LDC #: 39849D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 11-30-17
SDG #: 17-29969 Level III/IV Page: 1 of 2
Laboratory: BC Laboratories, Inc. Reviewer: MG
2nd Reviewer:

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: ClO4 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; 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-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 **VALIDATION COMPLETENESS WORKSHEET** Date: 11-30-17
SDG #: 17-29969 Level III/IV Page: 2 of 2
Laboratory: BC Laboratories, Inc. Reviewer: MG
2nd Reviewer:

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:

LDC #: 39849D6

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
2nd Reviewer:

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 anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

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

LDC #: 39849D6

VALIDATION FINDINGS WORKSHEET

Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→10, 12	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC [✓ CR^{6+}] [✓ ClO_4] ______ ______
11	↓	pH TDS [✓ Cl] F [✓ NO_3] [✓ NO_2] [✓ SO_4] [✓ PO_4] ALK CN^- NH_3 TKN TOC [✓ CR^{6+}] [✓ ClO_4] ______ ______
QC 13→15		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC [✓ CR^{6+}] [✓ ClO_4] ______ ______
↓ 16→18	↓	pH TDS [✓ Cl] F [✓ NO_3] [✓ NO_2] [✓ SO_4] [✓ PO_4] ALK CN^- NH_3 TKN TOC [✓ CR^{6+}] [✓ ClO_4] ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ______ ______
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC#: 39849D6

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: MG
2nd Reviewer:

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 #: 39849D6 (4) / 9MH

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: MG
2nd Reviewer: 9

METHOD: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of ClO_4 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:

$\%R = \frac{Found}{True} \times 100$ 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 r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	ClO_4	Blank	-	-	$r^2 = 0.994828$	$r^2 = 0.995013$	Y
		Standard 1	2 (mg/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	ClO_4	1915 CCV2	10.06 (mg/L)	10.00 (mg/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

Reviewer: MG
2nd Reviewer:

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 = Found / True x 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
0128 LCS	Laboratory control sample	Cr VI	0.0467 (mg/L)	0.050 (mg/L)	93.4	92.4	Y
2118 16	Matrix spike sample	ClO_4	(SSR-SR) 10.13 (µg/L)	10.101 (µg/L)	100	101	
0128/0128 18	Duplicate sample	Cr VI	0.00070 U (mg/L)	ND (mg/L)	0	-	

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.

LDC #: 39849D6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method See cover

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

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

Compound (analyte) results for Level IV sample = N.D. ~~reported with a positive detect were recalculated and verified using the following equation~~:

Concentration = Recalculation:

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)

Note:

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

90/10 (client select)

LDC #39937 (Tidewater- Powell, OH / NASA JPL, 4Q2017)

LDC	SDG#	DATE REC'D	(3) DATE DUE	VOA (524.2)		Cr (200.8)		CLO_4 (314.0)		Cr(VI) (7196)		Cl, SO_4 NO_3-N (300.0)		NO_2-N (353.2)		O-PO_4-P (365.1)																					
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	17-30097	11/28/17	12/19/17	11	0	10	0	10	0	10	0	-	-	-	-	-	-																		
A	17-30097	11/28/17	12/19/17	2	0	2	0	2	0	2	0	-	-	-	-	-	-																		
B	17-30166	11/28/17	12/19/17	11	0	10	0	10	0	10	0	-	-	-	-	-	-																		
B	17-30166	11/28/17	12/19/17	1	0	1	0	1	0	1	0	-	-	-	-	-	-																		
C	17-30324	11/28/17	12/19/17	6	0	5	0	5	0	5	0	0	0	0	0	0	0																		
C	17-30324	11/28/17	12/19/17	1	0	1	0	1	0	1	0	1	0	1	0	1	0																		
D	17-30445	11/28/17	12/19/17	9	0	8	0	8	0	8	0	3	0	3	0	3	0																		
E	17-30577	11/28/17	12/19/17	9	0	8	0	8	0	8	0	1	0	1	0	1	0																		
E	17-30577	11/28/17	12/19/17	2	0	2	0	2	0	2	0	0	0	0	0	0	0																		
Total	T/PG			52	0	47	0	47	0	47	0	5	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208

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

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.
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

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: BIJ2683 | 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 UJ
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 R

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

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
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

11/7/17

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

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
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 UJ
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 UJ
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

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

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
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

12/7/17

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 UJ
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 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-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
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

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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-23-5

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:	BIJ2683	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 UJ
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 UJ
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

11/7/17

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
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:	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 UJ
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-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:	BJJ2683	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

12/7/17 K

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[J2683	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 US
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 US
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 a

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:	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

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: 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 UJ
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

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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:	B[J2683	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

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:	BIJ2683	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 UJ
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 UJ
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

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:	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

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:	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 UJ
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

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:	BJJ2683	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	0.31	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

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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-23-2

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:	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 LCS
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 LCS
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

14/17/17 K

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:	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 g

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:	B[J2683	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 UJ
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

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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-23-1

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:	B[J2683	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	0.42	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	3.4	
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-23-1

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
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 V5
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 V5
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

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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

