m ³	Received: 03/25/15 11:06
Comments: Col 1 Start Time 3/23/15 16:19		Analysis Date: 03/26/15 12:14

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0426		0.0038

APR 02 2015

Initials: ER



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: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5032522-04

Sampled: 03/24/15 16:22

Matrix: Air

Sample Volume: 21.63 m³

Received: 03/25/15 11:06

Comments: Col 2 Start Time 3/23/15 16:20

Analysis Date: 03/26/15 12:55

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0431		0.0038

APR 02 2015

Initials: CR

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REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5032522-05

Sampled: 03/24/15 16:09

Matrix: Air

Sample Volume: 21.86 m³

Received: 03/25/15 11:06

Comments: Start Time 3/23/15 15:56

Analysis Date: 03/26/15 13:35

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0820		0.0038

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-3	Lab ID: 5032522-06	Sampled: 03/24/15 16:03
Matrix: Air	Sample Volume: 21.82 m ³	Received: 03/25/15 11:06
Comments: Start Time 3/23/15 15:48		Analysis Date: 03/26/15 13:45

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0424		0.0038

APR 02 2015

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5032522-07

Sampled: 03/24/15 15:39

Matrix: Air

Sample Volume: 21.63 m³

Received: 03/25/15 11:06

Comments: Start Time 3/23/15 15:37

Analysis Date: 03/26/15 13:56

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0559		0.0038

APR 02 2015

Initials: CR

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REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-21

Lab ID: 5032522-08

Sampled: 03/24/15 00:00

Matrix: Air

Sample Volume: 21.86 m³

Received: 03/25/15 11:06

Comments:

Analysis Date: 03/26/15 14:07

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

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FILE #: 3926.00

REPORTED: 03/31/15 15:30

SUBMITTED: 03/24/15 to 03/25/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-31	Lab ID: 5032522-09	Sampled: 03/24/15 00:00
Matrix: Air	Sample Volume: 21.82 m ³	Received: 03/25/15 11:06
Comments:		Analysis Date: 03/26/15 14:39

Hexavalent Chromium by SOP ERG-MOR-063

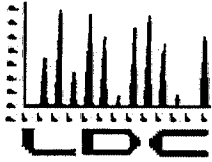
<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u> ng/m ³ Air	<u>Flag</u>	<u>MDL</u> ng/m ³ Air
Hexavalent Chromium	1854-02-99	ND	U	0.0038

APR 02 2015

Initials: *CR*

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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

April 7, 2015

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 April 2, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #34011:

<u>SDG</u>	<u>Fraction</u>
5032607/5032729	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: March 25 through March 26, 2015
LDC Report Date: April 6, 2015
Matrix: Air
Parameters: Hexavalent Chromium
Validation Level: EPA Level IV
Laboratory: Eastern Research Group
Sample Delivery Group (SDG): 5032607/5032729

Sample Identification

OAM 1 (03/25/15)
OAM 2 (03/25/15)
PAM-1 (03/25/15)
PAM-1D (03/25/15)
PAM-2 (03/25/15)
PAM-3 (03/25/15)
PAM-4 (03/25/15)
PAM-21 (03/25/15)
PAM-31 (03/25/15)
OAM 1 (03/26/15)
OAM 2 (03/26/15)
PAM-1 (03/26/15)
PAM-1D (03/26/15)
PAM-2 (03/26/15)
PAM-3 (03/26/15)
PAM-4 (03/26/15)
PAM-21 (03/26/15)
PAM-31 (03/26/15)
PAM-1 (03/25/15) DUP
PAM-1D (03/25/15) DUP
PAM-1 (03/26/15) DUP
PAM-1D (03/26/15) 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 (03/25/15) and PAM-31 (03/26/15) were identified as trip blanks. No hexavalent chromium was found.

