

LDC #: 39849D6

VALIDATION COMPLETENESS WORKSHEET

Date: 11-30-17

SDG #: 17-29969

Level III/IV

Page: 1 of 2

Laboratory: BC Laboratories, Inc.

Reviewer: MS
2nd Reviewer: MS**METHOD: (Analyte)** Chloride, Nitrate-N, Sulfate (EPA Method 300.0), Nitrite-N (EPA Method 353.2), Hexavalent Chromium (EPA SW846 Method 7196), Orthophosphate-P (EPA Method 365.1), Perchlorate (EPA Method 314.0)

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	EB = 12
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
VII.	Duplicate sample analysis	A	DUP (#15: ClO ₄ OK by difference)
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	D = 3+4
X.	Sample result verification	A	Not reviewed for Level III validation
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:

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-22-5	1729969-02	Water	10/19/17
2	MW-22-4	1729969-03	Water	10/19/17
3	MW-22-3	1729969-04	Water	10/19/17
4	DUP-4-4Q17	1729969-05	Water	10/19/17
5	MW-22-2	1729969-06	Water	10/19/17
6	MW-22-1	1729969-07	Water	10/19/17
7	MW-24-5	1729969-08	Water	10/19/17
8	MW-24-4	1729969-09	Water	10/19/17
9	MW-24-3**	1729969-10**	Water	10/19/17
10	MW-24-2	1729969-11	Water	10/19/17
11	MW-24-1	1729969-12	Water	10/19/17
12	EB-4-101917	1729969-13	Water	10/19/17
13	MW-22-2MS	1729969-06MS	Water	10/19/17
14	MW-22-2MSD	1729969-06MSD	Water	10/19/17
15	MW-22-2DUP	1729969-06DUP	Water	10/19/17
16	MW-24-1MS	1729969-12MS	Water	10/19/17
17	MW-24-1MSD	1729969-12MSD	Water	10/19/17

LDC #: 39849D6
SDG #: 17-29969
Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 11-30-17
Page: 2 of 2
Reviewer: MG
2nd Reviewer: [Signature]

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA Method 300.0), Nitrite-N (EPA Method 353.2), Hexavalent Chromium (EPA SW846 Method 7196), Orthophosphate-P (EPA Method 365.1), Perchlorate (EPA Method 314.0)

	Client ID	Lab ID	Matrix	Date
18	MW-24-1DUP	1729969-12DUP	Water	10/19/17
19				
20				
21				
22	PBW1			
23	PBW2			

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?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL (≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 39849D6

VALIDATION FINDINGS CHECKLIST

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

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

LDC#: 39849D6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics, Method See Cover

Analyte	Concentration (mg/L)		RPD	
	3	4		
Hexavalent Chromium	0.0024	0.0025	4	
Perchlorate (ug/L)	2.1	2.3	9	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2017\39849D6.WPD

LDC #: ⁴39879D6
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VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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

METHOD: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of C104 was recalculated. Calibration date: 11-1-17

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

$\%R = \frac{\text{Found}}{\text{True}} \times 100$
 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 ID	Conc. Found (units)	Area True (units)	Recalculated	Reported	Acceptable (Y/N)
					r or %R	r or %R	
Initial calibration	C104	Blank	-	-	$r^2 = 0.994878$	$r^2 = 0.995013$	Y
		Standard 1	2 (µg/L)	0.0025			
		Standard 2	4 ()	0.0046			
		Standard 3	6 ()	0.0070			
		Standard 4	10 ()	0.0137			
		Standard 5	20 ()	0.0250			
		Standard 6	-	-			
		Standard 7	-	-			
Calibration verification	Cr VI	0130 CCV3	0.0497 (mg/L)	0.050 (mg/L)	99.4	99.5	↓
Calibration verification	C104	1915 CCV2	10.06 (µg/L)	10.00 (µg/L)	101	101	
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 #: 39849D6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method see cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
<u>0128</u> <u>LCS</u>	Laboratory control sample	<u>Cr VI</u>	<u>0.0467 (mg/L)</u>	<u>0.050 (mg/L)</u>	<u>93.4</u>	<u>92.4</u>	<u>Y</u>
<u>2118</u> <u>16</u>	Matrix spike sample	<u>ClO₄</u>	(SSR-SR) <u>10.13 (ug/L)</u>	<u>10.101 (ug/L)</u>	<u>100</u>	<u>101</u>	↓
<u>0128/0128</u> <u>18</u>	Duplicate sample	<u>Cr VI</u>	<u>0.000704 (mg/L)</u>	<u>ND (mg/L)</u>	<u>0</u>	<u>-</u>	

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



LABORATORY DATA CONSULTANTS, INC.

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

Tidewater, Inc.
3761 Attucks Drive
Powell, OH 43065
ATTN: Mr. David Conner

December 18, 2017

SUBJECT: NASA JPL, 4Q2017, Data Validation

Dear Mr. Conner,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on November 28, 2017. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #39937:

SDG

Fraction

17-30097, 17-30166, 17-30324
17-30445, 17-30577

Volatiles, Chromium, Wet Chemistry

The data validation was performed under Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007, update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng
Project Manager/Senior Chemist

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Volatiles

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30097

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TB-5-102017	1730097-01	Water	10/20/17
MW-23-5	1730097-02	Water	10/20/17
MW-23-4	1730097-03	Water	10/20/17
MW-23-3	1730097-04	Water	10/20/17
MW-23-2**	1730097-05**	Water	10/20/17
MW-23-1	1730097-06	Water	10/20/17
MW-3-5	1730097-07	Water	10/20/17
MW-3-4	1730097-08	Water	10/20/17
MW-3-3	1730097-09	Water	10/20/17
MW-3-2**	1730097-10**	Water	10/20/17
MW-3-1	1730097-11	Water	10/20/17
EB-5-102017	1730097-12	Water	10/20/17
SB-2-102017	1730097-13	Water	10/20/17
MW-23-1MS	1730097-06MS	Water	10/20/17
MW-23-1MSD	1730097-06MSD	Water	10/20/17

**Indicates sample underwent Level IV review

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 524.2

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV evaluation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/26/17 (26oct35)	Bromomethane	47.7	TB-5-102017 MW-23-5 MW-23-4 MW-23-3 MW-23-2** MW-23-1	UJ (all non-detects)	A
10/26/17 (26oct36)	Methyl iodide Pentachloroethane	51.8 82.6	TB-5-102017 MW-23-5 MW-23-4 MW-23-3 MW-23-2** MW-23-1	UJ (all non-detects) UJ (all non-detects)	

Date	Compound	%D	Associated Samples	Flag	A or P
10/27/17 (27oct02)	Bromomethane	39.7	MW-3-5 MW-3-4 MW-3-3 MW-3-2** MW-3-1 EB-5-102017 SB-2-102017	UJ (all non-detects)	A
10/27/17 (27oct03)	Methyl iodide	56.1	MW-3-5 MW-3-4 MW-3-3 MW-3-2** MW-3-1 EB-5-102017 SB-2-102017	UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-5-102017 was identified as a trip blank. No contaminants were found.

Sample EB-5-102017 was identified as an equipment blank. No contaminants were found.

Sample SB-2-102017 was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to continuing calibration %D, data were qualified as estimated in thirteen samples.

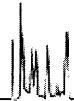
The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Volatiles - Data Qualification Summary - SDG 17-30097

Sample	Compound	Flag	A or P	Reason
TB-5-102017 MW-23-5 MW-23-4 MW-23-3 MW-23-2** MW-23-1	Bromomethane Methyl iodide Pentachloroethane	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D)
MW-3-5 MW-3-4 MW-3-3 MW-3-2** MW-3-1 EB-5-102017 SB-2-102017	Bromomethane Methyl iodide	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D)

NASA JPL, 4Q2017
Volatiles - Laboratory Blank Data Qualification Summary - SDG 17-30097

No Sample Data Qualified in this SDG



Tidewater Inc. Reported: 11/17/2017 12:37:28PM
 3761 Attucks Drive Project: JPL- GW Monitoring Wells
 Powell, OH 43065 Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-5-102017

Laboratory: BC Laboratories SDG: 17-30097
 Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
 Matrix: Water Laboratory ID: 1730097-01 File ID: 26OCT53.D
 Sampled: 10/20/17 07:00 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 06:00
 Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
 Batch: BJJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>UT</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U



Tidewater Inc. Reported: 11/17/2017 12:37:28PM
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 Powell, OH 43065 Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-5-102017

Laboratory: BC Laboratories SDG: 17-30097
 Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
 Matrix: Water Laboratory ID: 1730097-01 File ID: 26OCT53.D
 Sampled: 10/20/17 07:00 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 06:00
 Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
 Batch: BJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

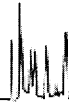
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UT</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>UT</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.7000	97.0	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.8900	98.9	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.6900	96.9	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	262417	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	103438	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	433458	7.38	447155	7.38	

* Values outside of QC limits

11/17/17 8



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

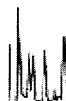
TB-5-102017

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-01</u>	File ID:	<u>26OCT53.D</u>		
Sampled:	<u>10/20/17 07:00</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 06:00</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2683</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-5

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-02 File ID: 26OCT54.D
Sampled: 10/20/17 07:45 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 06:23
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>UT</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 *DC*

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-5

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-02</u>	File ID:	<u>26OCT54.D</u>		
Sampled:	<u>10/20/17 07:45</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 06:23</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>B[J]2683</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.31	J
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-5

Laboratory:	BC Laboratories	SDG:	17-30097				
Client:	Tidewater Inc.	Project:	JPL- GW Monitoring Wells				
Matrix:	Water	Laboratory ID:	1730097-02	File ID:	26OCT54.D		
Sampled:	10/20/17 07:45	Prepared:	10/26/17 08:07	Analyzed:	10/27/17 06:23		
Solids:		Preparation:	EPA 5030 Water MS	Initial/Final:	25 ml / 25 ml		
Batch:	BJJ2683	Sequence:	1719642	Calibration:	1710006	Instrument:	MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UT</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>UT</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.160	102	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.020	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.120	101	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	254697	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	97097	9.62	107919	9.61	
1,4-Difluorobenzene (IS)	427531	7.38	447155	7.38	

* Values outside of QC limits

11/17 ✗

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

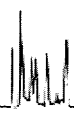
MW-23-5

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-02</u>	File ID:	<u>26OCT54.D</u>		
Sampled:	<u>10/20/17 07:45</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 06:23</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJ2683</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-4

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-03 File ID: 26OCT55.D
Sampled: 10/20/17 08:15 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 06:46
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: B[J]2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>UT</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 *[Signature]*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-4

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-03</u>	File ID:	<u>26OCT55.D</u>		
Sampled:	<u>10/20/17 08:15</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 06:46</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJ2683</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UT</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>UT</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.9800	99.8	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.010	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.050	100	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	259910	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	99862	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	426512	7.38	447155	7.38	

* Values outside of QC limits

11/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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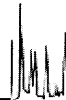
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-4

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-03</u>	File ID:	<u>26OCT55.D</u>		
Sampled:	<u>10/20/17 08:15</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 06:46</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2683</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits



Tidewater Inc.
 3761 Attucks Drive
 Powell, OH 43065

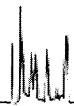
Reported: 11/17/2017 12:37:28PM
 Project: JPL- GW Monitoring Wells
 Project Number: 4Q17
 Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-3

Laboratory: BC Laboratories SDG: 17-30097
 Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
 Matrix: Water Laboratory ID: 1730097-04 File ID: 26OCT56.D
 Sampled: 10/20/17 08:40 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 07:10
 Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
 Batch: BfJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U UT
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-04</u>	File ID: <u>26OCT56.D</u>	
Sampled: <u>10/20/17 08:40</u>	Prepared: <u>10/26/17 08:07</u>	Analyzed: <u>10/27/17 07:10</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>B[J]2683</u>	Sequence: <u>1719642</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

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Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-3

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-04 File ID: 26OCT56.D
Sampled: 10/20/17 08:40 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 07:10
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UT</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>UT</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.380	104	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.060	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.6900	96.9	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	258759	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	102392	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	426990	7.38	447155	7.38	

* Values outside of QC limits

11/17/17 8

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

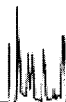
MW-23-3

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-04</u>	File ID:	<u>26OCT56.D</u>		
Sampled:	<u>10/20/17 08:40</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 07:10</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJ2683</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17 &



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

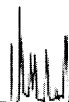
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-2

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-05 File ID: 26OCT57.D
Sampled: 10/20/17 09:00 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 07:33
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>UT</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.42	J
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 8



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-05</u>	File ID: <u>26OCT57.D</u>	
Sampled: <u>10/20/17 09:00</u>	Prepared: <u>10/26/17 08:07</u>	Analyzed: <u>10/27/17 07:33</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJ2683</u>	Sequence: <u>1719642</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.31	J
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	1.1	
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-2

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-05 File ID: 26OCT57.D
Sampled: 10/20/17 09:00 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 07:33
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>KS</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>KS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.220	102	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.060	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9900	99.9	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	250264	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	101288	9.62	107919	9.61	
1,4-Difluorobenzene (IS)	421164	7.38	447155	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

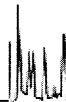
MW-23-2

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-05</u>	File ID:	<u>26OCT57.D</u>		
Sampled:	<u>10/20/17 09:00</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 07:33</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJ2683</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-1

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-06 File ID: 26OCT52.D
Sampled: 10/20/17 09:45 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 05:36
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>UT</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.92	
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.16	J
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 *2*

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-23-1

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-06</u>	File ID:	<u>26OCT52.D</u>		
Sampled:	<u>10/20/17 09:45</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 05:36</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2683</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

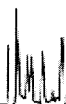
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>KS</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>KS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.060	101	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.240	102	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9500	99.5	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	236353	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	93734	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	397173	7.38	447155	7.38	

* Values outside of QC limits

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

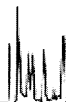
MW-23-1

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-06 File ID: 26OCT52.D
Sampled: 10/20/17 09:45 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 05:36
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

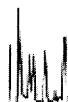
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-5

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-07 File ID: 27OCT16.D
Sampled: 10/20/17 11:35 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 14:57
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>US</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.20	J
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

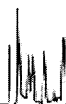
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-5

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-07 File ID: 27OCT16.D
Sampled: 10/20/17 11:35 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 14:57
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-5

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/20/17 11:35
Solids:
Batch: BJ2683
SDG: 17-30097
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730097-07
Prepared: 10/26/17 08:07
Preparation: EPA 5030 Water MS
File ID: 27OCT16.D
Analyzed: 10/27/17 14:57
Initial/Final: 25 ml / 25 ml
Sequence: 1719744
Calibration: 1710006
Instrument: MS-V5

Table with 5 columns: CAS NO., COMPOUND, DILUTION, CONC. (ug/L), Q. Lists various organic compounds and their concentrations.

Table with 6 columns: SYSTEM MONITORING COMPOUND, ADDED (ug/L), CONC (ug/L), % REC, QC LIMITS, Q. Shows surrogate compounds and their recovery percentages.

Table with 6 columns: INTERNAL STANDARD, AREA, RT, REF AREA, REF RT, Q. Lists internal standards used for calibration.

* Values outside of QC limits

Handwritten signature/initials



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

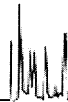
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-4

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-08 File ID: 27OCT17.D
Sampled: 10/20/17 12:15 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 15:21
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>KS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.19	J
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-4

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/20/17 12:15
Solids:
Batch: BJ2683
SDG: 17-30097
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730097-08
Prepared: 10/26/17 08:07
Preparation: EPA 5030 Water MS
File ID: 27OCT17.D
Analyzed: 10/27/17 15:21
Initial/Final: 25 ml / 25 ml
Sequence: 1719744
Calibration: 1710006
Instrument: MS-V5

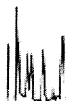
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Table with 6 columns: SYSTEM MONITORING COMPOUND, ADDED (ug/L), CONC (ug/L), % REC, QC LIMITS, Q. Lists surrogate compounds and their recovery percentages.

Table with 6 columns: INTERNAL STANDARD, AREA, RT, REF AREA, REF RT, Q. Lists internal standards and their retention times.

* Values outside of QC limits

Handwritten signature and date 11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

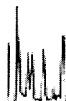
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-3

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-09 File ID: 27OCT18.D
Sampled: 10/20/17 12:45 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 15:44
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	J
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-3

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-09 File ID: 27OCT18.D
Sampled: 10/20/17 12:45 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 15:44
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-3

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-09 File ID: 27OCT18.D
Sampled: 10/20/17 12:45 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 15:44
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

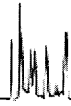
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UT</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.4300	94.3	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.8800	98.8	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.8200	98.2	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	261488	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	100334	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	421669	7.38	436994	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-10</u>	File ID: <u>27OCT19.D</u>	
Sampled: <u>10/20/17 13:05</u>	Prepared: <u>10/26/17 08:07</u>	Analyzed: <u>10/27/17 16:07</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2683</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

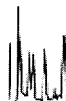
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-2

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-10 File ID: 27OCT19.D
Sampled: 10/20/17 13:05 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 16:07
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-2

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-10 File ID: 27OCT19.D
Sampled: 10/20/17 13:05 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 16:07
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

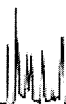
Table with 5 columns: CAS NO., COMPOUND, DILUTION, CONC. (ug/L), Q. Lists various organic compounds and their concentrations.

Table with 6 columns: SYSTEM MONITORING COMPOUND, ADDED (ug/L), CONC (ug/L), % REC, QC LIMITS, Q. Shows surrogate compounds and recovery percentages.

Table with 6 columns: INTERNAL STANDARD, AREA, RT, REF AREA, REF RT, Q. Lists internal standards used for calibration.

* Values outside of QC limits

11/17/17 2



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

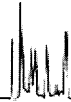
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-1

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-11 File ID: 27OCT20.D
Sampled: 10/20/17 13:30 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 16:30
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>US</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

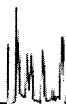
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-1

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-11 File ID: 27OCT20.D
Sampled: 10/20/17 13:30 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 16:30
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-3-1

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-11 File ID: 27OCT20.D
Sampled: 10/20/17 13:30 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 16:30
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

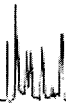
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UT</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.6600	96.6	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9000	99.0	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.100	101	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	257519	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	98968	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	428597	7.38	436994	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

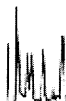
MW-3-1

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-11</u>	File ID:	<u>27OCT20.D</u>		
Sampled:	<u>10/20/17 13:30</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 16:30</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2683</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

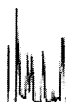
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-5-102017

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-12 File ID: 27OCT21.D
Sampled: 10/20/17 13:40 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 16:54
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>US</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

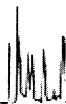
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-5-102017

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-12 File ID: 27OCT21.D
Sampled: 10/20/17 13:40 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 16:54
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-5-102017

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-12 File ID: 27OCT21.D
Sampled: 10/20/17 13:40 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 16:54
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UT</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.7900	97.9	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.090	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.7700	97.7	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	260331	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	100691	9.62	105852	9.61	
1,4-Difluorobenzene (IS)	426542	7.38	436994	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-5-102017

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-12</u>	File ID:	<u>27OCT21.D</u>		
Sampled:	<u>10/20/17 13:40</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 16:54</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2683</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

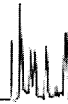
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

SB-2-102017

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-13 File ID: 27OCT22.D
Sampled: 10/20/17 13:50 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 17:17
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>UT</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

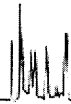
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

SB-2-102017

Laboratory: BC Laboratories SDG: 17-30097
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730097-13 File ID: 27OCT22.D
Sampled: 10/20/17 13:50 Prepared: 10/26/17 08:07 Analyzed: 10/27/17 17:17
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2683 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 *[Signature]*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:37:28PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

SB-2-102017

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30097</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730097-13</u>	File ID:	<u>27OCT22.D</u>		
Sampled:	<u>10/20/17 13:50</u>	Prepared:	<u>10/26/17 08:07</u>	Analyzed:	<u>10/27/17 17:17</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2683</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

METHOD: GC/MS Volatiles (EPA Method 524.2)

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/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL \leq 20% r^2 ICW \leq 30%
IV.	Continuing calibration	SW	CW \leq 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1 EB = 12 SB = 13
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	NA	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Level III validation
XIII.	Target compound identification	A	Not reviewed for Level III validation
XIV.	System performance	A	Not reviewed for Level III validation
XV.	Overall assessment of data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	TB-5-102017	1730097-01	Water	10/20/17
2	MW-23-5	1730097-02	Water	10/20/17
3	MW-23-4	1730097-03	Water	10/20/17
4	MW-23-3	1730097-04	Water	10/20/17
5	MW-23-2**	1730097-05**	Water	10/20/17
6	MW-23-1	1730097-06	Water	10/20/17
7	MW-3-5	1730097-07	Water	10/20/17
8	MW-3-4	1730097-08	Water	10/20/17
9	MW-3-3	1730097-09	Water	10/20/17
10	MW-3-2**	1730097-10**	Water	10/20/17
11	MW-3-1	1730097-11	Water	10/20/17
12	EB-5-102017	1730097-12	Water	10/20/17
13	SB-2-102017	1730097-13	Water	10/20/17

LDC #: 39937A1
SDG #: 17-30097
Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 12/05/17
Page: 2 of 2
Reviewer: SV
2nd Reviewer: CF

METHOD: GC/MS Volatiles (EPA Method 524.2)

	Client ID	Lab ID	Matrix	Date
14	MW-23-1MS	1730097-06MS	Water	10/20/17
15	MW-23-1MSD	1730097-06MSD	Water	10/20/17
16				
17				
18				
19				
20				

Notes:

-	BJ 2683 - BLK I					
-	1719744 - CCP I					

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. GC/MS Instrument performance check				
Was a tune check performed prior to establishing and/or re-establishing an initial calibration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the BFB performance results reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Initial calibration				
Did the laboratory perform at least 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIa. Initial Calibration Verification calibration				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration standard analyzed at the beginning of each analysis batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) of continuing calibration < 30%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed with each analysis batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field blanks				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field blanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VIII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?	<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 QC limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 39937 A1

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) within 70-130%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
X. Field duplicates				
Field duplicate pairs were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field duplicates.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
XI. Internal standards				
Were internal standard area counts within +/-30% of the area of the most recent continuing calibration standard and +/-50% of the average peak area in the initial calibration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were retention times within +/-30 seconds of the associated calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) or regression equations used to quantitate the compound?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were compound quantitation and CRQLs 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"/>	
XIII. Target compound identification				
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were chromatogram peaks verified and accounted for?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIV. System performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene	A2.
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane	B2.
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane	C2.
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene	D2.
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11	E2.
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12	F2.
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113	G2.
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114	H2.
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane	I2.
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide	J2.
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane	K2.
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane	L2.
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane	M2.
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane	N2.
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO. 1,1-Difluoroethane	O1. 3-Methylpentane	O2.
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane	P2.
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane	Q2.
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3-Trimethylbutane	R2.
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane	S2.
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane	T2.
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal	U2.
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene	V2.
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol	W2.
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene	X2.
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. <i>Hexachloroethane</i>	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. <i>Methyl iodide</i>	Z2.