Samples PAM-21 (03/25/15) and PAM-21 (03/26/15) 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. Results 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(03/25/15) and PAM-1D (03/25/15) and samples PAM-1(03/26/15) and PAM-1D (03/26/15) 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(03/25/15)	PAM-1D (03/25/15)			
Hexavalent chromium	0.0477	0.0524	9 (≤20)	-	-

Analyte	Concentration (ng/m ³)		RPD (Limits)	Flags	A or P
	PAM-1(03/26/15)	PAM-1D (03/26/15)			
Hexavalent chromium	0.0417	0.0386	8 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 5032607/5032729**

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
5032607/5032729**

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
5032607/5032729**

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

LDC #: 34011A6

VALIDATION COMPLETENESS WORKSHEET

Date: 4/6/15

SDG #: 5032607/5032729

Level IV

Page: 1 of 2

Laboratory: Eastern Research Group

Reviewer: SD

2nd Reviewer: OL

METHOD: (Analyte) 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.	Sample receipt/Technical holding times	A	03/25-26/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	FB=(8)(17) TB=(9)(18)
VI.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LS/D
IX.	Field duplicates	SW	FD=(3,4)(12,13)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

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

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	OAM 1 (03/25/15)	5032607-01	Air	03/25/15
2	OAM 2 (03/25/15)	5032607-02	Air	03/25/15
3	PAM-1 (03/25/15)	5032607-03	Air	03/25/15
4	PAM-1D (03/25/15)	5032607-04	Air	03/25/15
5	PAM-2 (03/25/15)	5032607-05	Air	03/25/15
6	PAM-3 (03/25/15)	5032607-06	Air	03/25/15
7	PAM-4 (03/25/15)	5032607-07	Air	03/25/15
8	PAM-21 (03/25/15)	5032607-08	Air	03/25/15
9	PAM-31 (03/25/15)	5032607-09	Air	03/25/15
10	OAM 1 (03/26/15)	5032729-01	Air	03/26/15
11	OAM 2 (03/26/15)	5032729-02	Air	03/26/15
12	PAM-1 (03/26/15)	5032729-03	Air	03/26/15
13	PAM-1D (03/26/15)	5032729-04	Air	03/26/15
14	PAM-2 (03/26/15)	5032729-05	Air	03/26/15
15	PAM-3 (03/26/15)	5032729-06	Air	03/26/15
16	PAM-4 (03/26/15)	5032729-07	Air	03/26/15
17	PAM-21 (03/26/15)	5032729-08	Air	03/26/15

LDC #: 34011A6

VALIDATION COMPLETENESS WORKSHEET

Date: 4/6/15

SDG #: 5032607/5032729

Level IV

Page: 2 of 2

Laboratory: Eastern Research Group

Reviewer: *[Signature]*

2nd Reviewer: *[Signature]*

METHOD: (Analyte) Hexavalent Chromium (ASTM D7614)

	Client ID	Lab ID	Matrix	Date
18	PAM-31 (03/26/15)	5032729-09	Air	03/26/15
19	PAM-1 (03/25/15)DUP	5032607-03DUP	Air	03/25/15
20	PAM-1D (03/25/15)DUP	5032607-04DUP	Air	03/25/15
21	PAM-1 (03/26/15)DUP	5032729-03DUP	Air	03/26/15
22	PAM-1D (03/26/15)DUP	5032729-04DUP	Air	03/26/15
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				

Notes:

Method: Inorganics (EPA Method See Coer)

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

LDC #: 34011 AD

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?	<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# 34011A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: SS
2nd Reviewer: OK

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0477	0.0524	9	

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	12	13		
Hexavalent Chromium	0.0417	0.0386	8	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\34011A6.wpd

LDC #: 34011AD

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1

Reviewer: SD

2nd Reviewer: SZ

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 3/31/15

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	0.0373886	0.99989	0.99989	Y
		s2	0.1	0.0688607			
		s3	0.2	0.1476989			
		s4	0.5	0.3856212			
		s5	1	0.7537491			
		s6	2	1.5562065			
ICV Calibration verification 11:16	Cr ⁺⁶	<u>Found</u> 0.5226 ng/ml	<u>True</u> 0.5 ng/ml		104.5%R	104.5%R	↓
CCV Calibration verification 12:21	Cr ⁺⁶	0.5222 ng/ml	0.5 ng/ml		104.4%R	104.4%R	
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS 11:49	Laboratory control sample	Cr ⁺⁶	1.06 ng/ml	1.00 ng/ml	106%R	106%R	Y
Not Required	Matrix spike sample	↓	(SSR-SR)				
DUP 12:52	Duplicate sample	↓	0.0466 ng/lm ³	0.0477 ng/lm ³	2.33%RPD	2.39%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 (2) 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: $\frac{0.0752675 - (-7.92 \times 10^{-3})}{0.7784574} = 0.1069 \text{ ng/ml}$
 $A = 0.0752675$ $m^3 = 21.51$
 $C_0 = -7.92 \times 10^{-3}$ $\frac{(\text{ng/ml})(V_f)}{m^3} = \text{ng/m}^3$ $\frac{(0.1069 \text{ ng/ml})(10 \text{ ml})}{21.51 \text{ m}^3} = 0.0497 \text{ ng/m}^3$
 $C_1 = 0.7784574$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0508	0.0508	Y
	2		0.0497	0.0497	Y
	3		0.0477	0.0477	Y
	4		0.0524	0.0524	Y
	5		0.0407	0.0407	Y
	6		0.0563	0.0562	Y*
	7		0.0481	0.0481	Y
	8		ND	ND	Y
	9		ND	ND	Y
	10		0.0519	0.0519	Y
	11		0.123	0.123	Y
	12		0.0417	0.0417	Y
	13		0.0386	0.0386	Y
	14		0.0502	0.0502	Y
	15		0.0514	0.0514	Y
	16		0.0460	0.0460	Y
	17		ND	ND	Y
	18		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: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5032607-01

Sampled: 03/25/15 14:48

Matrix: Air

Sample Volume: 21.51 m³

Received: 03/26/15 11:32

Comments: Start Time 3/24/15 14:53

Analysis Date: 03/31/15 13:57

Hexavalent Chromium by SOP ERG-MOR-063

<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		0.0038

APR 07 2015

Initials: *ER*

Eastern Research Group

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REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5032607-02

Sampled: 03/25/15 15:12

Matrix: Air

Sample Volume: 21.51 m³

Received: 03/26/15 11:32

Comments: Start Time 3/24/15 15:18

Analysis Date: 03/31/15 14:08

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0497		0.0038

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REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1

Lab ID: 5032607-03

Sampled: 03/25/15 16:05

Matrix: Air

Sample Volume: 21.32 m³

Received: 03/26/15 11:32

Comments: Col 1 Start Time 3/24/15 16:24

Analysis Date: 03/31/15 12:42

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0477		0.0038

APR 07 2015

Initials: CR

Eastern Research Group

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FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5032607-04

Sampled: 03/25/15 16:06

Matrix: Air

Sample Volume: 21.32 m³

Received: 03/26/15 11:32

Comments: Col 2 Start Time 3/24/15 16:25

Analysis Date: 03/31/15 13:01

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0524		0.0038

APR 07 2015

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5032607-05

Sampled: 03/25/15 15:47

Matrix: Air

Sample Volume: 21.16 m³

Received: 03/26/15 11:32

Comments: Start Time 3/24/15 16:10

Analysis Date: 03/31/15 14:40

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0407		0.0038

APR 07 2015

Initials: *CR*

Eastern Research Group

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Malvern, PA 19355

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FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5032607-06

Sampled: 03/25/15 15:37

Matrix: Air

Sample Volume: 21.17 m³

Received: 03/26/15 11:32

Comments: Start Time 3/24/15 16:06

Analysis Date: 03/31/15 14:51

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0563		0.0038

APR 07 2015

Initials: *CR*

Eastern Research Group

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FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5032607-07

Sampled: 03/25/15 15:29

Matrix: Air

Sample Volume: 21.4 m³

Received: 03/26/15 11:32

Comments: Start Time 3/24/15 15:42

Analysis Date: 03/31/15 15:02

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0481		0.0038

APR 07 2015

Initials: *ER*

Eastern Research Group

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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: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5032607-08