LDC #: 39937A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$$RRF = (A_x)(C_{is}) / (A_{is})(C_x)$$

average RRF = sum of the RRFs/number of standards

$$\%RSD = 100 * (S/X)$$

A_x = Area of Compound

C_x = Concentration of compound,

S= Standard deviation of the RRFs,

A_{is} = Area of associated internal standard

C_{is} = Concentration of internal standard

X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS V5	10/0517	cis-1,2-DCE (FB)	0.494497	0.494497	0.480664	0.480664	5.963	5.963
			Trichloroethene (DFB)	0.305019	0.305019	0.296404	0.296404	4.748	4.748
			1,2,4-TMB (CBZ)	5.026954	5.026954	4.834027	4.834027	13.490	13.490

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

$$\% \text{ Difference} = 100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$$

$$\text{RRF} = (\text{Ax})(\text{Cis}) / (\text{Ais})(\text{Cx})$$

Where:

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound,

Cx = Concentration of compound,

Ais = Area of associated internal standard

Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1	26OCT35 MS V5	10/26/17	cis-1,2-DCE (FB)	0.480664	0.525845	0.525845	9.4	9.4
			Trichloroethene (DFB)	0.296404	0.306484	0.306484	3.4	3.4
			1,2,4-TMB (CBZ)	4.83403	4.87375	4.87375	0.8	0.8
2	27OCT02 MS V5	10/27/17	cis-1,2-DCE (FB)	0.480664	0.570113	0.570113	18.6	18.6
			Trichloroethene (DFB)	0.296404	0.306550	0.306550	3.4	3.4
			1,2,4-TMB (CBZ)	4.83403	5.28740	5.28740	9.4	9.4

LDC #: 09957A1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: X

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 5

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	10.0	10.06	106	106	0
Bromofluorobenzene	↓	9.99	99.9	99.9	↓
1,2-Dichlorobenzene-d4	↓	10.22	102	102	↓
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

LDC #: 39957A1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = $100 * (SSC - SC) / SA$

Where: SSC = Spiked sample concentration
 SA = Spike added

SC = Sample concentration

RPD = $|MSC - MSDC| * 2 / (MSC + MSDC)$

MSC = Matrix spike percent recovery

MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: 14/15

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Percent Recovery		Percent Recovery		RPD	
						Reported	Recalc	Reported	Recalc	Reported	Recalc
1,1-Dichloroethene	25.0	25.0	0	29.48	28.51	118	118	114	114	3.14	3.14
Trichloroethene	↓	↓	3.35	27.02	28.45	94.7	94.7	101	101	5.86	5.86
Benzene	↓	↓	0	28.08	27.06	112	112	108	108	3.70	3.70
Toluene	↓	↓	↓	26.77	26.68	107	107	107	107	0.337	0.34
Chlorobenzene	↓	↓	↓	24.28	24.48	97.1	97.1	97.9	97.9	0.82	0.82

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

LDC #: 39907 A1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

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

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA

Where: SSC = Spiked sample concentration
 SA = Spike added

RPD = |LCS - LCSD| * 2 / (LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS ID: BJ2683-β51

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	25.0	NA	27.05	NA	108	108				
Trichloroethene	↓	↓	24.97	↓	99.9	99.9				
Benzene	↓	↓	25.98	↓	104	104				
Toluene	↓	↓	25.84	↓	103	103				
Chlorobenzene	↓	↓	24.06	↓	96.7	96.7				

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Chromium

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30097

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-23-5	1730097-02	Water	10/20/17
MW-23-4	1730097-03	Water	10/20/17
MW-23-3	1730097-04	Water	10/20/17
MW-23-2**	1730097-05**	Water	10/20/17
MW-23-1	1730097-06	Water	10/20/17
MW-3-5	1730097-07	Water	10/20/17
MW-3-4	1730097-08	Water	10/20/17
MW-3-3	1730097-09	Water	10/20/17
MW-3-2**	1730097-10**	Water	10/20/17
MW-3-1	1730097-11	Water	10/20/17
EB-5-102017	1730097-12	Water	10/20/17
SB-2-102017	1730097-13	Water	10/20/17
MW-23-1MS	1730097-06MS	Water	10/20/17
MW-23-1MSD	1730097-06MSD	Water	10/20/17
MW-23-1DUP	1730097-06DUP	Water	10/20/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chromium by Environmental Protection Agency (EPA) Method 200.8

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the method.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
10/31/17	CCV (09:22)	Chromium	88.9 (90-110)	MW-23-5 MW-23-1	J (all detects) UJ (all non-detects)	P

IV. ICP Interference Check Sample Analysis

ICP interference check sample analyses were not required by the method.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-5-102017 was identified as an equipment blank. No contaminants were found.

Sample SB-2-102017 was identified as a source blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. Percent differences (%D) were within QC limits.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to instrument calibration CCV %R, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Chromium - Data Qualification Summary - SDG 17-30097

Sample	Analyte	Flag	A or P	Reason
MW-23-5 MW-23-1	Chromium	J (all detects) UJ (all non-detects)	P	Instrument calibration (CCV %R)

NASA JPL, 4Q2017
Chromium - Laboratory Blank Data Qualification Summary - SDG 17-30097

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-23-5

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-02

File ID: PE_EL2_171031-033

Sampled: 10/20/17 07:45

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 09:06

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2718

Sequence: 1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U <u>US</u>	EPA-200.8

12/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-23-4

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-03

File ID: PE_EL2_171031-048

Sampled: 10/20/17 08:15

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 09:59

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2718

Sequence: 1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	3.2	1		EPA-200.8

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-23-3

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-04

File ID: PE_EL2_171031-049

Sampled: 10/20/17 08:40

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 10:02

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2718

Sequence: 1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	3.0	1		EPA-200.8

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-23-2

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-05

File ID: PE EL2 171031-050

Sampled: 10/20/17 09:00

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 10:05

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2718

Sequence: 1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1.1	1	J	EPA-200.8

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-23-1

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-06

File ID: PE_EL2_171031-027

Sampled: 10/20/17 09:45

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 08:45

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2718

Sequence: 1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.88	1	JJ	EPA-200.8

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-3-5

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-07

File ID: PE_EL2_171031-051

Sampled: 10/20/17 11:35

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 10:09

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2718

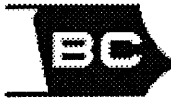
Sequence: 1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	11	1		EPA-200.8

12/17/17 d



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:33:00PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	---

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-3-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-08</u>	File ID: <u>PE_EL2 171031-052</u>	
Sampled: <u>10/20/17 12:15</u>	Prepared: <u>10/26/17 11:00</u>	Analyzed: <u>10/31/17 10:12</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJJ2718</u>	Sequence: <u>1719979</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	20	1		EPA-200.8

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-3-3

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-09

File ID: PE_EL2_171031-053

Sampled: 10/20/17 12:45

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 10:16

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2718

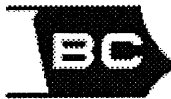
Sequence: 1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	2.4	1	J	EPA-200.8

12/17/17 [Signature]



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-3-2

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-10

File ID: PE_EL2_171031-054

Sampled: 10/20/17 13:05

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 10:19

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJ2718

Sequence:

1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-3-1

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-11

File ID: PE_EL2 171031-055

Sampled: 10/20/17 13:30

Prepared: 10/26/17 11:00

Analyzed: 10/31/17 10:23

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2718

Sequence:

1719979

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

11/17/17 2



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

EB-5-102017

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-12

File ID: PE_EL2 171030-291

Sampled: 10/20/17 13:40

Prepared: 10/27/17 08:30

Analyzed: 10/31/17 02:13

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJ2833

Sequence:

1719936

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:33:00PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

SB-2-102017

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-13

File ID: PE_EL2_171030-292

Sampled: 10/20/17 13:50

Prepared: 10/27/17 08:30

Analyzed: 10/31/17 02:16

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BIJ2833

Sequence: 1719936

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

12/17/17

LDC #: 39937A4a
 SDG #: 17-30097
 Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 12/12/17
 Page: 1 of 2
 Reviewer: JB
 2nd Reviewer: [Signature]

METHOD: Chromium (EPA Method 200.8)

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/A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not Required
V.	Laboratory Blanks	A	
VI.	Field Blanks	ND	EB=11, SB=12
VII.	Matrix Spike/Matrix Spike Duplicates	A	13, 14
VIII.	Duplicate sample analysis	A	15 - OK by difference
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	Not reviewed for Level III validation
XIV.	Overall Assessment of Data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-23-5	1730097-02	Water	10/20/17
2	MW-23-4	1730097-03	Water	10/20/17
3	MW-23-3	1730097-04	Water	10/20/17
4	MW-23-2**	1730097-05**	Water	10/20/17
5	MW-23-1	1730097-06	Water	10/20/17
6	MW-3-5	1730097-07	Water	10/20/17
7	MW-3-4	1730097-08	Water	10/20/17
8	MW-3-3	1730097-09	Water	10/20/17
9	MW-3-2**	1730097-10**	Water	10/20/17
10	MW-3-1	1730097-11	Water	10/20/17
11	EB-5-102017	1730097-12	Water	10/20/17
12	SB-2-102017	1730097-13	Water	10/20/17
13	MW-23-1MS	1730097-06MS	Water	10/20/17
14	MW-23-1MSD	1730097-06MSD	Water	10/20/17
15	MW-23-1DUP	1730097-06DUP	Water	10/20/17


LDC #: 39937A4a
SDG #: 17-30097
Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 12/12/17

Page: 2 of 2

Reviewer: 

2nd Reviewer: 

METHOD: Chromium (EPA Method 200.8)

	Client ID	Lab ID	Matrix	Date
16				
17				
18				
19				
20				

Notes: _____

Method:Metals (EPA SW 846 Method 6010/6020/7000)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution $\leq 5\%$?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?		✓		
Were the low standard checks within 70-130%			✓	
Were all initial calibration correlation coefficients within limits as specified by the method?			✓	
IV. 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.		/		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?			✓	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike 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 +/- RL (+/-2X RL for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.	✓			
VII. 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% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			✓	
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

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

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated	Reported	Acceptable (Y/N)
					%R	%R	
	ICP (Initial calibration)						
<u>ICV</u>	ICP/MS (Initial calibration) <u>10/30 7:10</u>	<u>Cr</u>	<u>50.774 ug/L</u>	<u>50.000 ug/L</u>	<u>102.7</u>	<u>102.7</u>	<u>Y</u>
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
<u>CCV₃</u>	ICP/MS (Continuing calibration) <u>10/31 9:31</u>	<u>Cr</u>	<u>40.051 ug/L</u>	<u>40.000 ug/L</u>	<u>100.7</u>	<u>100.7</u>	<u>Y</u>
	CVAA (Continuing calibration)						

Comments:

LDC #: 39937A4a
 SDG #: 17-30097

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Trace metals (EPA CLP SOW ILM02.1)

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

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

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
 True = Concentration of each analyte in the source.

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

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

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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (ug/L)
 SDR = Serial Dilution Result (ug/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
	ICP interference check						
LES	^{J2833} Laboratory control sample	Cr	40.209 ug/L	40.000 ug/L	1017.	1017	Y
MS	Matrix spike	Cr	^{0.882} (SSR-SR) 33.369 ug/L - SR = 32.487	40.000 ug/L	81.27.	81.27.	Y
MSD	Duplicate	Cr	33.455 ug/L	Found: 33.369 ug/L	0.257 RPD	0.257 RPD	Y
	ICP serial dilution						

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

SD - N/A ; result below 100 x MDL.

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Wet Chemistry

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30097

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-23-5	1730097-02	Water	10/20/17
MW-23-4	1730097-03	Water	10/20/17
MW-23-3	1730097-04	Water	10/20/17
MW-23-2**	1730097-05**	Water	10/20/17
MW-23-1	1730097-06	Water	10/20/17
MW-3-5	1730097-07	Water	10/20/17
MW-3-4	1730097-08	Water	10/20/17
MW-3-3	1730097-09	Water	10/20/17
MW-3-2**	1730097-10**	Water	10/20/17
MW-3-1	1730097-11	Water	10/20/17
EB-5-102017	1730097-12	Water	10/20/17
SB-2-102017	1730097-13	Water	10/20/17
MW-23-5MS	1730097-02MS	Water	10/20/17
MW-23-5MSD	1730097-02MSD	Water	10/20/17
MW-23-5DUP	1730097-02DUP	Water	10/20/17
MW-23-1MS	1730097-06MS	Water	10/20/17
MW-23-1MSD	1730097-06MSD	Water	10/20/17
MW-23-1DUP	1730097-06DUP	Water	10/20/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Hexavalent Chromium by Environmental Protection Agency (EPA) SW 846 Method 7196

Perchlorate by EPA Method 314.0

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-5-102017 was identified as an equipment blank. No contaminants were found.

Sample SB-2-102017 was identified as a source blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

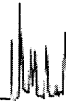
The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Wet Chemistry - Data Qualification Summary - SDG 17-30097

No Sample Data Qualified in this SDG

NASA JPL, 4Q2017
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 17-30097

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-23-5

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-02

File ID: F110217A.seq-18.0000.txt

Sampled: 10/20/17 07:45

Prepared: 11/02/17 11:00

Analyzed: 11/02/17 16:22

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B/K0310

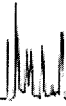
Sequence: 1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:29:35PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET

EPA-314.0

MW-23-4

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-03

File ID: F110217A.seq-19.0000.txt

Sampled: 10/20/17 08:15

Prepared: 11/02/17 11:00

Analyzed: 11/02/17 16:37

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0310

Sequence:

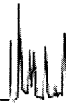
1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	1.2	1	J	EPA-314.0

12/17/17 *[Signature]*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-314.0

MW-23-3

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-04

File ID: F110217A.seq-20.0000.txt

Sampled: 10/20/17 08:40

Prepared: 11/02/17 11:00

Analyzed: 11/02/17 16:52

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0310

Sequence:

1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	2.8	1	J	EPA-314.0

11/17/17


Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:29:35PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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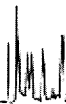
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-23-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-05</u>	File ID: <u>F110217A.seq-21.0000.txt</u>	
Sampled: <u>10/20/17 09:00</u>	Prepared: <u>11/02/17 11:00</u>	Analyzed: <u>11/02/17 17:08</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0310</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	4.2	1		EPA-314.0

12/17/17 




Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:29:35PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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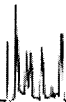
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-23-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-06</u>	File ID: <u>F110217A.seq-81.0000.txt</u>	
Sampled: <u>10/20/17 09:45</u>	Prepared: <u>11/02/17 11:00</u>	Analyzed: <u>11/03/17 11:27</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0310</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	3.8	1	J	EPA-314.0

12/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-3-5

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-07

File ID: F110217A.seq-28.0000.txt

Sampled: 10/20/17 11:35

Prepared: 11/02/17 11:00

Analyzed: 11/02/17 18:55

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJK0310

Sequence:

1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.74	1	J	EPA-314.0

11/17/17 [Signature]



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:29:35PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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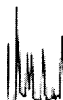
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-3-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-08</u>	File ID: <u>F110217A.seq-29.0000.txt</u>	
Sampled: <u>10/20/17 12:15</u>	Prepared: <u>11/02/17 11:00</u>	Analyzed: <u>11/02/17 19:10</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0310</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	1.0	1	J	EPA-314.0

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-3-3

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-09

File ID: F110217A.seq-30.0000.txt

Sampled: 10/20/17 12:45

Prepared: 11/02/17 11:00

Analyzed: 11/02/17 19:26

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0310

Sequence: 1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	1.0	1	J	EPA-314.0

12/17/17 e



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-3-2

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-10

File ID: F110217A.seq-31.0000.txt

Sampled: 10/20/17 13:05

Prepared: 11/02/17 11:00

Analyzed: 11/02/17 19:41

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0310

Sequence:

1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17

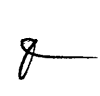
Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:29:35PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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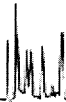
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-3-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-11</u>	File ID: <u>F110217A.seq-32.0000.txt</u>	
Sampled: <u>10/20/17 13:30</u>	Prepared: <u>11/02/17 11:00</u>	Analyzed: <u>11/02/17 19:56</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0310</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

EB-5-102017

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-12

File ID: F110217A.seq-33.0000.txt

Sampled: 10/20/17 13:40

Prepared: 11/02/17 11:00

Analyzed: 11/02/17 20:12

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0310

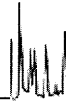
Sequence: 1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

SB-2-102017

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-13

File ID: F110217A.seq-34.0000.txt

Sampled: 10/20/17 13:50

Prepared: 11/02/17 11:00

Analyzed: 11/02/17 20:27

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B/K0310

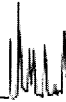
Sequence: 1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-23-5

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-02

File ID: 171021 0014 CR6-011

Sampled: 10/20/17 07:45

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:14

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2280

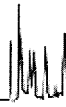
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-23-4

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-03

File ID: 171021 0014 CR6-015

Sampled: 10/20/17 08:15

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:14

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B1J2280

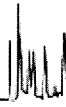
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0035	1		EPA-7196

12/17/17 Q



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Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-23-3

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-04

File ID: 171021 0014 CR6-016

Sampled: 10/20/17 08:40

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:14

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BFJ2280

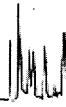
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0030	1		EPA-7196

12/17/17 d



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:29:35PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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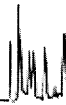
INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-23-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-05</u>	File ID: <u>171021 0014 CR6-017</u>	
Sampled: <u>10/20/17 09:00</u>	Prepared: <u>10/21/17 00:14</u>	Analyzed: <u>10/21/17 00:14</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2280</u>	Sequence: <u>1719647</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0010	1	J	EPA-7196

12/17/17



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Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-23-1

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-06

File ID: 171021 0014 CR6-022

Sampled: 10/20/17 09:45

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:20

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BfJ2281

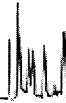
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-3-5

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-07

File ID: 171021 0014 CR6-026

Sampled: 10/20/17 11:35

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:20

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BfJ2281

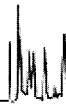
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17



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Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-7196

MW-3-4

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-08

File ID: 171021 0014 CR6-027

Sampled: 10/20/17 12:15

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:20

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2281

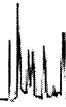
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 *[Signature]*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-3-3

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-09

File ID: 171021 0014 CR6-028

Sampled: 10/20/17 12:45

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:20

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2281

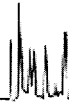
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0021	1		EPA-7196

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-3-2

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-10

File ID: 171021 0014 CR6-029

Sampled: 10/20/17 13:05

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:20

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2281

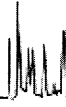
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17



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3761 Attucks Drive
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Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-3-1

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-11

File ID: 171021 0014 CR6-030

Sampled: 10/20/17 13:30

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:21

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[J2281

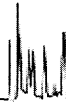
Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 [Signature]



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:29:35PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-7196

EB-5-102017

Laboratory: BC Laboratories

SDG: 17-30097

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730097-12

File ID: 171021 0014 CR6-033

Sampled: 10/20/17 13:40

Prepared: 10/21/17 00:14

Analyzed: 10/21/17 00:21

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJ2281

Sequence: 1719647

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 9



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:29:35PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

SB-2-102017

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30097</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730097-13</u>	File ID: <u>171021 0014 CR6-034</u>	
Sampled: <u>10/20/17 13:50</u>	Prepared: <u>10/21/17 00:14</u>	Analyzed: <u>10/21/17 00:21</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2281</u>	Sequence: <u>1719647</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17

LDC #: 39937A6

VALIDATION COMPLETENESS WORKSHEET

Date: 12/21/17

SDG #: 17-30097

Level III/IV

Page: 1 of 2

Laboratory: BC Laboratories, Inc.

Reviewer: JB2nd Reviewer: C**METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7196), Perchlorate (EPA Method 314.0)**

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/A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	EB=11, SB=12
VI.	Matrix Spike/Matrix Spike Duplicates	A	(13,14)(16,17)
VII.	Duplicate sample analysis	A	15,18
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for Level III validation
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:

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-23-5	1730097-02	Water	10/20/17
2	MW-23-4	1730097-03	Water	10/20/17
3	MW-23-3	1730097-04	Water	10/20/17
4	MW-23-2**	1730097-05**	Water	10/20/17
5	MW-23-1	1730097-06	Water	10/20/17
6	MW-3-5	1730097-07	Water	10/20/17
7	MW-3-4	1730097-08	Water	10/20/17
8	MW-3-3	1730097-09	Water	10/20/17
9	MW-3-2**	1730097-10**	Water	10/20/17
10	MW-3-1	1730097-11	Water	10/20/17
11	EB-5-102017	1730097-12	Water	10/20/17
12	SB-2-102017	1730097-13	Water	10/20/17
13	MW-23-5MS	1730097-02MS	Water	10/20/17
14	MW-23-5MSD	1730097-02MSD	Water	10/20/17
15	MW-23-5DUP	1730097-02DUP	Water	10/20/17
16	MW-23-1MS	1730097-06MS	Water	10/20/17
17	MW-23-1MSD	1730097-06MSD	Water	10/20/17

LDC #: 39937A6

VALIDATION COMPLETENESS WORKSHEET

Date: 12/12/17

SDG #: 17-30097

Level III/IV

Page: 2 of 2

Laboratory: BC Laboratories, Inc.

Reviewer: JS

2nd Reviewer: Q

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7196), Perchlorate (EPA Method 314.0)

	Client ID	Lab ID	Matrix	Date
18	MW-23-1DUP	1730097-06DUP	Water	10/20/17
19				
20				
21				
22				
23				

Notes: _____

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were 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?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL (≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?				

VALIDATION FINDINGS CHECKLIST

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

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

All circled methods are applicable to each sample.

Sample ID	Parameter
1-12	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
QC	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
13-15	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
16-18	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄

Comments: _____

LDC #: 39937A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C104 was recalculated. Calibration date: 11/1/17

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. (ug/L)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	C104	s1	2	0.0025	99.4828%	99.5013%	Y
		s2	4	0.0046			
		s3	6	0.007			
		s4	10	0.0137			
		s5	20	0.025			
Calibration verification	Cr ⁶⁺	ICV	<u>Found:</u> 0.0492 mg/L	<u>True:</u> 0.05000 mg/L	98.47	99.67	Y
11/2 18:24 Calibration verification	C104	CCV ₂	<u>Found:</u> 10.29261 ug/L	<u>True:</u> 10.000 ug/L	1037	1007	Y
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	ClO_4^-	10.29261 ug/L	10.0000 ug/L	103%	104%	Y
MS	Matrix spike sample 23-1	Cr_6^+	ND (SSR-SR) 0.0517894 mg/L	0.052632 mg/L	98%	99%	Y
MSD	Duplicate sample	Cr_6^+	0.0532631 mg/L	FOUND! 0.0517894 mg/L	2.81% RPD	1.147% RPD	Y

Comments: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Volatiles

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30166

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TB-6-102317	1730166-01	Water	10/23/17
MW-4-5	1730166-02	Water	10/23/17
MW-4-4	1730166-03	Water	10/23/17
MW-4-3	1730166-04	Water	10/23/17
MW-4-2	1730166-05	Water	10/23/17
MW-4-1	1730166-06	Water	10/23/17
MW-12-5	1730166-07	Water	10/23/17
MW-12-4	1730166-08	Water	10/23/17
DUP-5-4Q17	1730166-09	Water	10/23/17
MW-12-3	1730166-10	Water	10/23/17
MW-12-2**	1730166-11**	Water	10/23/17
EB-6-102317	1730166-12	Water	10/23/17

**Indicates sample underwent Level IV review

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 524.2

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV evaluation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/26/17 (26oct35)	Bromomethane	47.7	All samples in SDG 17-30166	UJ (all non-detects)	A
10/26/17 (26oct36)	Methyl iodide Pentachloroethane	51.8 82.6	All samples in SDG 17-30166	UJ (all non-detects) UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-6-102317 was identified as a trip blank. No contaminants were found.