Sampled: 03/25/15 00:00

Matrix: Air

Sample Volume: 21.16 m³

Received: 03/26/15 11:32

Comments:

Analysis Date: 03/31/15 15:12

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

APR 07 2015

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: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5032607-09

Sampled: 03/25/15 00:00

Matrix: Air

Sample Volume: 21.17 m³

Received: 03/26/15 11:32

Comments:

Analysis Date: 03/31/15 15:23

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

APR 07 2015

Initials: ER



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: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5032729-01

Sampled: 03/26/15 14:56

Matrix: Air

Sample Volume: 21.67 m³

Received: 03/27/15 13:51

Comments: Start Time 3/25/15 14:51

Analysis Date: 03/31/15 15:34

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0519		0.0038

APR 07 2015

Initials: ER

Eastern Research Group

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Environmental Resources Management, Inc

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 2

Lab ID: 5032729-02

Sampled: 03/26/15 15:16

Matrix: Air

Sample Volume: 21.63 m³

Received: 03/27/15 13:51

Comments: Start Time 3/25/15 15:14

Analysis Date: 03/31/15 15:44

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.123		0.0038

APR 07 2015

Initials: *CR*

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FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-1

Lab ID: 5032729-03

Sampled: 03/26/15 16:28

Matrix: Air

Sample Volume: 21.89 m³

Received: 03/27/15 13:51

Comments: Col 1 Start Time 3/25/15 16:09

Analysis Date: 03/31/15 13:20

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0417		0.0038

APR 07 2015

Initials: *CR*

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ATTN: Mr. Jeff Boggs

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FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5032729-04

Sampled: 03/26/15 16:31

Matrix: Air

Sample Volume: 21.91 m³

Received: 03/27/15 13:51

Comments: Col 2 Start Time 3/25/15 16:10

Analysis Date: 03/31/15 13:39

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0386		0.0038

APR 07 2015

Initials: CR

Eastern Research Group

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5032729-05

Sampled: 03/26/15 16:13

Matrix: Air

Sample Volume: 21.98 m³

Received: 03/27/15 13:51

Comments: Start Time 3/25/15 15:48

Analysis Date: 03/31/15 15:55

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0502		0.0038

APR 07 2015

Initials: *CR*

Eastern Research Group

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Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-3

Lab ID: 5032729-06

Sampled: 03/26/15 16:05

Matrix: Air

Sample Volume: 21.98 m³

Received: 03/27/15 13:51

Comments: Start Time 3/25/15 15:40

Analysis Date: 03/31/15 16:06

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0514		0.0038

APR 07 2015

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: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5032729-07

Sampled: 03/26/15 15:49

Matrix: Air

Sample Volume: 21.86 m³

Received: 03/27/15 13:51

Comments: Start Time 3/25/15 15:32

Analysis Date: 03/31/15 16:17

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0460		0.0038

APR 07 2015

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: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5032729-08

Sampled: 03/26/15 00:00

Matrix: Air

Sample Volume: 21.98 m³

Received: 03/27/15 13:51

Comments:

Analysis Date: 03/31/15 16:49

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	ND	U	0.0038

APR 07 2015

Initials: CR

Eastern Research Group

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PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 04/02/15 10:37

SUBMITTED: 03/26/15 to 03/27/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-31

Lab ID: 5032729-09

Sampled: 03/26/15 00:00

Matrix: Air

Sample Volume: 21.98 m³

Received: 03/27/15 13:51

Comments:

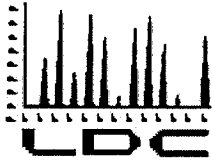
Analysis Date: 03/31/15 16:59

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

APR 07 2015

Initials: *ER*



LABORATORY DATA CONSULTANTS, INC.