Sample EB-6-102317 was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples MW-12-4 and DUP-5-4Q17 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	MW-12-4	DUP-5-4Q17	
Carbon tetrachloride	0.26	0.27	4
Chloroform	0.36	0.44	20

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to continuing calibration %D, data were qualified as estimated in twelve samples.

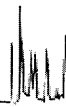
The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Volatiles - Data Qualification Summary - SDG 17-30166

Sample	Compound	Flag	A or P	Reason
TB-6-102317 MW-4-5 MW-4-4 MW-4-3 MW-4-2 MW-4-1 MW-12-5 MW-12-4 DUP-5-4Q17 MW-12-3 MW-12-2** EB-6-102317	Bromomethane Methyl iodide Pentachloroethane	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D)

NASA JPL, 4Q2017
Volatiles - Laboratory Blank Data Qualification Summary - SDG 17-30166

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

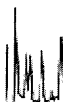
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-6-102317

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-01 File ID: 26OCT39.D
Sampled: 10/23/17 07:00 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 00:34
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

12/17/17 *MS*



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Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-6-102317

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-01 File ID: 26OCT39.D
Sampled: 10/23/17 07:00 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 00:34
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 8



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Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-4-5

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-02 File ID: 26OCT40.D
Sampled: 10/23/17 07:40 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 00:57
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

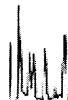
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UJ</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>UJ</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.090	101	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9700	99.7	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.7800	97.8	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	272527	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	106431	9.62	107919	9.61	
1,4-Difluorobenzene (IS)	452579	7.38	447155	7.38	

* Values outside of QC limits

11/17/17



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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-4-5

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30166</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730166-02</u>	File ID:	<u>26OCT40.D</u>		
Sampled:	<u>10/23/17 07:40</u>	Prepared:	<u>10/26/17 08:05</u>	Analyzed:	<u>10/27/17 00:57</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2682</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-4-4

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-03 File ID: 26OCT41.D
Sampled: 10/23/17 08:00 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 01:20
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

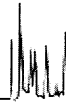
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>US</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.8500	98.5	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.110	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.6900	96.9	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	268027	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	107766	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	442825	7.38	447155	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:40:58PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

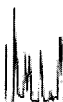
MW-4-4

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30166</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730166-03</u>	File ID:	<u>26OCT41.D</u>		
Sampled:	<u>10/23/17 08:00</u>	Prepared:	<u>10/26/17 08:05</u>	Analyzed:	<u>10/27/17 01:20</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2682</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET

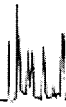
EPA-524.2

MW-4-3

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-04 File ID: 26OCT42.D
Sampled: 10/23/17 08:30 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 01:44
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: B[J]2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.75	
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-4-1

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-06 File ID: 26OCT44.D
Sampled: 10/23/17 10:00 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 02:30
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: B[J]2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 *MS*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-4-1

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-06 File ID: 26OCT44.D
Sampled: 10/23/17 10:00 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 02:30
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

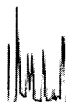
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>MS</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>MS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.060	101	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9500	99.5	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.5200	95.2	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	263144	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	103582	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	430763	7.38	447155	7.38	

* Values outside of QC limits

11/17/17 2



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-12-5

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-07 File ID: 26OCT45.D
Sampled: 10/23/17 11:00 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 02:53
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.18	J
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.29	J
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-12-5

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-07 File ID: 26OCT45.D
Sampled: 10/23/17 11:00 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 02:53
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

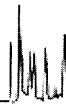
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>US</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.6500	96.5	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.040	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.8400	98.4	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	267071	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	101617	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	439622	7.38	447155	7.38	

* Values outside of QC limits

11/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-12-4

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-08 File ID: 26OCT46.D
Sampled: 10/23/17 11:30 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 03:17
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>US</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.26	J
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.36	J
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 *Q*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

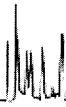
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-5-4Q17

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-09 File ID: 26OCT47.D
Sampled: 10/23/17 11:40 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 03:40
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BIJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.27	J
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.44	J
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:40:58PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-5-4Q17

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30166</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730166-09</u>	File ID:	<u>26OCT47.D</u>		
Sampled:	<u>10/23/17 11:40</u>	Prepared:	<u>10/26/17 08:05</u>	Analyzed:	<u>10/27/17 03:40</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2682</u>	Sequence:	<u>1719642</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-5-4Q17

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-09 File ID: 26OCT47.D
Sampled: 10/23/17 11:40 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 03:40
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: B[J]2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

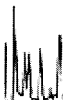
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>MS</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>MS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.7900	97.9	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.300	103	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.8800	98.8	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	262791	6.58	279719	6.57	
Chlorobenzene-d5 (IS)	102388	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	426114	7.38	447155	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:40:58PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

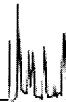
DUP-5-4Q17

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30166</u>
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730166-09</u>
Sampled:	<u>10/23/17 11:40</u>	Prepared:	<u>10/26/17 08:05</u>
Solids:		Preparation:	<u>EPA 5030 Water MS</u>
Batch:	<u>BJJ2682</u>	Initial/Final:	<u>25 ml / 25 ml</u>
	Sequence: <u>1719642</u>	Calibration:	<u>1710006</u>
		Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-12-3

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-10 File ID: 26OCT48.D
Sampled: 10/23/17 12:30 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 04:03
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	1.0	
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 *Q*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-12-3

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-10 File ID: 26OCT48.D
Sampled: 10/23/17 12:30 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 04:03
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BIJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

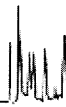
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>US</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.440	104	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9500	99.5	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.110	101	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	260577	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	99932	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	433464	7.38	447155	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET

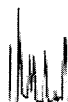
EPA-524.2

MW-12-2

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-11 File ID: 26OCT49.D
Sampled: 10/23/17 12:50 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 04:27
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>US</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET

EPA-524.2

EB-6-102317

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-12 File ID: 26OCT50.D
Sampled: 10/23/17 13:30 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 04:50
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

12/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-6-102317

Laboratory: BC Laboratories SDG: 17-30166
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730166-12 File ID: 26OCT50.D
Sampled: 10/23/17 13:30 Prepared: 10/26/17 08:05 Analyzed: 10/27/17 04:50
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2682 Sequence: 1719642 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>MS</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>MS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.9800	99.8	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.040	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.000	100	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	265972	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	103422	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	437443	7.38	447155	7.38	

* Values outside of QC limits

11/17/17

LDC #: 39937B1
 SDG #: 17-30166
 Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 12/14/17
 Page: 1 of 1
 Reviewer: SVY
 2nd Reviewer: [Signature]

METHOD: GC/MS Volatiles (EPA Method 524.2)

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/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 20% ✓ ICV ≤ 30%
IV.	Continuing calibration	SW	CCV ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1 EB = 12
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	SW	D = 8/9
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Level III validation
XIII.	Target compound identification	A	Not reviewed for Level III validation
XIV.	System performance	A	Not reviewed for Level III validation
XV.	Overall assessment of data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	TB-6-102317	1730166-01	Water	10/23/17
2	MW-4-5	1730166-02	Water	10/23/17
3	MW-4-4	1730166-03	Water	10/23/17
4	MW-4-3	1730166-04	Water	10/23/17
5	MW-4-2	1730166-05	Water	10/23/17
6	MW-4-1	1730166-06	Water	10/23/17
7	MW-12-5	1730166-07	Water	10/23/17
8	MW-12-4 D	1730166-08	Water	10/23/17
9	DUP-5-4Q17 D	1730166-09	Water	10/23/17
10	MW-12-3	1730166-10	Water	10/23/17
11	MW-12-2**	1730166-11**	Water	10/23/17
12	EB-6-102317	1730166-12	Water	10/23/17
13				

- BJ 2682 - Blk 1

LDC #: 39937 B1

VALIDATION FINDINGS CHECKLIST

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

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	/			
Was cooler temperature criteria met?	/			
II. GC/MS Instrument performance check				
Was a tune check performed prior to establishing and/or re-establishing an initial calibration?	/			
Were the BFB performance results reviewed and found to be within the specified criteria?	/			
III. Initial calibration				
Did the laboratory perform at least 5 point calibration prior to sample analysis?	/			
Were all percent relative standard deviations (%RSD) < 20%?	/			
IIIa. Initial Calibration Verification calibration				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	/			
Were all percent differences (%D) < 30%?	/	X		
IV. Continuing calibration				
Was a continuing calibration standard analyzed at the beginning of each analysis batch?	/			
Were all percent differences (%D) of continuing calibration < 30%?		/		
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	/			
Was a laboratory blank analyzed with each analysis batch?	/			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Field blanks				
Field blanks were identified in this SDG.	/			
Target compounds were detected in the field blanks.		/		
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
VIII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?		/		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			/	
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			

LDC #: 39937 b1

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) within 70-130%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
X. Field duplicates				
Field duplicate pairs were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field duplicates.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XI. Internal standards				
Were internal standard area counts within +/-30% of the area of the most recent continuing calibration standard and +/-50% of the average peak area in the initial calibration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were retention times within +/-30 seconds of the associated calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) or regression equations used to quantitate the compound?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were compound quantitation and CRQLs 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"/>	
XIII. Target compound identification				
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were chromatogram peaks verified and accounted for?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIV. System performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl chloride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO. 1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3-Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. <i>Hexachloroethane</i>
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. <i>Methyl iodide</i>

LDC #: 39937 B1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: GC/MS VOA (EPA Method 524.2)

Y N N/A
Y N N/A

Were field duplicate pairs identified in this SDG?
 Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤ %)
	8	9	
0	0.26	0.27	4
K	0.36	0.44	20

Compound	Concentration (ug/L)		RPD (≤ %)

Compound	Concentration (ug/L)		RPD (≤ %)

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$$RRF = (A_x)(C_{is}) / (A_{is})(C_x)$$

average RRF = sum of the RRFs/number of standards

$$\%RSD = 100 * (S/X)$$

A_x = Area of Compound

C_x = Concentration of compound,

S= Standard deviation of the RRFs,

A_{is} = Area of associated internal standard

C_{is} = Concentration of internal standard

X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS V5	10/0517	cis-1,2-DCE (FB)	0.494497	0.494497	0.480664	0.480664	5.963	5.963
			Trichloroethene (DFB)	0.305019	0.305019	0.296404	0.296404	4.748	4.748
			1,2,4-TMB (CBZ)	5.026954	5.026954	4.834027	4.834027	13.490	13.490

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

$$\% \text{ Difference} = 100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$$

$$\text{RRF} = (\text{Ax})(\text{Cis}) / (\text{Ais})(\text{Cx})$$

Where:

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound,

Cx = Concentration of compound,

Ais = Area of associated internal standard

Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1	26OCT05 MS V5	10/26/17	cis-1,2-DCE (FB)	0.480664	0.524877	0.524877	9.2	9.2
			Trichloroethene (DFB)	0.296404	0.297770	0.297770	0.5	0.5
			1,2,4-TMB (CBZ)	4.83403	4.81533	4.81533	0.4	0.4
2	26OCT35 MS V5	10/26/17	cis-1,2-DCE (FB)	0.480664	0.525845	0.525845	9.4	9.4
			Trichloroethene (DFB)	0.296404	0.306484	0.306484	3.4	3.4
			1,2,4-TMB (CBZ)	4.83403	4.87375	4.87375	0.8	0.8

LDC #: 5993767

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
 SS = Surrogate Spiked

Sample ID: # 11

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	10.0	10.16	102	107	0
Bromofluorobenzene	↓	9.45	94.5	94.5	↓
1,2-Dichlorobenzene-d4	↓	10.37	104	104	↓
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

LDC #: 39937B1

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample Results Verification

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

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = $100 * SSC/SA$

Where: SSC = Spiked sample concentration
 SA = Spike added

RPD = $|(LCS - LCSD) * 2 / (LCS + LCSD)|$

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS ID: PJ 2682-BS1

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	25.0	NA	27.21	NA	109	109				
Trichloroethene			25.73		103	103				
Benzene			26.05		104	104				
Toluene			24.88		99.5	99.5				
Chlorobenzene		X	23.04	V	92.2	92.2				

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Chromium

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30166

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-4-5	1730166-02	Water	10/23/17
MW-4-4	1730166-03	Water	10/23/17
MW-4-3	1730166-04	Water	10/23/17
MW-4-2	1730166-05	Water	10/23/17
MW-4-1	1730166-06	Water	10/23/17
MW-12-5	1730166-07	Water	10/23/17
MW-12-4	1730166-08	Water	10/23/17
DUP-5-4Q17	1730166-09	Water	10/23/17
MW-12-3	1730166-10	Water	10/23/17
MW-12-2**	1730166-11**	Water	10/23/17
EB-6-102317	1730166-12	Water	10/23/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chromium by Environmental Protection Agency (EPA) Method 200.8

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the method.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

ICP interference check sample analyses were not required by the method.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-6-102317 was identified as an equipment blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Flag	A or P
MW-15DUP (All samples in SDG 17-30166)	Chromium	28 (≤ 20)	J (all detects) UJ (all non-detects)	A

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. Percent differences (%D) were within QC limits.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples MW-12-4 and DUP-5-4Q17 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	MW-12-4	DUP-5-4Q17	
Chromium	0.99	0.75	28

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to DUP RPD, data were qualified as estimated in eleven samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Chromium - Data Qualification Summary - SDG 17-30166

Sample	Analyte	Flag	A or P	Reason
MW-4-5 MW-4-4 MW-4-3 MW-4-2 MW-4-1 MW-12-5 MW-12-4 DUP-5-4Q17 MW-12-3 MW-12-2** EB-6-102317	Chromium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD)

NASA JPL, 4Q2017
Chromium - Laboratory Blank Data Qualification Summary - SDG 17-30166

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:57:10PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-4-5

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-02

File ID: PE_EL2_171030-038

Sampled: 10/23/17 07:40

Prepared: 10/27/17 08:30

Analyzed: 10/30/17 09:00

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BfJ2845

Sequence:

1719868

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1.3	1	J J	EPA-200.8

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:57:10PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-4-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-04</u>	File ID: <u>PE_EL2_171030-040</u>	
Sampled: <u>10/23/17 08:30</u>	Prepared: <u>10/27/17 08:30</u>	Analyzed: <u>10/30/17 09:07</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJJ2845</u>	Sequence: <u>1719868</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	87	1	J	EPA-200.8

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:57:10PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-4-2

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-05

File ID: PE_EL2_171030-041

Sampled: 10/23/17 09:30

Prepared: 10/27/17 08:30

Analyzed: 10/30/17 09:11

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJ2845

Sequence: 1719868

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1.6	1	JJ	EPA-200.8

12/17/17 [Signature]

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:57:10PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-4-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-06</u>
Sampled: <u>10/23/17 10:00</u>	Prepared: <u>10/27/17 08:30</u>
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>
Batch: <u>BJ2845</u>	Sequence: <u>1719868</u>
	Calibration: <u>UNASSIGNED</u>
	Instrument: <u>PE-EL2</u>
	File ID: <u>PE_EL2_171030-042</u>
	Analyzed: <u>10/30/17 09:14</u>
	Initial/Final: <u>50 ml / 50 ml</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U <i>KS</i>	EPA-200.8

11/17/17 ✓



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:57:10PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-12-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-07</u>	File ID: <u>PE_EL2_171030-043</u>	
Sampled: <u>10/23/17 11:00</u>	Prepared: <u>10/27/17 08:30</u>	Analyzed: <u>10/30/17 09:17</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJ2845</u>	Sequence: <u>1719868</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1.3	1	JJ	EPA-200.8

11/17/17 *[Signature]*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:57:10PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-12-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-08</u>	File ID: <u>PE_EL2 171030-044</u>	
Sampled: <u>10/23/17 11:30</u>	Prepared: <u>10/27/17 08:30</u>	Analyzed: <u>10/30/17 09:21</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJ2845</u>	Sequence: <u>1719868</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.99	1	J	EPA-200.8

11/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:57:10PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

DUP-5-4Q17

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-09

File ID: PE_EL2_171030-045

Sampled: 10/23/17 11:40

Prepared: 10/27/17 08:30

Analyzed: 10/30/17 09:24

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2845

Sequence:

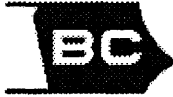
1719868

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.75	1	JJ	EPA-200.8

12/17/17 J



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:57:10PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	---

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-12-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-10</u>	File ID: <u>PE_EL2_171101-175</u>	
Sampled: <u>10/23/17 12:30</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/01/17 20:55</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJ2969</u>	Sequence: <u>1720126</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U <i>MS</i>	EPA-200.8

11/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:57:10PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	---

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-12-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-11</u>	File ID: <u>PE_EL2_171101-176</u>	
Sampled: <u>10/23/17 12:50</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/01/17 20:58</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJ2969</u>	Sequence: <u>1720126</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.72	1	J S	EPA-200.8

12/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:57:10PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	---

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

EB-6-102317

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-12</u>	File ID: <u>PE_EL2 171101-177</u>	
Sampled: <u>10/23/17 13:30</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/01/17 21:02</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJ2969</u>	Sequence: <u>1720126</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U <i>KS</i>	EPA-200.8

12/17/17 Y

LDC #: 39937B4a
 SDG #: 17-30166
 Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 12/12/17
 Page: 1 of 1
 Reviewer: J3
 2nd Reviewer: [Signature]

METHOD: Chromium (EPA Method 200.8)

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/A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not Required
V.	Laboratory Blanks	A	
VI.	Field Blanks	ND	EB=11
VII.	Matrix Spike/Matrix Spike Duplicates	A	MW-15 MSID From 17-30324
VIII.	Duplicate sample analysis	SW	MW-15 DUP From 17-30324
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	FIB
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	Not reviewed for Level III validation
XIV.	Overall Assessment of Data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-4-5	1730166-02	Water	10/23/17
2	MW-4-4	1730166-03	Water	10/23/17
3	MW-4-3	1730166-04	Water	10/23/17
4	MW-4-2	1730166-05	Water	10/23/17
5	MW-4-1	1730166-06	Water	10/23/17
6	MW-12-5	1730166-07	Water	10/23/17
7	MW-12-4	1730166-08	Water	10/23/17
8	DUP-5-4Q17	1730166-09	Water	10/23/17
9	MW-12-3	1730166-10	Water	10/23/17
10	MW-12-2**	1730166-11**	Water	10/23/17
11	EB-6-102317	1730166-12	Water	10/23/17
12				
13				
14				

Notes:

Method: Metals (EPA SW 846 Method 6010/6020/7000)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution $\leq 5\%$?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were the low standard checks within 70-130%			✓	
Were all initial calibration correlation coefficients within limits as specified by the method?			✓	
IV. 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.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?			✓	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike 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 $\pm RL$ ($\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.			✓	
VII. 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% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.			✓	

LDC#: 39937B4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD	
	7	8		
Chromium	0.99	0.75	28	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2017\39937B4a.wpd

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

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

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated	Reported	Acceptable (Y/N)
					%R	%R	
	ICP (Initial calibration)						
<u>ICV</u>	ICP/MS (Initial calibration) <u>10/30 7:10</u>	<u>Cr</u>	<u>50.774 ug/L</u>	<u>50.000 ug/L</u>	<u>102.7</u>	<u>102.7</u>	<u>Y</u>
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
<u>CCV</u>	ICP/MS (Continuing calibration) <u>11/1 21:12</u>	<u>Cr</u>	<u>38.022 ug/L</u>	<u>40.000 ug/L</u>	<u>95.17</u>	<u>95.17</u>	<u>Y</u>
	CVAA (Continuing calibration)						

Comments:

LDC #: 3993784cSDG #: 17-30146

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1Reviewer: JB2nd Reviewer: 9**METHOD:** Trace metals (EPA CLP SOW ILM02.1)

Percent recoveries (%R) for an ICP interference check sample, 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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (ug/L)
 SDR = Serial Dilution Result (ug/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
	ICP interference check						
LCS	²⁸⁴⁵ Laboratory control sample	Cr	38.993 ug/L	40.000 ug/L	97.57%	97.57%	Y
MS	Matrix spike	Cr	^{28.623} (SSR-SR) 73.984 - 28.623 = 45.363 ug/L	40.000 ug/L	113%	113%	Y
MSD	Duplicate	Cr	74.826 ug/L	FOUND: 73.984 ug/L	1.13 RPD	1.13 RPD	Y
SD	ICP serial dilution	Cr	29.935 ug/L	28.623 ug/L	57%	NC	Y

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Wet Chemistry

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30166

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-4-5	1730166-02	Water	10/23/17
MW-4-4	1730166-03	Water	10/23/17
MW-4-3	1730166-04	Water	10/23/17
MW-4-2	1730166-05	Water	10/23/17
MW-4-1	1730166-06	Water	10/23/17
MW-12-5	1730166-07	Water	10/23/17
MW-12-4	1730166-08	Water	10/23/17
DUP-5-4Q17	1730166-09	Water	10/23/17
MW-12-3	1730166-10	Water	10/23/17
MW-12-2**	1730166-11**	Water	10/23/17
EB-6-102317	1730166-12	Water	10/23/17
MW-4-2MS	1730166-05MS	Water	10/23/17
MW-4-2MSD	1730166-05MSD	Water	10/23/17
MW-4-2DUP	1730166-05DUP	Water	10/23/17
MW-12-2MS	1730166-11MS	Water	10/23/17
MW-12-2MSD	1730166-11MSD	Water	10/23/17
MW-12-2DUP	1730166-11DUP	Water	10/23/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Hexavalent Chromium by Environmental Protection Agency (EPA) SW 846 Method 7196

Perchlorate by EPA Method 314.0

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-6-102317 was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples MW-12-4 and DUP-5-4Q17 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD
	MW-12-4	DUP-5-4Q17	
Perchlorate	2.1	2.2	5
Hexavalent chromium	0.00070U	0.00071	1

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

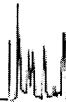
The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Wet Chemistry - Data Qualification Summary - SDG 17-30166

No Sample Data Qualified in this SDG

NASA JPL, 4Q2017
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 17-30166

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-4-5

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-02

File ID: 171023 2000 CR6-009

Sampled: 10/23/17 07:40

Prepared: 10/23/17 20:00

Analyzed: 10/23/17 20:01

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2462

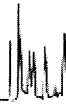
Sequence: 1719600

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

Handwritten signature/initials



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-4-4

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-03

File ID: 171023 2000 CR6-010

Sampled: 10/23/17 08:00

Prepared: 10/23/17 20:00

Analyzed: 10/23/17 20:01

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJ2462

Sequence: 1719600

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 8


Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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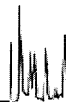
INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-4-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-04</u>	File ID: <u>171023 2000 CR6-011</u>	
Sampled: <u>10/23/17 08:30</u>	Prepared: <u>10/23/17 20:00</u>	Analyzed: <u>10/23/17 20:01</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2462</u>	Sequence: <u>1719600</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-4-2