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

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

April 8, 2015

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 April 7, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #34039:

<u>SDG</u>	<u>Fraction</u>
5040133	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: March 31, 2015

LDC Report Date: April 7, 2015

Matrix: Air

Parameters: Hexavalent Chromium

Validation Level: EPA Level IV

Laboratory: Eastern Research Group

Sample Delivery Group (SDG): 5040133

Sample Identification

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

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)	Flag	A or P
	PAM-1	PAM-1D			
Hexavalent chromium	0.0492	0.0460	7 (≤20)	-	-

**Harbor Point, MD, Hexavalent Chromium Monitoring
Hexavalent Chromium - Data Qualification Summary - SDG 5040133**

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
5040133**

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 5040133**

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

LDC #: 34039A6

VALIDATION COMPLETENESS WORKSHEET

Date: 4/7/15

SDG #: 5040133

Level IV

Page: 1 of 1

Laboratory: Eastern Research Group

Reviewer: SO

2nd Reviewer: [Signature]

METHOD: (Analyte) 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.	Sample receipt/Technical holding times	A	03/31/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	FB=(8) TB=(9)
VI.	Matrix Spike/Matrix Spike Duplicates	N	Not Required
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS10
IX.	Field duplicates	SW	FD=(3.4)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

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

SB=Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	OAM 1	5040133-01	Air	03/31/15
2	OAM 2	5040133-02	Air	03/31/15
3	PAM-1	5040133-03	Air	03/31/15
4	PAM-1D	5040133-04	Air	03/31/15
5	PAM-2	5040133-05	Air	03/31/15
6	PAM-3	5040133-06	Air	03/31/15
7	PAM-4	5040133-07	Air	03/31/15
8	PAM-21	5040133-08	Air	03/31/15
9	PAM-31	5040133-09	Air	03/31/15
10	PAM-1 DUP	5040133-03DUP	Air	03/31/15
11	PAM-1D DUP	5040133-04DUP	Air	03/31/15
12				
13				
14				
15				

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

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# 34039A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration (ng/m3)		RPD (≤ 20)	Qual.
	3	4		
Hexavalent Chromium	0.0492	0.0460	7	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\34039A6.wpd

LDC #: 34039AD

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr⁺⁶ was recalculated. Calibration date: 04/02/15

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	0.0319887	0.99992	0.99992	Y
		s2	0.1	0.0661265			
		s3	0.2	0.1472828			
		s4	0.5	0.3840763			
		s5	1	0.7518733			
		s6	2	1.5481016			
ICV 11:34 Calibration verification	Cr ⁺⁶	<u>Found</u> 0.5226 ng/ml	<u>True</u> 0.5 ng/ml		104.5%R	104.5%R	↓
CCV 12:38 Calibration verification	Cr ⁺⁶	0.5258 ng/ml	0.5 ng/ml		105.2%R	105.2%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 #: 34039A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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 12:06	Laboratory control sample	Cr^{+6}	1.06 ng/ml	1.00 ng/ml	106%R	106%R	Y
N	Matrix spike sample	↓	(SSR-SR)				
DUP 13:09	Duplicate sample	↓	0.0492 ng/m ³	0.0492 ng/m ³	0%RPD	0%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 (2) Cr⁺⁶ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(A - C_0) / C_1 \times V_f$ $V_f = 10 \text{ ml}$ $V_m = 21.52 \text{ m}^3$ Recalculation: $(0.0702549 - (-9.77E-03)) / 0.77626 = 0.1031 \text{ ng/ml}$

$A = 0.0702549$ $C_0 = -9.77E-03$ $C_1 = 0.77626$ $(\text{ng/ml}) \times (\text{ml}) / \text{m}^3 = \text{ng/m}^3$ $(0.1031 \text{ ng/ml}) \times (10 \text{ ml}) / 21.52 \text{ m}^3 = 0.0479 \text{ ng/m}^3$

#	Sample ID	Analyte	Reported Concentration (ng/m ³)	Calculated Concentration (ng/m ³)	Acceptable (Y/N)
	1	Cr ⁺⁶	0.0389	0.0388	Y*
	2		0.0479	0.0479	Y
	3		0.0492	0.0492	Y
	4		0.0460	0.0461	Y*
	5		0.0386	0.0386	Y
	6		0.0467	0.0467	Y
	7		0.0802	0.0802	Y
	8		ND	ND	
	9		ND	ND	

Note: _____



CERTIFICATE OF ANALYSIS

Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

FILE #: 3926.00

REPORTED: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE:

SITE CODE:

Honeywell Hex Chrome Study

Description: OAM 1

Lab ID: 5040133-01

Sampled: 03/31/15 14:53

Matrix: Air

Sample Volume: 21.54 m³

Received: 04/01/15 13:20

Comments: Start Time 3/30/15 14:58

Analysis Date: 04/02/15 13:37

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0389		0.0038

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Initials: ER



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Environmental Resources Management, Inc

75 Valley Stream Parkway, Suite 400

Malvern, PA 19355

ATTN: Mr. Jeff Boggs

PHONE: (443) 803-8495

FAX: (410) 266-8912

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REPORTED: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: OAM 2	Lab ID: 5040133-02	Sampled: 03/31/15 15:12
Matrix: Air	Sample Volume: 21.52 m ³	Received: 04/01/15 13:20
Comments: Start Time 3/30/15 15:18		Analysis Date: 04/02/15 13:48

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0479		0.0038

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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: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-1	Lab ID: 5040133-03	Sampled: 03/31/15 15:54
Matrix: Air	Sample Volume: 21.6 m ³	Received: 04/01/15 13:20
Comments: Col 1 Start Time 3/30/15 15:54		Analysis Date: 04/02/15 12:59

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0492		0.0038

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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: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-1D

Lab ID: 5040133-04

Sampled: 03/31/15 15:55

Matrix: Air

Sample Volume: 21.63 m³

Received: 04/01/15 13:20

Comments: Col 2 Start Time 3/30/15 15:53

Analysis Date: 04/02/15 13:18

Hexavalent Chromium by SOP ERG-MOR-063

<u>Analyte</u>	<u>CAS Number</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>
		<u>ng/m³ Air</u>		<u>ng/m³ Air</u>
Hexavalent Chromium	1854-02-99	0.0460		0.0038

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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: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-2

Lab ID: 5040133-05

Sampled: 03/31/15 15:43

Matrix: Air

Sample Volume: 21.56 m³

Received: 04/01/15 13:20

Comments: Start Time 3/30/15 15:45

Analysis Date: 04/02/15 13:58

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0386		0.0038

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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

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REPORTED: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE: Honeywell Hex Chrome Study
SITE CODE:

Description: PAM-3	Lab ID: 5040133-06	Sampled: 03/31/15 15:36
Matrix: Air	Sample Volume: 21.53 m ³	Received: 04/01/15 13:20
Comments: Start Time 3/30/15 15:40		Analysis Date: 04/02/15 14:09

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0467		0.0038

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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

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REPORTED: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE:
SITE CODE:

Honeywell Hex Chrome Study

Description: PAM-4

Lab ID: 5040133-07

Sampled: 03/31/15 15:29

Matrix: Air

Sample Volume: 21.46 m³

Received: 04/01/15 13:20

Comments: Start Time 3/30/15 15:39

Analysis Date: 04/02/15 14:20

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0802		0.0038

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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: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-21

Lab ID: 5040133-08

Sampled: 03/31/15 00:00

Matrix: Air

Sample Volume: 21.56 m³

Received: 04/01/15 13:20

Comments:

Analysis Date: 04/02/15 14:30

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

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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: 04/07/15 12:13

SUBMITTED: 04/01/15

AQS SITE

CODE: SITE CODE: Honeywell Hex Chrome Study

Description: PAM-31	Lab ID: 5040133-09	Sampled: 03/31/15 00:00
Matrix: Air	Sample Volume: 21.53 m ³	Received: 04/01/15 13:20
Comments:		Analysis Date: 04/02/15 15:03

Hexavalent Chromium by SOP ERG-MOR-063

<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	0.0038

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