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-05

File ID: 171023 2000 CR6-005

Sampled: 10/23/17 09:30

Prepared: 10/23/17 20:00

Analyzed: 10/23/17 20:01

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2462

Sequence: 1719600

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-4-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-06</u>	File ID: <u>171023 2000 CR6-012</u>	
Sampled: <u>10/23/17 10:00</u>	Prepared: <u>10/23/17 20:00</u>	Analyzed: <u>10/23/17 20:01</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2462</u>	Sequence: <u>1719600</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 9



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-12-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-07</u>	File ID: <u>171023 2000 CR6-015</u>	
Sampled: <u>10/23/17 11:00</u>	Prepared: <u>10/23/17 20:00</u>	Analyzed: <u>10/23/17 20:07</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJ2462</u>	Sequence: <u>1719600</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00098	1	J	EPA-7196

11/17/17 &

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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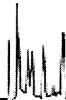
INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-12-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-08</u>	File ID: <u>171023 2000 CR6-016</u>	
Sampled: <u>10/23/17 11:30</u>	Prepared: <u>10/23/17 20:00</u>	Analyzed: <u>10/23/17 20:07</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2462</u>	Sequence: <u>1719600</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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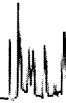
INORGANIC ANALYSIS DATA SHEET
EPA-7196

DUP-5-4Q17

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>	
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>	
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-09</u>	File ID: <u>171023 2000 CR6-017</u>
Sampled: <u>10/23/17 11:40</u>	Prepared: <u>10/23/17 20:00</u>	Analyzed: <u>10/23/17 20:07</u>
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>
Batch: <u>BJJ2462</u>	Sequence: <u>1719600</u>	Calibration: <u>UNASSIGNED</u>
		Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00071	1	J	EPA-7196

12/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-7196

MW-12-3

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-10

File ID: 171023 2000 CR6-018

Sampled: 10/23/17 12:30

Prepared: 10/23/17 20:00

Analyzed: 10/23/17 20:07

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[J]2462

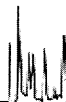
Sequence: 1719600

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-12-2

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-11

File ID: 171023 2000 CR6-022

Sampled: 10/23/17 12:50

Prepared: 10/23/17 20:00

Analyzed: 10/23/17 20:07

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2463

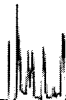
Sequence: 1719600

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 [Signature]



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

EB-6-102317

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-12</u>	File ID: <u>171023 2000 CR6-019</u>	
Sampled: <u>10/23/17 13:30</u>	Prepared: <u>10/23/17 20:00</u>	Analyzed: <u>10/23/17 20:07</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJ2462</u>	Sequence: <u>1719600</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-4-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-02</u>	File ID: <u>F110217A.seq-98.0000.txt</u>	
Sampled: <u>10/23/17 07:40</u>	Prepared: <u>11/03/17 01:00</u>	Analyzed: <u>11/03/17 18:43</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0311</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17 &



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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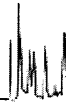
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-4-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-03</u>	File ID: <u>F110217A.seq-99.0000.txt</u>	
Sampled: <u>10/23/17 08:00</u>	Prepared: <u>11/03/17 01:00</u>	Analyzed: <u>11/03/17 18:58</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0311</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-314.0

MW-4-3

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-04

File ID: F110217A.seq-100.0000.txt

Sampled: 10/23/17 08:30

Prepared: 11/03/17 01:00

Analyzed: 11/03/17 19:14

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0311

Sequence:

1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17


Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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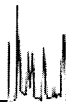
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-4-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-05</u>	File ID: <u>F110217A.seq-101.0000.txt</u>	
Sampled: <u>10/23/17 09:30</u>	Prepared: <u>11/03/17 01:00</u>	Analyzed: <u>11/03/17 19:29</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0311</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	3.8	1	J	EPA-314.0

12/17/17 



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-4-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-06</u>	File ID: <u>F110217A.seq-102.0000.txt</u>	
Sampled: <u>10/23/17 10:00</u>	Prepared: <u>11/03/17 01:00</u>	Analyzed: <u>11/03/17 19:44</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0311</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-12-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-07</u>	File ID: <u>F110217A.seq-103.0000.txt</u>	
Sampled: <u>10/23/17 11:00</u>	Prepared: <u>11/03/17 01:00</u>	Analyzed: <u>11/03/17 20:00</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0311</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	1.5	1	J	EPA-314.0

12/17/17 *[Signature]*

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 12:44:24PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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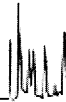
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-12-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30166</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730166-08</u>	File ID: <u>F110217A.seq-104.0000.txt</u>	
Sampled: <u>10/23/17 11:30</u>	Prepared: <u>11/03/17 01:00</u>	Analyzed: <u>11/03/17 20:15</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0311</u>	Sequence: <u>1720402</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	2.1	1	J	EPA-314.0

12/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

DUP-5-4Q17

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-09

File ID: F110217A.seq-105.0000.txt

Sampled: 10/23/17 11:40

Prepared: 11/03/17 01:00

Analyzed: 11/03/17 20:30

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B/K0311

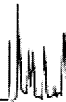
Sequence: 1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	2.2	1	J	EPA-314.0

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-12-3

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-10

File ID: F110217A.seq-106.0000.txt

Sampled: 10/23/17 12:30

Prepared: 11/03/17 01:00

Analyzed: 11/03/17 20:46

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B/K0311

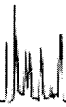
Sequence: 1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.71	1	J	EPA-314.0

12/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-314.0

MW-12-2

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-11

File ID: F110217A.seq-109.0000.txt

Sampled: 10/23/17 12:50

Prepared: 11/03/17 01:00

Analyzed: 11/03/17 21:32

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B/K0311

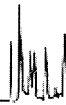
Sequence: 1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:44:24PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

EB-6-102317

Laboratory: BC Laboratories

SDG: 17-30166

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730166-12

File ID: F110217A.seq-110.0000.txt

Sampled: 10/23/17 13:30

Prepared: 11/03/17 01:00

Analyzed: 11/03/17 21:47

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B/K0311

Sequence: 1720402

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17

LDC #: 39937B6
 SDG #: 17-30166
 Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 12/12/17
 Page: 1 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7196), Perchlorate (EPA Method 314.0)

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 / A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	EB=11
VI.	Matrix Spike/Matrix Spike Duplicates	A	(12,13) (19,16)
VII.	Duplicate sample analysis	A	14, 17
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	(7,8)
X.	Sample result verification	A	Not reviewed for Level III validation
XI	Overall assessment of data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-4-5	1730166-02	Water	10/23/17
2	MW-4-4	1730166-03	Water	10/23/17
3	MW-4-3	1730166-04	Water	10/23/17
4	MW-4-2	1730166-05	Water	10/23/17
5	MW-4-1	1730166-06	Water	10/23/17
6	MW-12-5	1730166-07	Water	10/23/17
7	MW-12-4	1730166-08	Water	10/23/17
8	DUP-5-4Q17	1730166-09	Water	10/23/17
9	MW-12-3	1730166-10	Water	10/23/17
10	MW-12-2**	1730166-11**	Water	10/23/17
11	EB-6-102317	1730166-12	Water	10/23/17
12	MW-4-2MS	1730166-05MS	Water	10/23/17
13	MW-4-2MSD	1730166-05MSD	Water	10/23/17
14	MW-4-2DUP	1730166-05DUP	Water	10/23/17
15	MW-12-2MS	1730166-11MS	Water	10/23/17
16	MW-12-2MSD	1730166-11MSD	Water	10/23/17
17	MW-12-2DUP	1730166-11DUP	Water	10/23/17

LDC #: 39937B6

VALIDATION COMPLETENESS WORKSHEET

Date: 12/12/17

SDG #: 17-30166

Level III/IV

Page: 2 of 2

Laboratory: BC Laboratories, Inc.

Reviewer: J3

2nd Reviewer: [Signature]

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7196), Perchlorate (EPA Method 314.0)

	Client ID	Lab ID	Matrix	Date
18				
19				
20				
21				
22				

Notes: _____

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were 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?	✓			
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 $\leq 5\text{X}$ 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 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 Sample Specific Analysis Reference

All circled methods are applicable to each sample.

Sample ID	Parameter
1-11	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
60	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
12-17	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄

Comments: _____

LDC# 39937B6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration		RPD	
	7	8		
Perchlorate (ug/L)	2.1	2.2	5	
Hexavalent Chromium (mg/L)	0.00070U	0.00071	1	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2017\39937B6.wpd

LDC #: 39937BL

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C104⁻ was recalculated. Calibration date: 11/1/17

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. (ug/L)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	C104 ⁻	s1	2	0.0025	99.4828%	99.5013%	Y
		s2	4	0.0046			
		s3	6	0.007			
		s4	10	0.0137			
		s5	20	0.025			
Calibration verification	Cr6 ⁻	ICV	<u>FOUND:</u> 0.0497	<u>TRUE:</u> 0.050000 mg/L	99.47	99.37	Y
21:01 Calibration verification	C104 ⁻	CCV ₆	<u>FOUND:</u> 9.50180ug/L	<u>TRUE:</u> 10.000ug/L	95.07	97.82	Y
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method see covr

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	C104 ⁻	9.5018 µg/L	10.000 µg/L	95.0%	97.6%	Y
MS	Matrix spike sample ⁻⁵	Cr6 ⁺	ND (SSR-SR) 0.0478947 mg/L	0.052632 mg/L	91%	90%	Y
MSD	Duplicate sample	Cr6 ⁺	0.0478947 mg/L	FOUND: 0.0478947 mg/L	0 RPD	0.702%	Y

Comments: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017
LDC Report Date: December 13, 2017
Parameters: Volatiles
Validation Level: Level III & IV
Laboratory: BC Laboratories, Inc.
Sample Delivery Group (SDG): 17-30324

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TB-7-102417	1730324-01	Water	10/24/17
MW-5	1730324-02	Water	10/24/17
DUP-6-4Q17	1730324-03	Water	10/24/17
MW-8**	1730324-04**	Water	10/24/17
MW-15	1730324-05	Water	10/24/17
MW-10	1730324-06	Water	10/24/17
MW-6	1730324-07	Water	10/24/17
MW-15MS	1730324-05MS	Water	10/24/17
MW-15MSD	1730324-05MSD	Water	10/24/17
MW-6MS	1730324-07MS	Water	10/24/17
MW-6MSD	1730324-07MSD	Water	10/24/17

**Indicates sample underwent Level IV review

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 524.2

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV evaluation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/27/17 (27oct02)	Bromomethane	39.7	TB-7-102417 MW-5 MW-15 MW-10 MW-6	UJ (all non-detects)	A
10/27/17 (27oct03)	Methyl iodide	56.7	TB-7-102417 MW-5 MW-15 MW-10 MW-6	UJ (all non-detects)	A
10/27/17 (27oct33)	Pentachloroethane	77.0	DUP-6-4Q17 MW-8**	UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-7-102417 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples MW-5 and DUP-6-4Q17 were identified as field duplicates. No results were detected in any of the samples.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to continuing calibration %D, data were qualified as estimated in seven samples.

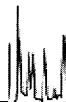
The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Volatiles - Data Qualification Summary - SDG 17-30324

Sample	Compound	Flag	A or P	Reason
TB-7-102417 MW-5 MW-15 MW-10 MW-6	Bromomethane Methyl iodide	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D)
DUP-6-4Q17 MW-8**	Pentachloroethane	UJ (all non-detects)	A	Continuing calibration (%D)

NASA JPL, 4Q2017
Volatiles - Laboratory Blank Data Qualification Summary - SDG 17-30324

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

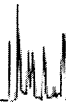
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-7-102417

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-01 File ID: 27OCT23.D
Sampled: 10/24/17 07:00 Prepared: 10/27/17 07:00 Analyzed: 10/27/17 17:40
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2684 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>KS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

12/17/17 *KS*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-7-102417

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-01 File ID: 27OCT23.D
Sampled: 10/24/17 07:00 Prepared: 10/27/17 07:00 Analyzed: 10/27/17 17:40
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2684 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

12/17/17 8

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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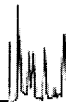
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-7-102417

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30324</u>
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730324-01</u>
		File ID:	<u>27OCT23.D</u>
Sampled:	<u>10/24/17 07:00</u>	Prepared:	<u>10/27/17 07:00</u>
		Analyzed:	<u>10/27/17 17:40</u>
Solids:		Preparation:	<u>EPA 5030 Water MS</u>
		Initial/Final:	<u>25 ml / 25 ml</u>
Batch:	<u>BJJ2684</u>	Sequence:	<u>1719744</u>
		Calibration:	<u>1710006</u>
		Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

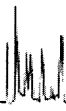
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-5

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-02 File ID: 27OCT24.D
Sampled: 10/24/17 11:13 Prepared: 10/27/17 07:00 Analyzed: 10/27/17 18:04
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2684 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>KS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 *KS*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-5

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30324</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730324-02</u>	File ID:	<u>27OCT24.D</u>		
Sampled:	<u>10/24/17 11:13</u>	Prepared:	<u>10/27/17 07:00</u>	Analyzed:	<u>10/27/17 18:04</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2684</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>MS</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.290	103	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.040	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9100	99.1	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	259509	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	101415	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	421774	7.38	436994	7.38	

* Values outside of QC limits

11/17/17 &

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-5

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30324</u>
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730324-02</u>
Sampled:	<u>10/24/17 11:13</u>	Prepared:	<u>10/27/17 07:00</u>
Solids:		Preparation:	<u>EPA 5030 Water MS</u>
Batch:	<u>BJJ2684</u>	Sequence:	<u>1719744</u>
		Calibration:	<u>1710006</u>
		Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17 


Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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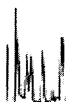
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-6-4Q17

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30324</u>
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730324-03</u>
		File ID:	<u>27OCT36.D</u>
Sampled:	<u>10/24/17 11:23</u>	Prepared:	<u>10/27/17 07:00</u>
		Analyzed:	<u>10/27/17 22:43</u>
Solids:		Preparation:	<u>EPA 5030 Water MS</u>
		Initial/Final:	<u>25 ml / 25 ml</u>
Batch:	<u>BJJ2684</u>	Sequence:	<u>1719744</u>
		Calibration:	<u>1710006</u>
		Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-6-4Q17

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-03 File ID: 27OCT36.D
Sampled: 10/24/17 11:23 Prepared: 10/27/17 07:00 Analyzed: 10/27/17 22:43
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2684 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>UT</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.7400	97.4	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.050	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.8600	98.6	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	261933	6.58	265548	6.57	
Chlorobenzene-d5 (IS)	98156	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	423705	7.38	427034	7.38	

* Values outside of QC limits

11/17/17 *QC*

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-8

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-04</u>	File ID: <u>27OCT37.D</u>	
Sampled: <u>10/24/17 11:58</u>	Prepared: <u>10/27/17 07:00</u>	Analyzed: <u>10/27/17 23:06</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2684</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

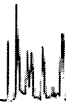
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.540	105	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9900	99.9	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.8700	98.7	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	250917	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	102341	9.62	105600	9.61	
1,4-Difluorobenzene (IS)	422193	7.38	427034	7.38	

* Values outside of QC limits

12/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

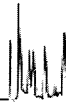
MW-8

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30324</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730324-04</u>	File ID:	<u>27OCT37.D</u>		
Sampled:	<u>10/24/17 11:58</u>	Prepared:	<u>10/27/17 07:00</u>	Analyzed:	<u>10/27/17 23:06</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2684</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

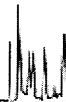
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-15

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-05 File ID: 27OCT08.D
Sampled: 10/24/17 12:39 Prepared: 10/27/17 07:00 Analyzed: 10/27/17 11:51
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2684 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>MS</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-15

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-05 File ID: 27OCT08.D
Sampled: 10/24/17 12:39 Prepared: 10/27/17 07:00 Analyzed: 10/27/17 11:51
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2684 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

12/16/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-15

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-05 File ID: 27OCT08.D
Sampled: 10/24/17 12:39 Prepared: 10/27/17 07:00 Analyzed: 10/27/17 11:51
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2684 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>MS</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.8600	98.6	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9300	99.3	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.7100	97.1	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	265317	6.58	273259	6.57	
Chlorobenzene-d5 (IS)	105033	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	435664	7.38	436994	7.38	

* Values outside of QC limits

12/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-15

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30324</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730324-05</u>	File ID:	<u>27OCT08.D</u>		
Sampled:	<u>10/24/17 12:39</u>	Prepared:	<u>10/27/17 07:00</u>	Analyzed:	<u>10/27/17 11:51</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2684</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/07/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-10

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-06</u>	File ID: <u>27OCT38.D</u>	
Sampled: <u>10/24/17 13:14</u>	Prepared: <u>10/27/17 07:00</u>	Analyzed: <u>10/27/17 23:30</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2684</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>US</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-10

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-06 File ID: 27OCT38.D
Sampled: 10/24/17 13:14 Prepared: 10/27/17 07:00 Analyzed: 10/27/17 23:30
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: B[J]2684 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

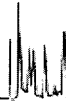
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>MS</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.9500	99.5	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.140	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.5600	95.6	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	263869	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	101188	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	423296	7.38	427034	7.38	

* Values outside of QC limits

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

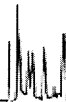
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-6

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-07 File ID: 27OCT26.D
Sampled: 10/24/17 14:02 Prepared: 10/27/17 12:00 Analyzed: 10/27/17 18:50
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2685 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U <i>LO</i>
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.46	J
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 *Q*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:42:43PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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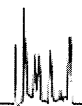
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-6

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-07</u>	File ID: <u>27OCT26.D</u>	
Sampled: <u>10/24/17 14:02</u>	Prepared: <u>10/27/17 12:00</u>	Analyzed: <u>10/27/17 18:50</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2685</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.35	J
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	1.8	
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-6

Laboratory: BC Laboratories SDG: 17-30324
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730324-07 File ID: 27OCT26.D
Sampled: 10/24/17 14:02 Prepared: 10/27/17 12:00 Analyzed: 10/27/17 18:50
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2685 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U <i>UT</i>
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.370	104	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.240	102	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9800	99.8	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	256386	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	100163	9.62	105852	9.61	
1,4-Difluorobenzene (IS)	419339	7.38	436994	7.38	

* Values outside of QC limits

12/17/17

LDC #: 39937C1

VALIDATION COMPLETENESS WORKSHEET

Date: 12/05/17

SDG #: 17-30324

Level III/IV

Page: 1 of 1

Laboratory: BC Laboratories, Inc.

Reviewer: [Signature]
2nd Reviewer: [Signature]

METHOD: GC/MS Volatiles (EPA Method 524.2)

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/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL = 20% ICV = 30.2
IV.	Continuing calibration	SW	CV = 38%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	NA	
IX.	Laboratory control samples	A	VCS
X.	Field duplicates	ND	D = 2/3
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Level III validation
XIII.	Target compound identification	A	Not reviewed for Level III validation
XIV.	System performance	A	Not reviewed for Level III validation
XV.	Overall assessment of data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	TB-7-102417	1730324-01	Water	10/24/17
2	MW-5	1730324-02	Water	10/24/17
3	DUP-6-4Q17	1730324-03	Water	10/24/17
4	MW-8**	1730324-04**	Water	10/24/17
5	MW-15	1730324-05	Water	10/24/17
6	MW-10	1730324-06	Water	10/24/17
7	MW-6	1730324-07	Water	10/24/17
8	MW-15MS	1730324-05MS	Water	10/24/17
9	MW-15MSD	1730324-05MSD	Water	10/24/17
10	MW-6MS	1730324-07MS	Water	10/24/17
11	MW-6MSD	1730324-07MSD	Water	10/24/17
12				

18) BJ 2684 - Buk L 1719744 - COB 2
 2) BJ 2685 - 1

LDC #: 34937C1

VALIDATION FINDINGS CHECKLIST

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

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. GC/MS Instrument performance check				
Was a tune check performed prior to establishing and/or re-establishing an initial calibration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the BFB performance results reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Initial calibration				
Did the laboratory perform at least 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIa. Initial Calibration Verification calibration				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration standard analyzed at the beginning of each analysis batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) of continuing calibration < 30%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed with each analysis batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field blanks				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field blanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VIII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?	<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 QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 3997C1

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) within 70-130%?	/			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target compounds were detected in the field duplicates.	/			
XI. Internal standards				
Were internal standard area counts within +/-30% of the area of the most recent continuing calibration standard and +/-50% of the average peak area in the initial calibration?	/			
Were retention times within +/-30 seconds of the associated calibration standard?	/			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) or regression equations used to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Target compound identification				
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?	/			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	/			
Were chromatogram peaks verified and accounted for?	/			
XIV. System performance				
System performance was found to be acceptable.	/			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene	A2.
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane	B2.
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane	C2.
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene	D2.
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11	E2.
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12	F2.
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113	G2.
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114	H2.
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane	I2.
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide	J2.
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane	K2.
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane	L2.
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane	M2.
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane	N2.
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO. 1,1-Difluoroethane	O1. 3-Methylpentane	O2.
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane	P2.
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane	Q2.
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane	R2.
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane	S2.
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane	T2.
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal	U2.
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene	V2.
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol	W2.
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene	X2.
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. <i>Hexachloroethane</i>	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. <i>Methyl iodide</i>	Z2.

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$$RRF = (A_x)(C_{is}) / (A_{is})(C_x)$$

average RRF = sum of the RRFs/number of standards

$$\%RSD = 100 * (S/X)$$

A_x = Area of Compound

C_x = Concentration of compound,

S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard

C_{is} = Concentration of internal standard

X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS V5	10/0517	cis-1,2-DCE (FB)	0.494497	0.494497	0.480664	0.480664	5.963	5.963
			Trichloroethene (DFB)	0.305019	0.305019	0.296404	0.296404	4.748	4.748
			1,2,4-TMB (CBZ)	5.026954	5.026954	4.834027	4.834027	13.490	13.490

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

$$\% \text{ Difference} = 100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$$

$$\text{RRF} = (\text{Ax})(\text{Cis}) / (\text{Ais})(\text{Cx})$$

Where:

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound,

Cx = Concentration of compound,

Ais = Area of associated internal standard

Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1	27OCT02 MS V5	10/27/17	cis-1,2-DCE (FB)	0.480664	0.570113	0.570113	18.6	18.6
			Trichloroethene (DFB)	0.296404	0.306550	0.306550	3.4	3.4
			1,2,4-TMB (CBZ)	4.83403	5.28740	5.28740	9.4	9.4
2	27OCT32 MS V5	10/27/17	cis-1,2-DCE (FB)	0.480664	0.529117	0.529117	10.1	10.1
			Trichloroethene (DFB)	0.296404	0.293743	0.293743	0.9	0.9
			1,2,4-TMB (CBZ)	4.83403	4.81747	4.81747	0.3	0.3

LDC #: 39937 C1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #4

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	16.0	9.99	99.9	99.9	0
Bromofluorobenzene	↓	9.87	98.7	98.7	↓
1,2-Dichlorobenzene-d4	↓	10.54	105	105	↓
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

LDC #: 39957C1

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

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

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = $100 * (SSC - SC) / SA$

Where: SSC = Spiked sample concentration
 SA = Spike added

SC = Sample concentration

RPD = $| MSC - MSDC | * 2 / (MSC + MSDC)$

MSC = Matrix spike percent recovery

MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: 8/9

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Percent Recovery		Percent Recovery		RPD	
						Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
1,1-Dichloroethene	25.0	25.0	0	27.47	27.56	110	110	110	110	0.327	0.33
Trichloroethene	↓	↓	↓	24.60	25.91	98.4	98.4	104	104	5.19	5.2
Benzene	↓	↓	↓	26.2	26.99	105	105	106	106	1.1	1.1
Toluene	↓	↓	↓	26.83	27.63	107	107	111	111	2.94	2.9
Chlorobenzene	↓	↓	↓	22.99	24.45	92.0	92.0	97.8	97.8	6.16	6.2

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

LDC #: 31937C1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Page: 1 of 1
 Reviewer: JVG
 2nd Reviewer: 4

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA

Where: SSC = Spiked sample concentration
 SA = Spike added

RPD = |LCS - LCSD| * 2 / (LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS ID: B J2684-BS4

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	25.0	NA	27.66	NA	111	111				
Trichloroethene	↓	↓	24.28	↓	97.1	97.1				
Benzene	↓	↓	25.9	↓	104	104				
Toluene	↓	↓	26.19	↓	105	105				
Chlorobenzene	↓	↓	24.19	↓	96.8	96.8				

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Chromium

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30324

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-5	1730324-02	Water	10/24/17
DUP-6-4Q17	1730324-03	Water	10/24/17
MW-8**	1730324-04**	Water	10/24/17
MW-15	1730324-05	Water	10/24/17
MW-10	1730324-06	Water	10/24/17
MW-6	1730324-07	Water	10/24/17
MW-15MS	1730324-05MS	Water	10/24/17
MW-15MSD	1730324-05MSD	Water	10/24/17
MW-15DUP	1730324-05DUP	Water	10/24/17
MW-6MS	1730324-07MS	Water	10/24/17
MW-6MSD	1730324-07MSD	Water	10/24/17
MW-6DUP	1730324-07DUP	Water	10/24/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chromium by Environmental Protection Agency (EPA) Method 200.8

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the method.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

ICP interference check sample analyses were not required by the method.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For MW-6MS/MSD, no data were qualified for Chromium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration. Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Flag	A or P
MW-15DUP (MW-5 DUP-6-4Q17 MW-8** MW-15 MW-10)	Chromium	28 (≤20)	J (all detects)	A

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. Percent differences (%D) were within QC limits.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples MW-5 and DUP-6-4Q17 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	MW-5	DUP-6-4Q17	
Chromium	0.96	1.2	22

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to DUP RPD, data were qualified as estimated in five samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

**NASA JPL, 4Q2017
Chromium - Data Qualification Summary - SDG 17-30324**

Sample	Analyte	Flag	A or P	Reason
MW-5 DUP-6-4Q17 MW-8** MW-15 MW-10	Chromium	J (all detects)	A	Duplicate sample analysis (RPD)

**NASA JPL, 4Q2017
Chromium - Laboratory Blank Data Qualification Summary - SDG 17-30324**

No Sample Data Qualified in this SDG



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:50:31PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	--

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-02</u>	File ID: <u>PE_EL2_171101-171</u>	
Sampled: <u>10/24/17 11:13</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/01/17 20:37</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJ2969</u>	Sequence: <u>1720126</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.96	1	J 5	EPA-200.8

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:50:31PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

DUP-6-4Q17

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-03

File ID: PE_EL2_171101-172

Sampled: 10/24/17 11:23

Prepared: 10/30/17 08:30

Analyzed: 11/01/17 20:40

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJ2969

Sequence:

1720126

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1.2	1	JJ	EPA-200.8

11/17/17 JJ



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:50:31PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-8

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-04

File ID: PE_EL2_171101-173

Sampled: 10/24/17 11:58

Prepared: 10/30/17 08:30

Analyzed: 11/01/17 20:43

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2969

Sequence:

1720126

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	14	1	J	EPA-200.8

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:50:31PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-15

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-05

File ID: PE_EL2_171101-161

Sampled: 10/24/17 12:39

Prepared: 10/30/17 08:30

Analyzed: 11/01/17 19:47

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2969

Sequence:

1720126

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	29	1	J	EPA-200.8

11/17/17 [Signature]



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:50:31PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-10

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-06

File ID: PE_EL2_171101-174

Sampled: 10/24/17 13:14

Prepared: 10/30/17 08:30

Analyzed: 11/01/17 20:47

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJ2969

Sequence:

1720126

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	2.6	1	JJ	EPA-200.8

11/17/17 JJ



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:50:31PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-6

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-07

File ID: PE_EL2_171031-108

Sampled: 10/24/17 14:02

Prepared: 10/31/17 08:30

Analyzed: 10/31/17 13:52

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ3118

Sequence:

1720030

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1100	1		EPA-200.8

11/17/17 Q

LDC #: 39937C4a
 SDG #: 17-30324
 Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 12/12/17
 Page: 1 of 1
 Reviewer: JB
 2nd Reviewer: [Signature]

METHOD: Chromium (EPA Method 200.8)

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/A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not Required
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	(7,8) (10,11) → Cr > 4x
VIII.	Duplicate sample analysis	SW	9, 12
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	(1,2)
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	Not reviewed for Level III validation
XIV.	Overall Assessment of Data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-5	1730324-02	Water	10/24/17
2	DUP-6-4Q17	1730324-03	Water	10/24/17
3	MW-8**	1730324-04**	Water	10/24/17
4	MW-15	1730324-05	Water	10/24/17
5	MW-10	1730324-06	Water	10/24/17
6	MW-6	1730324-07	Water	10/24/17
7	MW-15MS	1730324-05MS	Water	10/24/17
8	MW-15MSD	1730324-05MSD	Water	10/24/17
9	MW-15DUP	1730324-05DUP	Water	10/24/17
10	MW-6MS	1730324-07MS	Water	10/24/17
11	MW-6MSD	1730324-07MSD	Water	10/24/17
12	MW-6DUP	1730324-07DUP	Water	10/24/17
13				
14				

Notes: _____

Method: Metals (EPA SW 846 Method 6010/6020/7000)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution $\leq 5\%$?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were the low standard checks within 70-130%			✓	
Were all initial calibration correlation coefficients within limits as specified by the method?			✓	
IV. 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.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?			✓	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike 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 $\pm RL$ ($\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.	✓		✓	
VII. 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% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC#: 39937C4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD	
	1	2		
Chromium	0.96	1.2	22	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2017\39937C4a.wpd

VALIDATION FINDINGS WORKSHEET

Initial and Continuing Calibration Calculation Verification

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

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

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

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated	Reported	Acceptable (Y/N)
					%R	%R	
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration) 10/31 7:40	Cr	50.410 ug/L	50.000 ug/L	101.7%	101.7%	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration) 11/1 20:25	Cr	39.702 ug/L	40.000 ug/L	99.3%	99.3%	Y
	CVAA (Continuing calibration)						

Comments:

LDC #: 39937C4
 SDG #: 12-30324

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Percent recoveries (%R) for an ICP interference check sample, 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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (ug/L)
 SDR = Serial Dilution Result (ug/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
	ICP interference check						
LCS	³¹¹⁸ Laboratory control sample	Cr	38.236 ug/L	40.000 ug/L	95.67%	95.67%	Y
MS	Matrix spike	Cr	^{28.623} (SSR-SR) 73.986 - 28.623 = 45.363 ug/L	40.000 ug/L	113%	113%	Y
MSD	Duplicate	Cr	74.826 ug/L	Found: 73.986 ug/L	1.13 RPD	1.13 RPD	Y
SD	ICP serial dilution	Cr	1133.19 ug/L	1100 ug/L	37.07%	NC	Y

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Wet Chemistry

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30324

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-5	1730324-02	Water	10/24/17
DUP-6-4Q17	1730324-03	Water	10/24/17
MW-8**	1730324-04**	Water	10/24/17
MW-15	1730324-05	Water	10/24/17
MW-10	1730324-06	Water	10/24/17
MW-6	1730324-07	Water	10/24/17
MW-8MS	1730324-04MS	Water	10/24/17
MW-8MSD	1730324-04MSD	Water	10/24/17
MW-8DUP	1730324-04DUP	Water	10/24/17
MW-15MS	1730324-05MS	Water	10/24/17
MW-15MSD	1730324-05MSD	Water	10/24/17
MW-15DUP	1730324-05DUP	Water	10/24/17
MW-6MS	1730324-07MS	Water	10/24/17
MW-6MSD	1730324-07MSD	Water	10/24/17
MW-6DUP	1730324-07DUP	Water	10/24/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Chloride, Nitrate as Nitrogen and Sulfate by Environmental Protection Agency (EPA) Method 300.0

Nitrite as Nitrogen by EPA Method 353.2

Hexavalent Chromium by EPA SW 846 Method 7196

Orthophosphate as Phosphorus by EPA Method 365.1

Perchlorate by EPA Method 314.0

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples MW-5 and DUP-6-4Q17 were identified as field duplicates. No results were detected in any of the samples.

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

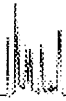
The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Wet Chemistry - Data Qualification Summary - SDG 17-30324

No Sample Data Qualified in this SDG

NASA JPL, 4Q2017
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 17-30324

No Sample Data Qualified in this SDG



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:45:51PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-02</u>	File ID: <u>171024 2137 CR6-009</u>	
Sampled: <u>10/24/17 11:13</u>	Prepared: <u>10/24/17 21:37</u>	Analyzed: <u>10/24/17 21:37</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2847</u>	Sequence: <u>1719769</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:45:51PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

DUP-6-4Q17

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-03</u>	File ID: <u>171024 2137 CR6-010</u>	
Sampled: <u>10/24/17 11:23</u>	Prepared: <u>10/24/17 21:37</u>	Analyzed: <u>10/24/17 21:37</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2847</u>	Sequence: <u>1719769</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:45:51PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-8

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-04</u>	File ID: <u>171024 2137 CR6-011</u>	
Sampled: <u>10/24/17 11:58</u>	Prepared: <u>10/24/17 21:37</u>	Analyzed: <u>10/24/17 21:37</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJ2847</u>	Sequence: <u>1719769</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:45:51PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-15

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-05</u>	File ID: <u>171024 2137 CR6-005</u>	
Sampled: <u>10/24/17 12:39</u>	Prepared: <u>10/24/17 21:37</u>	Analyzed: <u>10/24/17 21:37</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B1J2847</u>	Sequence: <u>1719769</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 9



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:45:51PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-10

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-06</u>	File ID: <u>171024 2137 CR6-025</u>	
Sampled: <u>10/24/17 13:14</u>	Prepared: <u>10/24/17 21:37</u>	Analyzed: <u>10/24/17 22:10</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2847</u>	Sequence: <u>1719769</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0020	1		EPA-7196

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:45:51PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-5

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-02

File ID: F110417.seq-17.0000.txt

Sampled: 10/24/17 11:13

Prepared: 11/04/17 02:00

Analyzed: 11/04/17 12:21

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0383

Sequence: 1720418

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17 *[Signature]*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:45:51PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

DUP-6-4Q17

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-03

File ID: F110417.seq-18.0000.txt

Sampled: 10/24/17 11:23

Prepared: 11/04/17 02:00

Analyzed: 11/04/17 12:36

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0383

Sequence: 1720418

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:45:51PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-15

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-05

File ID: F110417.seq-20.0000.txt

Sampled: 10/24/17 12:39

Prepared: 11/04/17 02:00

Analyzed: 11/04/17 13:07

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0383

Sequence:

1720418

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	J	EPA-314.0

12/17/17 *[Signature]*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:45:51PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-10

Laboratory: BC Laboratories

SDG: 17-30324

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730324-06

File ID: F110417.seq-24.0000.txt

Sampled: 10/24/17 13:14

Prepared: 11/04/17 02:00

Analyzed: 11/04/17 14:08

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0383

Sequence: 1720418

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	2.1	1	J	EPA-314.0

11/17/17 J



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:45:51PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-365.1

MW-8

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-04</u>	File ID: <u>171025 1011 PO4-074</u>	
Sampled: <u>10/24/17 11:58</u>	Prepared: <u>10/25/17 10:11</u>	Analyzed: <u>10/25/17 10:52</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJ2889</u>	Sequence: <u>1719787</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.017	1	U	EPA-365.1

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:45:51PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-353.2

MW-8

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30324</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730324-04</u>	File ID: <u>171025 0829 NO2-032</u>	
Sampled: <u>10/24/17 11:58</u>	Prepared: <u>10/25/17 08:29</u>	Analyzed: <u>10/25/17 09:08</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2890</u>	Sequence: <u>1719790</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
14797-65-0	Nitrite as N	0.010	1	U	EPA-353.2

12/1/17

LDC #: 39937C6
 SDG #: 17-30324
 Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 12/12/17
 Page: 1 of 2
 Reviewer: *[Signature]*
 2nd Reviewer: *[Signature]*

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA Method 300.0), Nitrite-N (EPA Method 353.2), Hexavalent Chromium (EPA SW846 Method 7196), Orthophosphate-P (EPA Method 365.1), Perchlorate (EPA Method 314.0)

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/A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	(7,8) (10,11) (13,14)
VII.	Duplicate sample analysis	A	9, 12, 15
VIII.	Laboratory control samples	A	LOS
IX.	Field duplicates	ND	1,2
X.	Sample result verification	A	Not reviewed for Level III validation
XI	Overall assessment of data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-5	1730324-02	Water	10/24/17
2	DUP-6-4Q17	1730324-03	Water	10/24/17
3	MW-8**	1730324-04**	Water	10/24/17
4	MW-15	1730324-05	Water	10/24/17
5	MW-10	1730324-06	Water	10/24/17
6	MW-6	1730324-07	Water	10/24/17
7	MW-8MS [†]	1730324-04MS	Water	10/24/17
8	MW-8MSD	1730324-04MSD	Water	10/24/17
9	MW-8DUP	1730324-04DUP	Water	10/24/17
10	MW-15MS [†]	1730324-05MS	Water	10/24/17
11	MW-15MSD	1730324-05MSD	Water	10/24/17
12	MW-15DUP	1730324-05DUP	Water	10/24/17
13	MW-6MS [†]	1730324-07MS	Water	10/24/17
14	MW-6MSD	1730324-07MSD	Water	10/24/17
15	MW-6DUP	1730324-07DUP	Water	10/24/17
16				
17				

LDC #: 39937C6
SDG #: 17-30324
Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 12/12/17
Page: 2 of 2
Reviewer: JB
2nd Reviewer: [Signature]

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA Method 300.0), Nitrite-N (EPA Method 353.2), Hexavalent Chromium (EPA SW846 Method 7196), Orthophosphate-P (EPA Method 365.1), Perchlorate (EPA Method 314.0)

	Client ID	Lab ID	Matrix	Date
18				
19				
20				

Notes:

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were 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?	✓			
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 $\leq 5\text{X}$ 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 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
Sample Specific Analysis Reference

All circled methods are applicable to each sample.

Sample ID	Parameter
1,2,4-6	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
3	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
0c	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
7-9	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
10-15	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄

Comments: _____

LDC #: 3993706

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1

Reviewer: VB

2nd Reviewer: AK

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cl⁻ was recalculated. Calibration date: 10/23/17

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. (ug/l)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial Calibration Verification	Cl ⁻	s1	0	133642.000	99.9718%	99.8874%	Y
		s2	0.5	309322.000			
		s3	4	639683.000			
		s4	20	1494698.000			
		s5	50	4038235.000			
		s6	100	8313356.000			
		s7	200	17835745.000			
Calibration verification	NO ₂	ICV	Found: 0.4924 mg/L	True: 0.5000 mg/L	98.57	98.97	Y
14:54 Calibration verification	ClO ₄	CCV ₃	Found: 9.093 ug/L	True: 10.000 ug/L	90.97	93.17	Y
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	Cr6 ⁺	0.0508 mg/L	0.050000 mg/L	102%	101%	Y
MS	Matrix spike sample	O ⁻ Phos.	ND (SSR-SR) 0.21893 mg/L	0.21053 mg/L	104%	108%	Y
MSD	Duplicate sample	OPO ₄ ⁻	0.21426 mg/L	Found: 0.21893 mg/L	2.1 RPD	0.884 RPD	Y

Comments: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Volatiles

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30445

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TB-8-102517	1730445-01	Water	10/25/17
MW-13	1730445-02	Water	10/25/17
MW-16	1730445-03	Water	10/25/17
DUP-7-4Q17	1730445-04	Water	10/25/17
MW-7	1730445-05	Water	10/25/17
MW-9	1730445-06	Water	10/25/17
MW-1	1730445-07	Water	10/25/17
DUP-8-4Q17	1730445-08	Water	10/25/17
EB-7-102517	1730445-09	Water	10/25/17
MW-13MS	1730445-02MS	Water	10/25/17
MW-13MSD	1730445-02MSD	Water	10/25/17

**Indicates sample underwent Level IV review

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 524.2

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV evaluation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/27/17	Pentachloroethane	77.0	All samples in SDG 17-30445	UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-8-102517 was identified as a trip blank. No contaminants were found.

Sample EB-7-102517 was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples MW-16 and DUP-7-4Q17 and samples MW-1 and DUP-8-4Q17 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	MW-16	DUP-7-4Q17	
Bromodichloromethane	0.41	0.47	14
Chloroform	0.94	0.99	5

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to continuing calibration %D, data were qualified as estimated in nine samples.

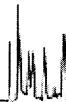
The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Volatiles - Data Qualification Summary - SDG 17-30445

Sample	Compound	Flag	A or P	Reason
TB-8-102517 MW-13 MW-16 DUP-7-4Q17 MW-7 MW-9 MW-1 DUP-8-4Q17 EB-7-102517	Pentachloroethane	UJ (all non-detects)	A	Continuing calibration (%D)

NASA JPL, 4Q2017
Volatiles - Laboratory Blank Data Qualification Summary - SDG 17-30445

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-8-102517

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-01 File ID: 27OCT46.D
Sampled: 10/25/17 07:00 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 02:36
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 Q

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-8-102517

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-01</u>	File ID: <u>27OCT46.D</u>	
Sampled: <u>10/25/17 07:00</u>	Prepared: <u>10/27/17 13:14</u>	Analyzed: <u>10/28/17 02:36</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2864</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.9500	99.5	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.140	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9400	99.4	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	256308	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	94851	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	417749	7.38	427034	7.38	

* Values outside of QC limits

11/17 2

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

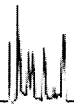
TB-8-102517

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30445</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730445-01</u>	File ID:	<u>27OCT46.D</u>		
Sampled:	<u>10/25/17 07:00</u>	Prepared:	<u>10/27/17 13:14</u>	Analyzed:	<u>10/28/17 02:36</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2864</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-13

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-02</u>	File ID: <u>27OCT40.D</u>	
Sampled: <u>10/25/17 08:40</u>	Prepared: <u>10/27/17 13:14</u>	Analyzed: <u>10/28/17 00:16</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2864</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.21	J
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.37	J
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	4.0	
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

12/17/17

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-13

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-02 File ID: 27OCT40.D
Sampled: 10/25/17 08:40 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 00:16
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

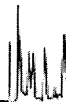
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	9.7800	97.8	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.060	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.7500	97.5	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	256952	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	100898	9.62	105600	9.61	
1,4-Difluorobenzene (IS)	416902	7.38	427034	7.38	

* Values outside of QC limits

11/17/17 DC



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

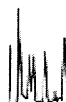
Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-16

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-03 File ID: 27OCT47.D
Sampled: 10/25/17 09:35 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 02:59
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.41	J
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.94	
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-16

Laboratory: BC Laboratories SDG: 17-30445
 Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
 Matrix: Water Laboratory ID: 1730445-03 File ID: 27OCT47.D
 Sampled: 10/25/17 09:35 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 02:59
 Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
 Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 9

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-16

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-03</u>	File ID: <u>27OCT47.D</u>	
Sampled: <u>10/25/17 09:35</u>	Prepared: <u>10/27/17 13:14</u>	Analyzed: <u>10/28/17 02:59</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2864</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.410	104	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.190	102	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.010	100	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	254619	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	96173	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	415533	7.38	427034	7.38	

* Values outside of QC limits

11/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

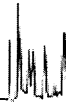
MW-16

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-03</u>	File ID: <u>27OCT47.D</u>	
Sampled: <u>10/25/17 09:35</u>	Prepared: <u>10/27/17 13:14</u>	Analyzed: <u>10/28/17 02:59</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2864</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

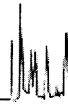
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-7-4Q17

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-04 File ID: 27OCT48.D
Sampled: 10/25/17 09:45 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 03:22
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.47	J
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.99	
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

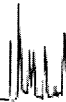
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-7-4Q17

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-04 File ID: 27OCT48.D
Sampled: 10/25/17 09:45 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 03:22
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-7-4Q17

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-04 File ID: 27OCT48.D
Sampled: 10/25/17 09:45 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 03:22
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

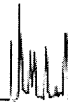
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>LS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.650	106	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.100	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.5400	95.4	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	254179	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	99341	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	426466	7.38	427034	7.38	

* Values outside of QC limits

12/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

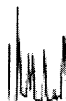
DUP-7-4Q17

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30445</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730445-04</u>	File ID:	<u>27OCT48.D</u>		
Sampled:	<u>10/25/17 09:45</u>	Prepared:	<u>10/27/17 13:14</u>	Analyzed:	<u>10/28/17 03:22</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2864</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

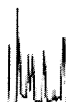
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-7

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-05 File ID: 27OCT49.D
Sampled: 10/25/17 10:37 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 03:45
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	2.0	
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

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Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

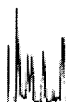
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-7

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-05 File ID: 27OCT49.D
Sampled: 10/25/17 10:37 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 03:45
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

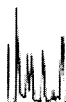
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-9

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-06 File ID: 27OCT50.D
Sampled: 10/25/17 11:50 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 04:09
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

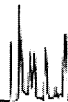
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-9

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-06 File ID: 27OCT50.D
Sampled: 10/25/17 11:50 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 04:09
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

12/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-9

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/25/17 11:50
Solids:
Batch: BJ2864
SDG: 17-30445
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730445-06
Prepared: 10/27/17 13:14
Preparation: EPA 5030 Water MS
File ID: 27OCT50.D
Analyzed: 10/28/17 04:09
Initial/Final: 25 ml / 25 ml
Sequence: 1719744
Calibration: 1710006
Instrument: MS-V5

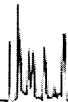
Table with 5 columns: CAS NO., COMPOUND, DILUTION, CONC. (ug/L), Q. Lists various organic compounds and their concentrations.

Table with 6 columns: SYSTEM MONITORING COMPOUND, ADDED (ug/L), CONC (ug/L), % REC, QC LIMITS, Q. Shows surrogate compounds and their recovery percentages.

Table with 6 columns: INTERNAL STANDARD, AREA, RT, REF AREA, REF RT, Q. Lists internal standards used for calibration.

* Values outside of QC limits

Handwritten signature/initials



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

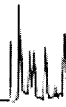
MW-9

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30445</u>
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730445-06</u>
Sampled:	<u>10/25/17 11:50</u>	Prepared:	<u>10/27/17 13:14</u>
Solids:		Preparation:	<u>EPA 5030 Water MS</u>
Batch:	<u>BJJ2864</u>	Sequence:	<u>1719744</u>
		Calibration:	<u>1710006</u>
		Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17 *Q*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

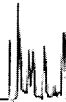
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-1

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-07 File ID: 27OCT51.D
Sampled: 10/25/17 13:04 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 04:32
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-1

Laboratory: BC Laboratories SDG: 17-30445
 Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
 Matrix: Water Laboratory ID: 1730445-07 File ID: 27OCT51.D
 Sampled: 10/25/17 13:04 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 04:32
 Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
 Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-1

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-07 File ID: 27OCT51.D
Sampled: 10/25/17 13:04 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 04:32
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

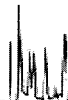
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.390	104	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.8600	98.6	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.8400	98.4	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	246890	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	97457	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	417157	7.38	427034	7.38	

* Values outside of QC limits

12/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

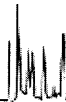
MW-1

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30445</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730445-07</u>	File ID:	<u>27OCT51.D</u>		
Sampled:	<u>10/25/17 13:04</u>	Prepared:	<u>10/27/17 13:14</u>	Analyzed:	<u>10/28/17 04:32</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2864</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17 



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-8-4Q17

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-08</u>	File ID: <u>27OCT52.D</u>	
Sampled: <u>10/25/17 13:14</u>	Prepared: <u>10/27/17 13:14</u>	Analyzed: <u>10/28/17 04:55</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2864</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17 Q

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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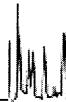
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-8-4Q17

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30445</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730445-08</u>	File ID:	<u>27OCT52.D</u>		
Sampled:	<u>10/25/17 13:14</u>	Prepared:	<u>10/27/17 13:14</u>	Analyzed:	<u>10/28/17 04:55</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2864</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

12/17/17 *Q*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

DUP-8-4Q17

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-08 File ID: 27OCT52.D
Sampled: 10/25/17 13:14 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 04:55
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

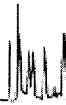
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>UT</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.170	102	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.280	103	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.7600	97.6	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	246774	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	94271	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	397552	7.38	427034	7.38	

* Values outside of QC limits

12/17/17 *QC*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

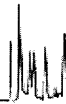
DUP-8-4Q17

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-08 File ID: 27OCT52.D
Sampled: 10/25/17 13:14 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 04:55
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17 DC



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

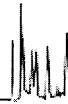
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-7-102517

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-09 File ID: 27OCT53.D
Sampled: 10/25/17 13:20 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 05:18
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 DC



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:55:45PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-7-102517

Laboratory: BC Laboratories SDG: 17-30445
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730445-09 File ID: 27OCT53.D
Sampled: 10/25/17 13:20 Prepared: 10/27/17 13:14 Analyzed: 10/28/17 05:18
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2864 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

Table with 5 columns: CAS NO., COMPOUND, DILUTION, CONC. (ug/L), Q. Lists various organic compounds and their concentrations.

Table with 6 columns: SYSTEM MONITORING COMPOUND, ADDED (ug/L), CONC (ug/L), % REC, QC LIMITS, Q. Lists surrogate compounds and their recovery percentages.

Table with 6 columns: INTERNAL STANDARD, AREA, RT, REF AREA, REF RT, Q. Lists internal standards and their retention times.

* Values outside of QC limits

12/17/17 4

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:55:45PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-7-102517

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30445</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730445-09</u>	File ID:	<u>27OCT53.D</u>		
Sampled:	<u>10/25/17 13:20</u>	Prepared:	<u>10/27/17 13:14</u>	Analyzed:	<u>10/28/17 05:18</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2864</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17 

LDC #: 39937D1

VALIDATION COMPLETENESS WORKSHEET

Date: 12/05/17

SDG #: 17-30445

Level III

Page: 1 of 1

Laboratory: BC Laboratories, Inc.

Reviewer: SVG

2nd Reviewer: [Signature]

METHOD: GC/MS Volatiles (EPA Method 524.2)

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/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICV $\leq 20\%$ ✓ ICV $\leq 30\%$
IV.	Continuing calibration	SW	CV $\leq 30\%$
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1 EB = 9
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	NA	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	SW	D = 3/4 * 7/8
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	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	TB-8-102517	1730445-01	Water	10/25/17
2	MW-13	1730445-02	Water	10/25/17
3	MW-16 D ₁	1730445-03	Water	10/25/17
4	DUP-7-4Q17 D ₁	1730445-04	Water	10/25/17
5	MW-7	1730445-05	Water	10/25/17
6	MW-9	1730445-06	Water	10/25/17
7	MW-1 D ₂	1730445-07	Water	10/25/17
8	DUP-8-4Q17 D ₂	1730445-08	Water	10/25/17
9	EB-7-102517	1730445-09	Water	10/25/17
10	MW-13MS	1730445-02MS	Water	10/25/17
11	MW-13MSD	1730445-02MSD	Water	10/25/17
12				
13	BJ2864 - Blk 1			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene	A2.
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane	B2.
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane	C2.
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene	D2.
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11	E2.
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12	F2.
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113	G2.
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114	H2.
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane	I2.
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide	J2.
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane	K2.
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane	L2.
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane	M2.
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane	N2.
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO. 1,1-Difluoroethane	O1. 3-Methylpentane	O2.
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane	P2.
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane	Q2.
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane	R2.
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane	S2.
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane	T2.
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal	U2.
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene	V2.
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol	W2.
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene	X2.
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. <i>Hexachloroethane</i>	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. <i>Methyl iodide</i>	Z2.

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: GC/MS VOA (EPA Method 524.2)

Y N N/A
Y N N/A

Were field duplicate pairs identified in this SDG?
 Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤ %)
	3	4	
P	0.41	0.47	14
K	0.94	0.99	5

Compound	Concentration (ug/L)		RPD (≤ %)

Compound	Concentration (ug/L)		RPD (≤ %)

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017
LDC Report Date: December 18, 2017
Parameters: Chromium
Validation Level: Level III & IV
Laboratory: BC Laboratories, Inc.
Sample Delivery Group (SDG): 17-30445

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-13	1730445-02	Water	10/25/17
MW-16	1730445-03	Water	10/25/17
DUP-7-4Q17	1730445-04	Water	10/25/17
MW-7	1730445-05	Water	10/25/17
MW-9	1730445-06	Water	10/25/17
MW-1	1730445-07	Water	10/25/17
DUP-8-4Q17	1730445-08	Water	10/25/17
EB-7-102517	1730445-09	Water	10/25/17
MW-13MS	1730445-02MS	Water	10/25/17
MW-13MSD	1730445-02MSD	Water	10/25/17
MW-13DUP	1730445-02DUP	Water	10/25/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chromium by Environmental Protection Agency (EPA) Method 200.8

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the method.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
11/02/17	CCV (09:32)	Chromium	89.8 (90-110)	MW-16 DUP-7-4Q17 MW-7 MW-9 MW-1 DUP-8-4Q17 EB-7-102517	J (all detects)	P

IV. ICP Interference Check Sample Analysis

ICP interference check sample analyses were not required by the method.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-7-102517 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Analyte	Concentration (ug/L)
EB-7-102517	Chromium	0.90

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For MW-13MS/MSD, no data were qualified for Chromium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration. Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Flag	A or P
MW-13DUP (All samples in SDG 17-30166)	Chromium	20.8 (≤20)	J (all detects)	A

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. Percent differences (%D) were within QC limits.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples MW-16 and DUP-7-4Q17 and samples MW-1 and DUP-8-4Q17 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	MW-16	DUP-7-4Q17	
Chromium	490	1100	77

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to instrument calibration CCV %D and DUP RPD, data were qualified as estimated in eight samples.

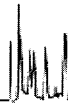
The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Chromium - Data Qualification Summary - SDG 17-30455

Sample	Analyte	Flag	A or P	Reason
MW-16 DUP-7-4Q17 MW-7 MW-9 MW-1 DUP-8-4Q17 EB-7-102517	Chromium	J (all detects)	P	Instrument calibration (CCV %R)
MW-13 MW-16 DUP-7-4Q17 MW-7 MW-9 MW-1 DUP-8-4Q17 EB-7-102517	Chromium	J (all detects)	A	Duplicate sample analysis (RPD)

NASA JPL, 4Q2017
Chromium - Laboratory Blank Data Qualification Summary - SDG 17-30445

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:00:29PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-13

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-02

File ID: PE_EL2_171102-027

Sampled: 10/25/17 08:40

Prepared: 10/30/17 08:30

Analyzed: 11/02/17 08:21

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ2974

Sequence: 1720154

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1500	1	J	EPA-200.8

12/17/17 J

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:00:29PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-16

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>	
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>	
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-03</u>	File ID: <u>PE_EL2_171102-037</u>
Sampled: <u>10/25/17 09:35</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/02/17 08:58</u>
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>
Batch: <u>BJ2974</u>	Sequence: <u>1720154</u>	Calibration: <u>UNASSIGNED</u> Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	490	1	J	EPA-200.8

12/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:00:29PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

DUP-7-4Q17

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-04</u>	File ID: <u>PE_EL2_171102-038</u>	
Sampled: <u>10/25/17 09:45</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/02/17 09:01</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJJ2974</u>	Sequence: <u>1720154</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1100	1	J	EPA-200.8

12/17/17 


Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:00:29PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-7

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>	
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>	
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-05</u>	File ID: <u>PE_EL2_171102-039</u>
Sampled: <u>10/25/17 10:37</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/02/17 09:05</u>
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>
Batch: <u>BJJ2974</u>	Sequence: <u>1720154</u>	Calibration: <u>UNASSIGNED</u>
		Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1200	1	J	EPA-200.8

11/17/17 


Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:00:29PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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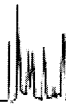
INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-9

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-06</u>	File ID: <u>PE_EL2_171102-040</u>	
Sampled: <u>10/25/17 11:50</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/02/17 09:08</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJ2974</u>	Sequence: <u>1720154</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	8.9	1	J	EPA-200.8

11/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:00:29PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-1

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-07

File ID: PE_EL2_171102-041

Sampled: 10/25/17 13:04

Prepared: 10/30/17 08:30

Analyzed: 11/02/17 09:11

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: B[J]2974

Sequence: 1720154

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U <i>MS</i>	EPA-200.8

12/17/17 *OC*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:00:29PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

DUP-8-4Q17

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-08

File ID: PE_EL2_171102-042

Sampled: 10/25/17 13:14

Prepared: 10/30/17 08:30

Analyzed: 11/02/17 09:15

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJ2974

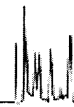
Sequence: 1720154

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U <u>US</u>	EPA-200.8

12/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:00:29PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

EB-7-102517

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-09</u>	File ID: <u>PE_EL2_171102-043</u>	
Sampled: <u>10/25/17 13:20</u>	Prepared: <u>10/30/17 08:30</u>	Analyzed: <u>11/02/17 09:18</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJJ2974</u>	Sequence: <u>1720154</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.90	1	J J	EPA-200.8

12/17/17 &

LDC #: 39937D4a
 SDG #: 17-30445
 Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12/12/17
 Page: 1 of 1
 Reviewer: J3
 2nd Reviewer: [Signature]

METHOD: Chromium (EPA Method 200.8)

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/A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not Required
V.	Laboratory Blanks	A	
VI.	Field Blanks	SW	EB=8
VII.	Matrix Spike/Matrix Spike Duplicates	A	(9,10); Cr > 4x
VIII.	Duplicate sample analysis	SW	11
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LOS
XI.	Field Duplicates	SW	(2,3) (6,7) ~ ND
XII.	Internal Standard (ICP-MS)	N	Not Reviewed Level 3
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

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

	Client ID	Lab ID	Matrix	Date
1	MW-13	1730445-02	Water	10/25/17
2	MW-16	1730445-03	Water	10/25/17
3	DUP-7-4Q17	1730445-04	Water	10/25/17
4	MW-7	1730445-05	Water	10/25/17
5	MW-9	1730445-06	Water	10/25/17
6	MW-1	1730445-07	Water	10/25/17
7	DUP-8-4Q17	1730445-08	Water	10/25/17
8	EB-7-102517	1730445-09	Water	10/25/17
9	MW-13MS	1730445-02MS	Water	10/25/17
10	MW-13MSD	1730445-02MSD	Water	10/25/17
11	MW-13DUP	1730445-02DUP	Water	10/25/17
12				
13				
14				

Notes: _____

LDC#: 39937D4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD	
	2	3		
Chromium	490	1100	77	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2017\39937D4a.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Wet Chemistry

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30445

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-13	1730445-02	Water	10/25/17
MW-16	1730445-03	Water	10/25/17
DUP-7-4Q17	1730445-04	Water	10/25/17
MW-7	1730445-05	Water	10/25/17
MW-9	1730445-06	Water	10/25/17
MW-1	1730445-07	Water	10/25/17
DUP-8-4Q17	1730445-08	Water	10/25/17
EB-7-102517	1730445-09	Water	10/25/17
MW-13MS	1730445-02MS	Water	10/25/17
MW-13MSD	1730445-02MSD	Water	10/25/17
MW-13DUP	1730445-02DUP	Water	10/25/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Chloride, Nitrate as Nitrogen and Sulfate by Environmental Protection Agency (EPA) Method 300.0

Nitrite as Nitrogen by EPA Method 353.2

Hexavalent Chromium by EPA SW 846 Method 7196

Orthophosphate as Phosphorus by EPA Method 365.1

Perchlorate by EPA Method 314.0

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-7-102517 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Analyte	Concentration (mg/L)
EB-7-102517	Hexavalent chromium	0.0012

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples MW-16 and DUP-7-4Q17 and samples MW-1 and DUP-8-4Q17 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD
	MW-16	DUP-7-4Q17	
Perchlorate	0.83 ug/L	0.84 ug/L	1
Hexavalent chromium	0.0017 mg/L	0.0019 mg/L	11

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

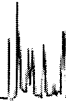
The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Wet Chemistry - Data Qualification Summary - SDG 17-30445

No Sample Data Qualified in this SDG

NASA JPL, 4Q2017
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 17-30445

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-13

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-02

File ID: 171025 2145 CR6-021

Sampled: 10/25/17 08:40

Prepared: 10/25/17 21:45

Analyzed: 10/25/17 21:45

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJ2908

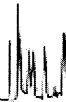
Sequence: 1719840

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0036	1		EPA-7196

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-16

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-03

File ID: 171025 2145 CR6-040

Sampled: 10/25/17 09:35

Prepared: 10/25/17 21:45

Analyzed: 10/25/17 22:28

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2908

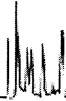
Sequence: 1719840

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0017	1	J	EPA-7196

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-7196

DUP-7-4Q17

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-04

File ID: 171025 2145 CR6-026

Sampled: 10/25/17 09:45

Prepared: 10/25/17 21:45

Analyzed: 10/25/17 21:45

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[J2908

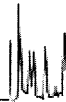
Sequence: 1719840

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0019	1	J	EPA-7196

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-7196

MW-7

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-05

File ID: 171025 2145 CR6-027

Sampled: 10/25/17 10:37

Prepared: 10/25/17 21:45

Analyzed: 10/25/17 21:45

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2908

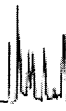
Sequence: 1719840

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0013	1	J	EPA-7196

11/17/17 8




Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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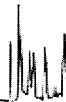
INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-9

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-06</u>	File ID: <u>171025 2145 CR6-028</u>	
Sampled: <u>10/25/17 11:50</u>	Prepared: <u>10/25/17 21:45</u>	Analyzed: <u>10/25/17 21:45</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2908</u>	Sequence: <u>1719840</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-7196

MW-1

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-07

File ID: 171025 2145 CR6-031

Sampled: 10/25/17 13:04

Prepared: 10/25/17 21:45

Analyzed: 10/25/17 21:48

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[J]2908

Sequence: 1719840

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 2


Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

DUP-8-4Q17

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-08</u>	File ID: <u>171025 2145 CR6-032</u>	
Sampled: <u>10/25/17 13:14</u>	Prepared: <u>10/25/17 21:45</u>	Analyzed: <u>10/25/17 21:48</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJ2908</u>	Sequence: <u>1719840</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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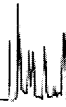
INORGANIC ANALYSIS DATA SHEET
EPA-7196

EB-7-102517

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-09</u>	File ID: <u>171025 2145 CR6-033</u>	
Sampled: <u>10/25/17 13:20</u>	Prepared: <u>10/25/17 21:45</u>	Analyzed: <u>10/25/17 21:48</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJ2908</u>	Sequence: <u>1719840</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0012	1	J	EPA-7196

12/17/17 *[Signature]*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-365.1

MW-13

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-02</u>	File ID: <u>171026 0907 PO4-050</u>	
Sampled: <u>10/25/17 08:40</u>	Prepared: <u>10/26/17 09:07</u>	Analyzed: <u>10/26/17 09:28</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[J2901</u>	Sequence: <u>1719851</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.066	1		EPA-365.1

12/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-365.1

MW-16

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>	
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>	
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-03</u>	File ID: <u>171026 0907 PO4-054</u>
Sampled: <u>10/25/17 09:35</u>	Prepared: <u>10/26/17 09:07</u>	Analyzed: <u>10/26/17 09:28</u>
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>
Batch: <u>BJJ2901</u>	Sequence: <u>1719851</u>	Calibration: <u>UNASSIGNED</u> Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.25	1		EPA-365.1



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-365.1

MW-7

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-05</u>	File ID: <u>171026 0907 PO4-055</u>	
Sampled: <u>10/25/17 10:37</u>	Prepared: <u>10/26/17 09:07</u>	Analyzed: <u>10/26/17 09:28</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJ2901</u>	Sequence: <u>1719851</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.021	1	J	EPA-365.1

12/17/17 Q




Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-353.2

MW-13

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-02</u>	File ID: <u>171026 0809 NO2-025</u>	
Sampled: <u>10/25/17 08:40</u>	Prepared: <u>10/26/17 08:09</u>	Analyzed: <u>10/26/17 08:37</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJ2906</u>	Sequence: <u>1719849</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
14797-65-0	Nitrite as N	0.010	1	U	EPA-353.2

11/17/17 

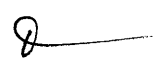
Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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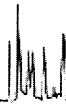
INORGANIC ANALYSIS DATA SHEET
EPA-353.2

MW-16

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>	
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>	
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-03</u>	File ID: <u>171026 0809 NO2-029</u>
Sampled: <u>10/25/17 09:35</u>	Prepared: <u>10/26/17 08:09</u>	Analyzed: <u>10/26/17 08:37</u>
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>
Batch: <u>BJ2906</u>	Sequence: <u>1719849</u>	Calibration: <u>UNASSIGNED</u> Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
14797-65-0	Nitrite as N	0.010	1	U	EPA-353.2

12/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-353.2

MW-7

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-05

File ID: 171026 0809 NO2-033

Sampled: 10/25/17 10:37

Prepared: 10/26/17 08:09

Analyzed: 10/26/17 08:46

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[J]2906

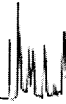
Sequence: 1719849

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
14797-65-0	Nitrite as N	0.010	1	U	EPA-353.2

12/17/17 *[Signature]*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET

EPA-300.0

MW-13

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-02

File ID: B102617.seq-06

Sampled: 10/25/17 08:40

Prepared: 10/26/17 12:00

Analyzed: 10/26/17 14:09

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJ2763

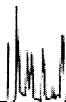
Sequence: 1720204

Calibration: UNASSIGNED

Instrument: IC2

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
16887-00-6	Chloride	63	1		EPA-300.0
14797-55-8	Nitrate as N	2.0	1		EPA-300.0
14808-79-8	Sulfate	45	1		EPA-300.0

12/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-300.0

MW-16

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-03

File ID: B102617.seq-10

Sampled: 10/25/17 09:35

Prepared: 10/26/17 12:00

Analyzed: 10/26/17 15:17

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2763

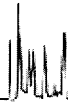
Sequence: 1720204

Calibration: UNASSIGNED

Instrument: IC2

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
16887-00-6	Chloride	90	1		EPA-300.0
14797-55-8	Nitrate as N	1.5	1		EPA-300.0
14808-79-8	Sulfate	55	1		EPA-300.0

12/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	--

INORGANIC ANALYSIS DATA SHEET
EPA-300.0

MW-7

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-05</u>	File ID: <u>B102617.seq-11</u>	
Sampled: <u>10/25/17 10:37</u>	Prepared: <u>10/26/17 12:00</u>	Analyzed: <u>10/26/17 15:35</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2763</u>	Sequence: <u>1720204</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC2</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
16887-00-6	Chloride	89	1		EPA-300.0
14797-55-8	Nitrate as N	1.5	1		EPA-300.0
14808-79-8	Sulfate	55	1		EPA-300.0

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-314.0

MW-13

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-02

File ID: F110617.seq-15.0000.txt

Sampled: 10/25/17 08:40

Prepared: 11/06/17 10:00

Analyzed: 11/06/17 13:56

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0479

Sequence: 1720512

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	69	10	D	EPA-314.0

Handwritten signature/initials



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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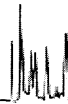
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-16

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-03</u>	File ID: <u>F110617.seq-22.0000.txt</u>	
Sampled: <u>10/25/17 09:35</u>	Prepared: <u>11/06/17 10:00</u>	Analyzed: <u>11/06/17 15:43</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0479</u>	Sequence: <u>1720512</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.83	1	J	EPA-314.0

11/17/17 J



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	--

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

DUP-7-4Q17

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-04</u>	File ID: <u>F110617.seq-23.0000.txt</u>	
Sampled: <u>10/25/17 09:45</u>	Prepared: <u>11/06/17 10:00</u>	Analyzed: <u>11/06/17 15:59</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0479</u>	Sequence: <u>1720512</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.84	1	J	EPA-314.0

11/17/17


Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 1:57:50PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-7

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30445</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730445-05</u>	File ID: <u>F110617.seq-24.0000.txt</u>	
Sampled: <u>10/25/17 10:37</u>	Prepared: <u>11/06/17 10:00</u>	Analyzed: <u>11/06/17 16:14</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0479</u>	Sequence: <u>1720512</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	4.2	1		EPA-314.0

11/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-9

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-06

File ID: F110617.seq-25.0000.txt

Sampled: 10/25/17 11:50

Prepared: 11/06/17 10:00

Analyzed: 11/06/17 16:29

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0479

Sequence: 1720512

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-1

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-07

File ID: F110617.seq-26.0000.txt

Sampled: 10/25/17 13:04

Prepared: 11/06/17 10:00

Analyzed: 11/06/17 16:45

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0479

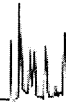
Sequence: 1720512

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET

EPA-314.0

DUP-8-4Q17

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-08

File ID: F110617.seq-27.0000.txt

Sampled: 10/25/17 13:14

Prepared: 11/06/17 10:00

Analyzed: 11/06/17 17:00

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0479

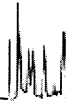
Sequence: 1720512

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17 *Q*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 1:57:50PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

EB-7-102517

Laboratory: BC Laboratories

SDG: 17-30445

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730445-09

File ID: F110617.seq-28.0000.txt

Sampled: 10/25/17 13:20

Prepared: 11/06/17 10:00

Analyzed: 11/06/17 17:15

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0479

Sequence: 1720512

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17

LDC #: 39937D6

VALIDATION COMPLETENESS WORKSHEETDate: 12/12/17

SDG #: 17-30445

Level III

Page: 1 of 1Laboratory: BC Laboratories, Inc.Reviewer: 32nd Reviewer: [Signature]

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA Method 300.0), Nitrite-N (EPA Method 353.2), Hexavalent Chromium (EPA SW846 Method 7196), Orthophosphate-P (EPA Method 365.1), Perchlorate (EPA Method 314.0)

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 / A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB = 8
VI.	Matrix Spike/Matrix Spike Duplicates	A	10, 11
VII.	Duplicate sample analysis	A	12
VIII.	Laboratory control samples	A	LOS
IX.	Field duplicates	SW	(2,3) (4,7)
X.	Sample result verification	N	
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	MW-13	1730445-02	Water	10/25/17
2	MW-16	1730445-03	Water	10/25/17
3	DUP-7-4Q17	1730445-04	Water	10/25/17
4	MW-7	1730445-05	Water	10/25/17
5	MW-9	1730445-06	Water	10/25/17
6	MW-1	1730445-07	Water	10/25/17
7	DUP-8-4Q17	1730445-08	Water	10/25/17
8	EB-7-102517	1730445-09	Water	10/25/17
9	MW-13MS	1730445-02MS	Water	10/25/17
10	MW-13MSD	1730445-02MSD	Water	10/25/17
11	MW-13DUP	1730445-02DUP	Water	10/25/17
12				
13				
14				
15				

Notes: _____

LDC# 39937D6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

Inorganics: Method See Cover

Analyte	Concentration		RPD	
	2	3		
Perchlorate (ug/L)	0.83	0.84	1	
Hexavalent Chromium (mg/L)	0.0017	0.0019	11	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2017\39937D6.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Volatiles

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30577

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TB-9-102617	1730577-01	Water	10/26/17
MW-11-5	1730577-02	Water	10/26/17
MW-11-4**	1730577-03**	Water	10/26/17
MW-11-3	1730577-04	Water	10/26/17
MW-11-2	1730577-05	Water	10/26/17
MW-11-1	1730577-06	Water	10/26/17
MW-21-5	1730577-07	Water	10/26/17
MW-21-4**	1730577-08**	Water	10/26/17
MW-21-3	1730577-09	Water	10/26/17
MW-21-2	1730577-10	Water	10/26/17
EB-8-102617	1730577-11	Water	10/26/17
MW-21-2MS	1730577-10MS	Water	10/26/17
MW-21-2MSD	1730577-10MSD	Water	10/26/17

**Indicates sample underwent Level IV review

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 524.2

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV evaluation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/27/17	Pentachloroethane	77.0	MW-21-2	UJ (all non-detects)	A
10/28/17 (27oct61)	2,2-Dichloropropane	31.2	TB-9-102617 MW-11-5 MW-11-4** MW-11-3 MW-11-2 MW-11-1 MW-21-5 MW-21-4** MW-21-3 EB-8-102617	UJ (all non-detects)	A

Date	Compound	%D	Associated Samples	Flag	A or P
10/28/17 (27oct62)	Pentachloroethane	98.4	TB-9-102617 MW-11-5 MW-11-4** MW-11-3 MW-11-2 MW-11-1 MW-21-5 MW-21-4** MW-21-3 EB-8-102617	UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-9-102617 was identified as a trip blank. No contaminants were found.

Sample EB-8-102617 was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to continuing calibration %D, data were qualified as estimated in eleven samples.

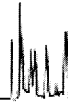
The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Volatiles - Data Qualification Summary - SDG 17-30577

Sample	Compound	Flag	A or P	Reason
MW-21-2	Pentachloroethane	UJ (all non-detects)	A	Continuing calibration (%D)
TB-9-102617 MW-11-5 MW-11-4** MW-11-3 MW-11-2 MW-11-1 MW-21-5 MW-21-4** MW-21-3 EB-8-102617	2,2-Dichloropropane Pentachloroethane	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D)

NASA JPL, 4Q2017
Volatiles - Laboratory Blank Data Qualification Summary - SDG 17-30577

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

TB-9-102617

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-01 File ID: 27OCT65.D
Sampled: 10/26/17 07:00 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 09:59
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

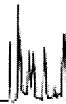
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-5

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-02 File ID: 27OCT66.D
Sampled: 10/26/17 08:45 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 10:23
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.17	J
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 *Q*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-5

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/26/17 08:45
Solids:
Batch: BIJ2865
SDG: 17-30577
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730577-02
Prepared: 10/27/17 13:16
Preparation: EPA 5030 Water MS
File ID: 27OCT66.D
Analyzed: 10/28/17 10:23
Initial/Final: 25 ml / 25 ml
Sequence: 1719744
Calibration: 1710006
Instrument: MS-V5

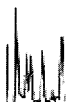
Table with 5 columns: CAS NO., COMPOUND, DILUTION, CONC. (ug/L), Q. Lists various organic compounds and their concentrations.

Table with 6 columns: SYSTEM MONITORING COMPOUND, ADDED (ug/L), CONC (ug/L), % REC, QC LIMITS, Q. Lists surrogate compounds and their QC limits.

Table with 6 columns: INTERNAL STANDARD, AREA, RT, REF AREA, REF RT, Q. Lists internal standards used in the analysis.

* Values outside of QC limits

Handwritten signature/initials



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

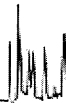
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-4

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-03 File ID: 27OCT67.D
Sampled: 10/26/17 09:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 10:46
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U <i>MS</i>

12/17/17 *Q*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-4

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-03 File ID: 27OCT67.D
Sampled: 10/26/17 09:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 10:46
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	J
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17 Q

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 4:27:57PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-4

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30577</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730577-03</u>	File ID:	<u>27OCT67.D</u>		
Sampled:	<u>10/26/17 09:30</u>	Prepared:	<u>10/27/17 13:16</u>	Analyzed:	<u>10/28/17 10:46</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2865</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>MS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.230	102	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.110	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9600	99.6	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	240408	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	92693	9.61	99516	9.61	
1,4-Difluorobenzene (IS)	393613	7.38	415323	7.38	

* Values outside of QC limits



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

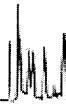
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-3

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-04 File ID: 27OCT68.D
Sampled: 10/26/17 10:00 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 11:09
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U US

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

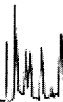
MW-11-3

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-04 File ID: 27OCT68.D
Sampled: 10/26/17 10:00 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 11:09
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-2

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-05 File ID: 27OCT69.D
Sampled: 10/26/17 10:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 11:32
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U <i>US</i>

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

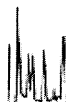
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-2

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-05 File ID: 27OCT69.D
Sampled: 10/26/17 10:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 11:32
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

Handwritten signature



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-2

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-05 File ID: 27OCT69.D
Sampled: 10/26/17 10:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 11:32
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

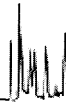
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>MS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.140	101	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.010	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9500	99.5	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	243316	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	93039	9.61	99516	9.61	
1,4-Difluorobenzene (IS)	395172	7.38	415323	7.38	

* Values outside of QC limits

Handwritten signature



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 4:27:57PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

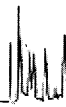
MW-11-2

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30577</u>				
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>				
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730577-05</u>	File ID:	<u>27OCT69.D</u>		
Sampled:	<u>10/26/17 10:30</u>	Prepared:	<u>10/27/17 13:16</u>	Analyzed:	<u>10/28/17 11:32</u>		
Solids:		Preparation:	<u>EPA 5030 Water MS</u>	Initial/Final:	<u>25 ml / 25 ml</u>		
Batch:	<u>BJJ2865</u>	Sequence:	<u>1719744</u>	Calibration:	<u>1710006</u>	Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

Handwritten signature/initials



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

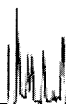
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-1

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-06 File ID: 27OCT70.D
Sampled: 10/26/17 07:50 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 11:55
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethane	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U <i>MS</i>

11/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

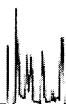
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-11-1

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-06 File ID: 27OCT70.D
Sampled: 10/26/17 07:50 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 11:55
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.23	U
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

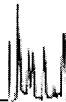
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-5

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-07 File ID: 27OCT71.D
Sampled: 10/26/17 11:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 12:18
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.73	
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-5

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/26/17 11:30
Solids:
Batch: BJJ2865
Sequence: 1719744
SDG: 17-30577
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730577-07
Prepared: 10/27/17 13:16
Preparation: EPA 5030 Water MS
File ID: 27OCT71.D
Analyzed: 10/28/17 12:18
Initial/Final: 25 ml / 25 ml
Calibration: 1710006
Instrument: MS-V5

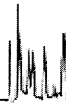
Table with 5 columns: CAS NO., COMPOUND, DILUTION, CONC. (ug/L), Q. Lists various organic compounds and their concentrations.

Table with 6 columns: SYSTEM MONITORING COMPOUND, ADDED (ug/L), CONC (ug/L), % REC, QC LIMITS, Q. Lists surrogate compounds and their recovery percentages.

Table with 6 columns: INTERNAL STANDARD, AREA, RT, REF AREA, REF RT, Q. Lists internal standards and their retention times.

* Values outside of QC limits

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Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-4

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-08 File ID: 27OCT72.D
Sampled: 10/26/17 12:10 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 12:42
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	1.2	
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.24	J
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

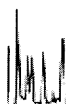
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-3

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-09 File ID: 27OCT73.D
Sampled: 10/26/17 12:35 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 13:05
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.40	J
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U <i>US</i>

11/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-3

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-09 File ID: 27OCT73.D
Sampled: 10/26/17 12:35 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 13:05
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.78	
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.92	
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

11/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 4:27:57PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-09</u>	File ID: <u>27OCT73.D</u>	
Sampled: <u>10/26/17 12:35</u>	Prepared: <u>10/27/17 13:16</u>	Analyzed: <u>10/28/17 13:05</u>	
Solids:	Preparation: <u>EPA 5030 Water MS</u>	Initial/Final: <u>25 ml / 25 ml</u>	
Batch: <u>BJJ2865</u>	Sequence: <u>1719744</u>	Calibration: <u>1710006</u>	Instrument: <u>MS-V5</u>

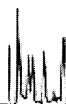
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>MS</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.640	106	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.240	102	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9300	99.3	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	232319	6.58	255124	6.57	
Chlorobenzene-d5 (IS)	90429	9.62	99516	9.61	
1,4-Difluorobenzene (IS)	381014	7.38	415323	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-2

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-10 File ID: 27OCT55.D
Sampled: 10/26/17 13:00 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 06:05
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.19	J
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U

11/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

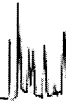
ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-2

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-10 File ID: 27OCT55.D
Sampled: 10/26/17 13:00 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 06:05
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
563-58-6	1,1-Dichloropropene	1	0.19	U
10061-01-5	cis-1,3-Dichloropropene	1	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	0.13	U
100-41-4	Ethylbenzene	1	0.15	U
87-68-3	Hexachlorobutadiene	1	0.20	U
98-82-8	Isopropylbenzene	1	0.14	U
99-87-6	p-Isopropyltoluene	1	0.14	U
75-09-2	Methylene chloride	1	0.21	U
1634-04-4	Methyl t-butyl ether	1	0.14	U
91-20-3	Naphthalene	1	0.16	U
103-65-1	n-Propylbenzene	1	0.12	U
100-42-5	Styrene	1	0.12	U
630-20-6	1,1,1,2-Tetrachloroethane	1	0.21	U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.17	U
127-18-4	Tetrachloroethene	1	0.75	
108-88-3	Toluene	1	0.17	U
87-61-6	1,2,3-Trichlorobenzene	1	0.19	U
120-82-1	1,2,4-Trichlorobenzene	1	0.15	U
71-55-6	1,1,1-Trichloroethane	1	0.21	U
79-00-5	1,1,2-Trichloroethane	1	0.21	U
79-01-6	Trichloroethene	1	0.19	U
75-69-4	Trichlorofluoromethane	1	0.14	U
96-18-4	1,2,3-Trichloropropane	1	0.78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	0.19	U
95-63-6	1,2,4-Trimethylbenzene	1	0.17	U
108-67-8	1,3,5-Trimethylbenzene	1	0.14	U
75-01-4	Vinyl chloride	1	0.18	U
67-64-1	Acetone	1	6.6	U
107-13-1	Acrylonitrile	1	1.5	U
107-05-1	Allyl chloride	1	0.47	U
994-05-8	t-Amyl Methyl ether	1	0.19	U
75-65-0	t-Butyl alcohol	1	9.4	U

12/17/17 9



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-21-2

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-10 File ID: 27OCT55.D
Sampled: 10/26/17 13:00 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 06:05
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

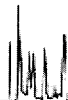
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.110	101	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.320	103	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.5600	95.6	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	246590	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	96513	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	398959	7.38	427034	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 4:27:57PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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ORGANIC ANALYSIS DATA SHEET
EPA-524.2

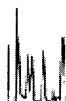
MW-21-2

Laboratory:	<u>BC Laboratories</u>	SDG:	<u>17-30577</u>
Client:	<u>Tidewater Inc.</u>	Project:	<u>JPL- GW Monitoring Wells</u>
Matrix:	<u>Water</u>	Laboratory ID:	<u>1730577-10</u>
Sampled:	<u>10/26/17 13:00</u>	Prepared:	<u>10/27/17 13:16</u>
Solids:		Preparation:	<u>EPA 5030 Water MS</u>
Batch:	<u>BJJ2865</u>	Initial/Final:	<u>25 ml / 25 ml</u>
	Sequence: <u>1719744</u>	Calibration:	<u>1710006</u>
		Instrument:	<u>MS-V5</u>

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

11/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-8-102617

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-11 File ID: 27OCT74.D
Sampled: 10/26/17 13:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 13:28
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
71-43-2	Benzene	1	0.11	U
108-86-1	Bromobenzene	1	0.15	U
74-97-5	Bromochloromethane	1	0.27	U
75-27-4	Bromodichloromethane	1	0.20	U
75-25-2	Bromoform	1	0.46	U
74-83-9	Bromomethane	1	0.20	U
104-51-8	n-Butylbenzene	1	0.15	U
135-98-8	sec-Butylbenzene	1	0.13	U
98-06-6	tert-Butylbenzene	1	0.18	U
56-23-5	Carbon tetrachloride	1	0.17	U
108-90-7	Chlorobenzene	1	0.14	U
75-00-3	Chloroethane	1	0.17	U
67-66-3	Chloroform	1	0.14	U
74-87-3	Chloromethane	1	0.11	U
95-49-8	2-Chlorotoluene	1	0.14	U
106-43-4	4-Chlorotoluene	1	0.093	U
124-48-1	Dibromochloromethane	1	0.22	U
96-12-8	1,2-Dibromo-3-chloropropane	1	0.89	U
106-93-4	1,2-Dibromoethane	1	0.22	U
74-95-3	Dibromomethane	1	0.23	U
95-50-1	1,2-Dichlorobenzene	1	0.21	U
541-73-1	1,3-Dichlorobenzene	1	0.16	U
106-46-7	1,4-Dichlorobenzene	1	0.15	U
75-71-8	Dichlorodifluoromethane	1	0.15	U
75-34-3	1,1-Dichloroethane	1	0.15	U
107-06-2	1,2-Dichloroethane	1	0.17	U
75-35-4	1,1-Dichloroethene	1	0.27	U
156-59-2	cis-1,2-Dichloroethene	1	0.27	U
156-60-5	trans-1,2-Dichloroethene	1	0.17	U
78-87-5	1,2-Dichloropropane	1	0.15	U
142-28-9	1,3-Dichloropropane	1	0.13	U
594-20-7	2,2-Dichloropropane	1	0.18	U <i>UT</i>

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-8-102617

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-11 File ID: 27OCT74.D
Sampled: 10/26/17 13:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 13:28
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

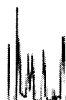
CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
75-15-0	Carbon disulfide	1	0.48	U
110-57-6	trans-1,4-Dichloro-2-butene	1	1.8	U
60-29-7	Diethyl ether	1	0.33	U
97-63-2	Ethyl methacrylate	1	1.3	U
637-92-3	Ethyl t-butyl ether	1	0.32	U
67-72-1	Hexachloroethane	1	0.11	U
591-78-6	2-Hexanone	1	5.0	U
126-98-7	Methacrylonitrile	1	2.3	U
78-93-3	Methyl ethyl ketone	1	3.3	U
74-88-4	Methyl iodide	1	1.1	U
108-10-1	Methyl isobutyl ketone	1	2.4	U
80-62-6	Methyl methacrylate	1	1.2	U
76-01-7	Pentachloroethane	1	0.63	U <i>US</i>
107-12-0	Propionitrile	1	6.2	U
109-99-9	Tetrahydrofuran	1	5.2	U
179601-23-1	p- & m-Xylenes	1	0.34	U
95-47-6	o-Xylene	1	0.13	U

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
1,2-Dichloroethane-d4 (Surrogate)	10.000	10.030	100	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.040	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.010	100	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	241397	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	92146	9.61	99516	9.61	
1,4-Difluorobenzene (IS)	391798	7.38	415323	7.38	

* Values outside of QC limits

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

EB-8-102617

Laboratory: BC Laboratories SDG: 17-30577
Client: Tidewater Inc. Project: JPL- GW Monitoring Wells
Matrix: Water Laboratory ID: 1730577-11 File ID: 27OCT74.D
Sampled: 10/26/17 13:30 Prepared: 10/27/17 13:16 Analyzed: 10/28/17 13:28
Solids: Preparation: EPA 5030 Water MS Initial/Final: 25 ml / 25 ml
Batch: BJJ2865 Sequence: 1719744 Calibration: 1710006 Instrument: MS-V5

CAS NO.	COMPOUND	DILUTION	CONC. (ug/L)	Q
107-14-2	Chloroacetonitrile	1		U
109-69-3	1-Chlorobutane	1		U
513-88-2	1,1-Dichloropropanone	1		U
96-33-3	Methyl acrylate	1		U
98-95-3	Nitrobenzene	1		U
79-46-9	2-Nitropropane	1		U

* Values outside of QC limits

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LDC #: 39937E1
 SDG #: 17-30577
 Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 12/05/17
 Page: 1 of 1
 Reviewer: JG
 2nd Reviewer: J

METHOD: GC/MS Volatiles (EPA Method 524.2)

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, A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A, A	ICAL \leq 20% r ² ICV \leq 30%
IV.	Continuing calibration	SW	CW \leq 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1 EB = 11
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	NA	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Level III validation
XIII.	Target compound identification	A	Not reviewed for Level III validation
XIV.	System performance	A	Not reviewed for Level III validation
XV.	Overall assessment of data	A	

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

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	TB-9-102617	1730577-01	Water	10/26/17
2	MW-11-5	1730577-02	Water	10/26/17
3	MW-11-4**	1730577-03**	Water	10/26/17
4	MW-11-3	1730577-04	Water	10/26/17
5	MW-11-2	1730577-05	Water	10/26/17
6	MW-11-1	1730577-06	Water	10/26/17
7	MW-21-5	1730577-07	Water	10/26/17
8	MW-21-4**	1730577-08**	Water	10/26/17
9	MW-21-3	1730577-09	Water	10/26/17
10	MW-21-2	1730577-10	Water	10/26/17
11	EB-8-102617	1730577-11	Water	10/26/17
12	MW-21-2MS	1730577-10MS	Water	10/26/17
13	MW-21-2MSD	1730577-10MSD	Water	10/26/17

① BJ2865-BLK1 ② 1719744-CCB3

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	/			
Was cooler temperature criteria met?	/			
II. GC/MS Instrument performance check				
Was a tune check performed prior to establishing and/or re-establishing an initial calibration?	/			
Were the BFB performance results reviewed and found to be within the specified criteria?	/			
III. Initial calibration				
Did the laboratory perform at least 5 point calibration prior to sample analysis?	/			
Were all percent relative standard deviations (%RSD) < 20%?	/			
IIIa. Initial Calibration Verification calibration				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	/			
Were all percent differences (%D) < 30%?	/			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at the beginning of each analysis batch?	/			
Were all percent differences (%D) of continuing calibration ≤ 30%?		/		
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	/			
Was a laboratory blank analyzed with each analysis batch?	/			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Field blanks				
Field blanks were identified in this SDG.	/			
Target compounds were detected in the field blanks.		/		
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
VIII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	/			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			

LDC #: 39937 E1

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) within 70-130%?	/			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.			/	
XI. Internal standards				
Were internal standard area counts within +/-30% of the area of the most recent continuing calibration standard and +/-50% of the average peak area in the initial calibration?	/			
Were retention times within +/-30 seconds of the associated calibration standard?	/			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) or regression equations used to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Target compound identification				
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?	/			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	/			
Were chromatogram peaks verified and accounted for?	/			
XIV. System performance				
System performance was found to be acceptable.	/			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene	A2.
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane	B2.
C. Vinyl chloride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane	C2.
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene	D2.
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11	E2.
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12	F2.
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113	G2.
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114	H2.
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane	I2.
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide	J2.
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane	K2.
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane	L2.
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane	M2.
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane	N2.
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO. 1,1-Difluoroethane	O1. 3-Methylpentane	O2.
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane	P2.
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane	Q2.
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3-Trimethylbutane	R2.
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane	S2.
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane	T2.
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal	U2.
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene	V2.
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWWW. Ethyl methacrylate	W1. Methanol	W2.
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene	X2.
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. <i>Hexachloro ethane</i>	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. <i>Methyl iodide</i>	Z2.

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is}) / (A_{is})(C_x)$

average RRF = sum of the RRFs/number of standards

$\%RSD = 100 * (S/X)$

A_x = Area of Compound

C_x = Concentration of compound,

S= Standard deviation of the RRFs,

A_{is} = Area of associated internal standard

C_{is} = Concentration of internal standard

X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS V5	10/0517	cis-1,2-DCE (FB)	0.494497	0.494497	0.480664	0.480664	5.963	5.963
			Trichloroethene (DFB)	0.305019	0.305019	0.296404	0.296404	4.748	4.748
			1,2,4-TMB (CBZ)	5.026954	5.026954	4.834027	4.834027	13.490	13.490

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

$$\% \text{ Difference} = 100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$$

$$\text{RRF} = (\text{Ax})(\text{Cis}) / (\text{Ais})(\text{Cx})$$

Where:

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound,

Cx = Concentration of compound,

Ais = Area of associated internal standard

Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1	27OCT32 MS V5	10/27/17	cis-1,2-DCE (FB)	0.480664	0.529117	0.529117	10.1	10.1
			Trichloroethene (DFB)	0.296404	0.293743	0.293743	0.9	0.9
			1,2,4-TMB (CBZ)	4.83403	4.81747	4.81747	0.3	0.3
2	27OCT61 MS V5	10/28/17	cis-1,2-DCE (FB)	0.480664	0.548017	0.548017	14.0	14.0
			Trichloroethene (DFB)	0.296404	0.328246	0.328246	10.7	10.7
			1,2,4-TMB (CBZ)	4.83403	4.75231	4.75231	1.7	1.7

LDC #: 39937E1

VALIDATION FINDINGS WORKSHEET

Surrogate Results Verification

Page: 1 of 1Reviewer: JVG2nd reviewer: / **METHOD:** GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: $SF/SS * 100$

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: 3

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	10.0	10.11	101	101	0
Bromofluorobenzene		9.96	99.6	99.6	
1,2-Dichlorobenzene-d4		10.23	102	102	
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

LDC #: 39937E/

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = $100 * (SSC - SC) / SA$

Where: SSC = Spiked sample concentration
 SA = Spike added

SC = Sample concentration

RPD = $|MSC - MSDC| * 2 / (MSC + MSDC)$

MSC = Matrix spike percent recovery

MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: 12/13


Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Percent Recovery		Percent Recovery		RPD	
						Reported	Recalc	Reported	Recalc	Reported	Recalc
1,1-Dichloroethene	25.0	25.0	0	28.21	27.34	113	113	109	109	3.13	3.13
Trichloroethene	↓	↓	↓	24.78	24.97	99.1	99.1	99.9	99.9	0.764	0.76
Benzene	↓	↓	↓	26.49	25.78	106	106	103	103	2.72	2.72
Toluene	↓	↓	↓	26.57	25.99	106	106	104	104	2.02	2.02
Chlorobenzene	↓	↓	↓	23.58	23.40	94.3	94.3	93.6	93.6	0.766	0.77

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

LDC #: 39937E1

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample Results Verification

Page: 1 of 1
 Reviewer: JVG
 2nd Reviewer: 

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = $100 * SSC/SA$

Where: SSC = Spiked sample concentration
 SA = Spike added

RPD = $1 LCS - LCSD / 2 / (LCS + LCSD)$

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS ID: BJ2865-BS1

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	25.0	NA	27.43	NA	110	110				
Trichloroethene			27.64		111	111				
Benzene			26.51		106	106				
Toluene			25.42		102	102				
Chlorobenzene			23.7		94.8	94.8				

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Chromium

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30577

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-11-5	1730577-02	Water	10/26/17
MW-11-4**	1730577-03**	Water	10/26/17
MW-11-3	1730577-04	Water	10/26/17
MW-11-2	1730577-05	Water	10/26/17
MW-11-1	1730577-06	Water	10/26/17
MW-21-5	1730577-07	Water	10/26/17
MW-21-4**	1730577-08**	Water	10/26/17
MW-21-3	1730577-09	Water	10/26/17
MW-21-2	1730577-10	Water	10/26/17
EB-8-102617	1730577-11	Water	10/26/17
MW-21-2MS	1730577-10MS	Water	10/26/17
MW-21-2MSD	1730577-10MSD	Water	10/26/17
MW-21-2DUP	1730577-10DUP	Water	10/26/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chromium by Environmental Protection Agency (EPA) Method 200.8

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the method.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

ICP interference check sample analyses were not required by the method.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-8-102617 was identified as an equipment blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. Percent differences (%D) were within QC limits.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Chromium - Data Qualification Summary - SDG 17-30577

No Sample Data Qualified in this SDG

NASA JPL, 4Q2017
Chromium - Laboratory Blank Data Qualification Summary - SDG 17-30577

No Sample Data Qualified in this SDG



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:48:47PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-11-5

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-02RE1

File ID: PE_EL2_171110-094

Sampled: 10/26/17 08:45

Prepared: 10/31/17 08:30

Analyzed: 11/10/17 12:59

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ3121

Sequence: 1720762

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1.3	1	J	EPA-200.8

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:48:47PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-11-4

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-03RE1

File ID: PE_EL2_171110-095

Sampled: 10/26/17 09:30

Prepared: 10/31/17 08:30

Analyzed: 11/10/17 13:03

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BIJ3121

Sequence: 1720762

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

12/17/17 *[Signature]*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:48:47PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-11-3

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-04RE1

File ID: PE_EL2_171110-096

Sampled: 10/26/17 10:00

Prepared: 10/31/17 08:30

Analyzed: 11/10/17 13:06

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: B[J3121

Sequence: 1720762

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:48:47PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-11-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-05RE1</u>	File ID: <u>PE_EL2_171110-097</u>	
Sampled: <u>10/26/17 10:30</u>	Prepared: <u>10/31/17 08:30</u>	Analyzed: <u>11/10/17 13:09</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJJ3121</u>	Sequence: <u>1720762</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:48:47PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-11-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-06RE1</u>	File ID: <u>PE_EL2 171110-098</u>	
Sampled: <u>10/26/17 07:50</u>	Prepared: <u>10/31/17 08:30</u>	Analyzed: <u>11/10/17 13:13</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJ3121</u>	Sequence: <u>1720762</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

12/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:48:47PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-21-5

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-07RE1

File ID: PE_EL2_171110-099

Sampled: 10/26/17 11:30

Prepared: 10/31/17 08:30

Analyzed: 11/10/17 13:16

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ3121

Sequence:

1720762

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1.2	1	J	EPA-200.8

12/17/17 8



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:48:47PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-21-4

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-08RE1

File ID: PE_EL2_171110-100

Sampled: 10/26/17 12:10

Prepared: 10/31/17 08:30

Analyzed: 11/10/17 13:20

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ3121

Sequence:

1720762

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1.0	1	J	EPA-200.8

11/17/17



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:48:47PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-21-3

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-09RE1

File ID: PE_EL2_171110-101

Sampled: 10/26/17 12:35

Prepared: 10/31/17 08:30

Analyzed: 11/10/17 13:23

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ3121

Sequence: 1720762

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

12/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:48:47PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	--

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-21-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-10RE1</u>	File ID: <u>PE_EL2_171110-084</u>	
Sampled: <u>10/26/17 13:00</u>	Prepared: <u>10/31/17 08:30</u>	Analyzed: <u>11/10/17 12:21</u>	
Solids: <u>0.00</u>	Preparation: <u>EPA 200.2</u>	Initial/Final: <u>50 ml / 50 ml</u>	
Batch: <u>BJJ3121</u>	Sequence: <u>1720762</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>PE-EL2</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

12/17/17 *[Signature]*



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:48:47PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

EB-8-102617

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-11RE1

File ID: PE_EL2_171110-102

Sampled: 10/26/17 13:30

Prepared: 10/31/17 08:30

Analyzed: 11/10/17 13:27

Solids: 0.00

Preparation: EPA 200.2

Initial/Final: 50 ml / 50 ml

Batch: BJJ3121

Sequence: 1720762

Calibration: UNASSIGNED

Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.50	1	U	EPA-200.8

11/17/17 *[Signature]*

LDC #: 39937E4a

VALIDATION COMPLETENESS WORKSHEET

Date: 12/21/17

SDG #: 17-30577

Level III/IV

Page: 1 of 1

Laboratory: BC Laboratories, Inc.

Reviewer: B2nd Reviewer: D**METHOD:** Chromium (EPA Method 200.8)

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 / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	ND	EB = 10
VII.	Matrix Spike/Matrix Spike Duplicates	A	(11, 12)
VIII.	Duplicate sample analysis	A	13
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	Not reviewed for Level III validation
XIV.	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:

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-11-5	1730577-02	Water	10/26/17
2	MW-11-4**	1730577-03**	Water	10/26/17
3	MW-11-3	1730577-04	Water	10/26/17
4	MW-11-2	1730577-05	Water	10/26/17
5	MW-11-1	1730577-06	Water	10/26/17
6	MW-21-5	1730577-07	Water	10/26/17
7	MW-21-4**	1730577-08**	Water	10/26/17
8	MW-21-3	1730577-09	Water	10/26/17
9	MW-21-2	1730577-10	Water	10/26/17
10	EB-8-102617	1730577-11	Water	10/26/17
11	MW-21-2MS	1730577-10MS	Water	10/26/17
12	MW-21-2MSD	1730577-10MSD	Water	10/26/17
13	MW-21-2DUP	1730577-10DUP	Water	10/26/17
14				

Notes: _____

Method:Metals (EPA SW 846 Method 6010/6020/7000)

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. ICP/MS Tune</i>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution $\leq 5\%$?	✓			
<i>III. Calibration</i>				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were the low standard checks within 70-130%			✓	
Were all initial calibration correlation coefficients within limits as specified by the method?			✓	
<i>IV. 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>V. ICP Interference Check Sample</i>				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
<i>VI. Matrix spike/Matrix spike 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.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ($\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.	✓			
<i>VII. 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% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			✓	
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

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

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated	Reported	Acceptable (Y/N)
					%R	%R	
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Cr	51.742 ug/L	50.000 ug/L	1037%	1037%	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Cr	38.425 ug/L	40.000 ug/L	96.17%	96.17%	Y
	CVAA (Continuing calibration)						

Comments:

LDC #: 39937E4a
 SDG #: 17-30577

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Percent recoveries (%R) for an ICP interference check sample, 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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (ug/L)
 SDR = Serial Dilution Result (ug/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
IFB	ICP interference check	Cr	19.323 ug/L	20.000 ug/L	96.67%	96.67%	Y
LCS	Laboratory control sample	Cr	37.641 ug/L	40.000 ug/L	94.17%	94.17%	Y
MS	Matrix spike	Cr	ND (SSR-SR) 33.199 ug/L	40.000 ug/L	83.07%	83.07%	Y
MSD	Duplicate	Cr	33.313 ug/L	FOUND: 33.199 ug/L	0.343 RPD	0.343 RPD	Y
	ICP serial dilution						

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

SD - NA - sample ND.

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL, 4Q2017

LDC Report Date: December 13, 2017

Parameters: Wet Chemistry

Validation Level: Level III & IV

Laboratory: BC Laboratories, Inc.

Sample Delivery Group (SDG): 17-30557

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-11-5	1730577-02	Water	10/26/17
MW-11-4**	1730577-03**	Water	10/26/17
MW-11-3	1730577-04	Water	10/26/17
MW-11-2	1730577-05	Water	10/26/17
MW-11-1	1730577-06	Water	10/26/17
MW-21-5	1730577-07	Water	10/26/17
MW-21-4**	1730577-08**	Water	10/26/17
MW-21-3	1730577-09	Water	10/26/17
MW-21-2	1730577-10	Water	10/26/17
EB-8-102617	1730577-11	Water	10/26/17
MW-11-1MS	1730577-06MS	Water	10/26/17
MW-11-1MSD	1730577-06MSD	Water	10/26/17
MW-11-1DUP	1730577-06DUP	Water	10/26/17
MW-21-2MS	1730577-10MS	Water	10/26/17
MW-21-2MSD	1730577-10MSD	Water	10/26/17
MW-21-2DUP	1730577-10DUP	Water	10/26/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Chloride, Nitrate as Nitrogen and Sulfate by Environmental Protection Agency (EPA) Method 300.0

Nitrite as Nitrogen by EPA Method 353.2

Hexavalent Chromium by EPA SW 846 Method 7196

Orthophosphate as Phosphorus by EPA Method 365.1

Perchlorate by EPA Method 314.0

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
MW-11-1	Hexavalent chromium	24.55 hours	24 hours	UJ (all non-detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-8-102617 was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to technical holding time, data were qualified as estimated in one sample.

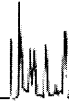
The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NASA JPL, 4Q2017
Wet Chemistry - Data Qualification Summary - SDG 17-30557

Sample	Analyte	Flag	A or P	Reason
MW-11-1	Hexavalent chromium	UJ (all non-detects)	P	Technical holding time

NASA JPL, 4Q2017
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 17-30557

No Sample Data Qualified in this SDG



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
--	--

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-11-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-02</u>	File ID: <u>171027 0104 CR6-020</u>	
Sampled: <u>10/26/17 08:45</u>	Prepared: <u>10/27/17 01:04</u>	Analyzed: <u>10/27/17 01:04</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2899</u>	Sequence: <u>1719996</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-11-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-03</u>	File ID: <u>171027 0104 CR6-021</u>	
Sampled: <u>10/26/17 09:30</u>	Prepared: <u>10/27/17 01:04</u>	Analyzed: <u>10/27/17 01:04</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2899</u>	Sequence: <u>1719996</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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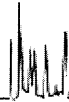
INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-11-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-04</u>	File ID: <u>171027 0104 CR6-022</u>	
Sampled: <u>10/26/17 10:00</u>	Prepared: <u>10/27/17 01:04</u>	Analyzed: <u>10/27/17 01:04</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2899</u>	Sequence: <u>1719996</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-11-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-05</u>	File ID: <u>171027 0104 CR6-023</u>	
Sampled: <u>10/26/17 10:30</u>	Prepared: <u>10/27/17 01:04</u>	Analyzed: <u>10/27/17 01:04</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2899</u>	Sequence: <u>1719996</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 Q

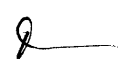
Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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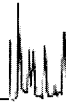
INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-11-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-06</u>	File ID: <u>171027 0104 CR6-087</u>	
Sampled: <u>10/26/17 07:50</u>	Prepared: <u>10/27/17 01:04</u>	Analyzed: <u>10/27/17 08:23</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2899</u>	Sequence: <u>1719996</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	UUS	EPA-7196

11/17/17 



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:46:09PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-21-5

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-07

File ID: 171027 0104 CR6-027

Sampled: 10/26/17 11:30

Prepared: 10/27/17 01:04

Analyzed: 10/27/17 01:10

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2899

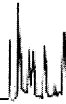
Sequence: 1719996

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0012	1	J	EPA-7196

12/17/17 *[Signature]*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET

EPA-7196

MW-21-4

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-08

File ID: 171027 0104 CR6-028

Sampled: 10/26/17 12:10

Prepared: 10/27/17 01:04

Analyzed: 10/27/17 01:10

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJJ2899

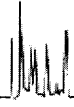
Sequence: 1719996

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0011	1	J	EPA-7196

11/17/17 J



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-21-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-09</u>	File ID: <u>171027 0104 CR6-029</u>	
Sampled: <u>10/26/17 12:35</u>	Prepared: <u>10/27/17 01:04</u>	Analyzed: <u>10/27/17 01:10</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[J2899</u>	Sequence: <u>1719996</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 Q



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:46:09PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-21-2

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-10

File ID: 171027 0104 CR6-085

Sampled: 10/26/17 13:00

Prepared: 10/27/17 01:04

Analyzed: 10/27/17 08:23

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: BJ2899

Sequence: 1719996

Calibration: UNASSIGNED

Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

11/17/17 9



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

EB-8-102617

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-11</u>	File ID: <u>171027 0104 CR6-030</u>	
Sampled: <u>10/26/17 13:30</u>	Prepared: <u>10/27/17 01:04</u>	Analyzed: <u>10/27/17 01:10</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[J]2899</u>	Sequence: <u>1719996</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.00070	1	U	EPA-7196

12/17/17 9

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-11-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-02</u>	File ID: <u>F110717.seq-7.0000.txt</u>	
Sampled: <u>10/26/17 08:45</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 02:12</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17 9

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-11-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-03</u>	File ID: <u>F110717.seq-8.0000.txt</u>	
Sampled: <u>10/26/17 09:30</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 02:28</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17 *cr*



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-11-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>	
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>	
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-04</u>	File ID: <u>F110717.seq-9.0000.txt</u>
Sampled: <u>10/26/17 10:00</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 02:43</u>
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>
Batch: <u>B[K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u> Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17 Q

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-11-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-05</u>	File ID: <u>F110717.seq-10.0000.txt</u>	
Sampled: <u>10/26/17 10:30</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 02:58</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17 ♀



Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 2:46:09PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-11-1

Laboratory: BC Laboratories

SDG: 17-30577

Client: Tidewater Inc.

Project: JPL- GW Monitoring Wells

Matrix: Water

Laboratory ID: 1730577-06

File ID: F110717.seq-11.0000.txt

Sampled: 10/26/17 07:50

Prepared: 11/06/17 23:00

Analyzed: 11/07/17 03:14

Solids: 0.00

Preparation: No Prep

Initial/Final: 20 ml / 20 ml

Batch: B[K0554

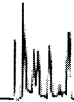
Sequence: 1720697

Calibration: UNASSIGNED

Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

11/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-21-5

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-07</u>	File ID: <u>F110717.seq-12.0000.txt</u>	
Sampled: <u>10/26/17 11:30</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 03:29</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B/K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	1.5	1	J	EPA-314.0

12/17/17 Q

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-21-4

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-08</u>	File ID: <u>F110717.seq-15.0000.txt</u>	
Sampled: <u>10/26/17 12:10</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 04:15</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	1.4	1	J	EPA-314.0

12/17/17 Q

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-21-3

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-09</u>	File ID: <u>F110717.seq-16.0000.txt</u>	
Sampled: <u>10/26/17 12:35</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 04:31</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	2.0	1	J	EPA-314.0

12/17/17 Q

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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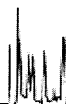
INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-21-2

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-10</u>	File ID: <u>F110717.seq-17.0000.txt</u>	
Sampled: <u>10/26/17 13:00</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 04:46</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	1.3	1	J	EPA-314.0

11/17/17 Q



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:46:09PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-314.0

EB-8-102617

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-11</u>	File ID: <u>F110717.seq-21.0000.txt</u>	
Sampled: <u>10/26/17 13:30</u>	Prepared: <u>11/06/17 23:00</u>	Analyzed: <u>11/07/17 05:47</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>B[K0554</u>	Sequence: <u>1720697</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC6</u>

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	0.58	1	U	EPA-314.0

12/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:44:04PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-365.1

MW-11-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>	
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>	
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-06</u>	File ID: <u>171027 1041 PO4-068</u>
Sampled: <u>10/26/17 07:50</u>	Prepared: <u>10/27/17 10:41</u>	Analyzed: <u>10/27/17 10:41</u>
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>
Batch: <u>BJJ3060</u>	Sequence: <u>1720077</u>	Calibration: <u>UNASSIGNED</u> Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.017	1	J	EPA-365.1

12/17/17

Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:44:04PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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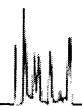
INORGANIC ANALYSIS DATA SHEET
EPA-353.2

MW-11-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>	
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>	
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-06</u>	File ID: <u>171027 0900 NO2-037</u>
Sampled: <u>10/26/17 07:50</u>	Prepared: <u>10/27/17 09:00</u>	Analyzed: <u>10/27/17 09:53</u>
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>
Batch: <u>BJJ3058</u>	Sequence: <u>1720070</u>	Calibration: <u>UNASSIGNED</u> Instrument: <u>KONE-1</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
14797-65-0	Nitrite as N	0.033	1	J	EPA-353.2

11/17/17



Tidewater Inc. 3761 Attucks Drive Powell, OH 43065	Reported: 11/17/2017 2:44:04PM Project: JPL- GW Monitoring Wells Project Number: 4Q17 Project Manager: David Conner
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INORGANIC ANALYSIS DATA SHEET
EPA-300.0

MW-11-1

Laboratory: <u>BC Laboratories</u>	SDG: <u>17-30577</u>		
Client: <u>Tidewater Inc.</u>	Project: <u>JPL- GW Monitoring Wells</u>		
Matrix: <u>Water</u>	Laboratory ID: <u>1730577-06</u>	File ID: <u>B102717A.seq-12</u>	
Sampled: <u>10/26/17 07:50</u>	Prepared: <u>10/27/17 20:00</u>	Analyzed: <u>10/27/17 23:46</u>	
Solids: <u>0.00</u>	Preparation: <u>No Prep</u>	Initial/Final: <u>20 ml / 20 ml</u>	
Batch: <u>BJJ2926</u>	Sequence: <u>1720700</u>	Calibration: <u>UNASSIGNED</u>	Instrument: <u>IC2</u>

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
16887-00-6	Chloride	23	1		EPA-300.0
14797-55-8	Nitrate as N	0.43	1		EPA-300.0
14808-79-8	Sulfate	44	1		EPA-300.0

12/17/17 *Q*

LDC #: 39937E6

VALIDATION COMPLETENESS WORKSHEET

Date: 12/12/17

SDG #: 17-30577

Level III/IV

Page: 1 of 2

Laboratory: BC Laboratories, Inc.

Reviewer: SB2nd Reviewer: [Signature]

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA Method 300.0), Nitrite-N (EPA Method 353.2), Hexavalent Chromium (EPA SW846 Method 7196), Orthophosphate-P (EPA Method 365.1), Perchlorate (EPA Method 314.0)

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 / SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	EB = 10
VI.	Matrix Spike/Matrix Spike Duplicates	A	(11, 12) (14, 15)
VII.	Duplicate sample analysis	A	13, 14
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for Level III validation
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:

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-11-5	1730577-02	Water	10/26/17
2	MW-11-4**	1730577-03**	Water	10/26/17
3	MW-11-3	1730577-04	Water	10/26/17
4	MW-11-2	1730577-05	Water	10/26/17
5	MW-11-1	1730577-06	Water	10/26/17
6	MW-21-5	1730577-07	Water	10/26/17
7	MW-21-4**	1730577-08**	Water	10/26/17
8	MW-21-3	1730577-09	Water	10/26/17
9	MW-21-2	1730577-10	Water	10/26/17
10	EB-8-102617	1730577-11	Water	10/26/17
11	MW-11-1MS	1730577-06MS	Water	10/26/17
12	MW-11-1MSD	1730577-06MSD	Water	10/26/17
13	MW-11-1DUP	1730577-06DUP	Water	10/26/17
14	MW-21-2MS	1730577-10MS	Water	10/26/17
15	MW-21-2MSD	1730577-10MSD	Water	10/26/17
16	MW-21-2DUP	1730577-10DUP	Water	10/26/17
17				

LDC #: 39937E6
SDG #: 17-30577
Laboratory: BC Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 12/21/17
Page: 2 of 2
Reviewer: [Signature]
2nd Reviewer: [Signature]

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA Method 300.0), Nitrite-N (EPA Method 353.2), Hexavalent Chromium (EPA SW846 Method 7196), Orthophosphate-P (EPA Method 365.1), Perchlorate (EPA Method 314.0)

	Client ID	Lab ID	Matrix	Date
18				
19				
20				
21				

Notes: _____

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were 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?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL (≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

Validation 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
Sample Specific Analysis Reference

All circled methods are applicable to each sample.

Sample ID	Parameter
5	pH TDS (Cl) F (NO ₂) (NO ₃) (SO ₄) (O-PO ₄) Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
1-10	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC (Cr6+) (ClO ₄)
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
0c	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
11-13	pH TDS Cl F NO ₃ (NO ₂) (SO ₄) (O-PO ₄) Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
14-16	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ (ClO ₄)
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄

Comments: _____

LDC #: 39937E6

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

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of C104 was recalculated. Calibration date: 11/6/17

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. (ug/L)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial calibration	C104	s1	2	0.0025	99.8843%	99.8665%	Y
		s2	4	0.005			
		s3	6	0.0068			
		s4	10	0.0125			
		s5	20	0.0248			
Calibration verification	Cr6+	ICV	<u>FOUND:</u> 0.0488 mg/L	<u>TRUE:</u> 0.05000 mg/L	96.67	97.27	Y
Calibration verification 3:45	C104	CCV	<u>FOUND:</u> 9.71361 ug/L	<u>TRUE:</u> 10.000 ug/L	972	1007	Y
Calibration verification							

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

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

METHOD: Inorganics, Method See Cover

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	ClO_4^-	9.7136ug/L	10.000ug/L	97.7	94.07	Y
MS	Matrix spike sample	Cr_6^+	ND (SSR-SR) 0.0537894mg/L	0.052632mg/L	102.7	101.7	Y
MSD	Duplicate sample	Cr_6^+	0.0537894mg/L	Found: 0.0537894mg/L	ORPD	0.598RPD	Y

Comments: _____