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

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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:	BIJ2683	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 LS
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

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Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:37:28PM
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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:	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

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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-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:	B[J2683	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 WJ
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	9.9900	99.9	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9700	99.7	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.6700	96.7	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	238597	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	96818	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	397525	7.38	436994	7.38	

* Values outside of QC limits

Tidewater Inc.
3761 Attucks Drive
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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:	B[J2683	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

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

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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:	B[J2683	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 US
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		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
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

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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-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
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 US
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	9.6700	96.7	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.020	100	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.020	100	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	265518	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	100490	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	429573	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

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:	BIJ2683	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 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
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 UJ
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

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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-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:	B[J2683	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

12/7/17 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:	B[J2683	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 UJ
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

12/7/17

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
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-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:	B[J2683	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 KJ
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 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:	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

12/17/17 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:	B[J2683	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 U5
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	10.130	101	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.8900	98.9	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9800	99.8	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	253353	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	98543	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	426243	7.38	436994	7.38	

* Values outside of QC limits

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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-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:	BJJ2683	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

12/7/17 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-3-1

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 UJ
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 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-3-1

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:	B[J2683	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

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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-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:	BIJ2683	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 UJ
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

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-3-1

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
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

12/7/17

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:	B[J2683	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 U5
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:	B[J2683	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

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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

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 UJ
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

12/7/17

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
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

12/7/17

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:	B[J2683	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 US
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

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:	B[J2683	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

17/17/17 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

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:	B[J2683	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 LCS
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	9.8700	98.7	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.7000	97.0	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	256834	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	101607	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	429585	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

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:	B[J2683	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

LDC #: 39937A1 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/05/17
SDG #: 17-30097 Level III/IV Page: 1 of 7
Laboratory: BC Laboratories, Inc. Reviewer: JVG
2nd Reviewer:

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% r ICV ≤ 30 %
IV.	Continuing calibration	SW	CCV ≤ 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	N A	
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 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/05/17
SDG #: 17-30097 Level III/IV Page: 2 of 2
Laboratory: BC Laboratories, Inc. Reviewer: JM
2nd Reviewer: CT

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:

-	BJ2683-BLK1						
-	1719744-CCB1						

LDC #: 39937A1

VALIDATION FINDINGS CHECKLIST

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%?	✓			
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 #: 34937 A1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: CT

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. Hexachloroethane	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. Methyl iodide	Z2.

LDC #: 39937A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

METHOD: GC/MS VOA (EPA Method 524.2)

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

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were all percent differences (%D) ≤ 30% ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
	10/26/17	26Oct35	B	47.7	1-6, 14, 15, Blk (MD)	J/UJ/A
		26Oct36	Z1	51.8		
			ZZZZ	82.6		
	10/27/17	27Oct02	B	39.7	7-13, 1719744-CCB1 (MD)	
		27Oct03	Z1	56.1		

CONCAL.wpd

LDC #: 39937A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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

LDC # 39937B1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer:

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:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(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 #: 39957 A1

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: 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

Reviewer: JVG
2nd Reviewer: [illegible]

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 = I MSC - MSDC I * 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 Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
1,1-Dichloroethene	25.0	25.0	0	29.4	28.5	118	118	114	114	3.14	3.14
Trichloroethene			3.35	27.0	28.5	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 #: 39957 A1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy 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 = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: BJ2683-BS1

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	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		96.2	96.2				

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.

LDC #: 39937A1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer: X

METHOD: GC/MS VOA (EPA Method 524.2)

Compound results reported with a positive detect were recalculated and verified using the following equation:

$$\text{Concentration} = \frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample purged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 5 , TCE

Conc. = (13687)(10.0)( )
(421164)(0.298404)( )( )

= 1.096

≈ 1.1 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Acceptable (Y/N)
			1.1		

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
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/20/17 07:45
Solids: 0.00
Batch: BIJ2718 Sequence: 1719979

SDG: 17-30097
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730097-02
Prepared: 10/26/17 11:00
Preparation: EPA 200.2
File ID: PE_EL2_171031-033
Analyzed: 10/31/17 09:06
Initial/Final: 50 ml / 50 ml
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 U5	EPA-200.8

12/7/17 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: BIJ2718
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 QL

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: BIJ2718
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
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/20/17 09:00
Solids: 0.00
Batch: BIJ2718 Sequence: 1719979

SDG: 17-30097
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730097-05
Prepared: 10/26/17 11:00
Preparation: EPA 200.2
File ID: PE_EL2_171031-050
Analyzed: 10/31/17 10:05
Initial/Final: 50 ml / 50 ml
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

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-23-1

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: BIJ2718
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	J	EPA-200.8

12/7/17

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: B[J2718
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 dl

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: BC Laboratories
SDG: 17-30097
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730097-08
File ID: PE_EL2_171031-052
Sampled: 10/20/17 12:15
Prepared: 10/26/17 11:00
Analyzed: 10/31/17 10:12
Solids: 0.00
Preparation: EPA 200.2
Initial/Final: 50 ml / 50 ml
Batch: BIJ2718
Sequence: 1719979
Calibration: UNASSIGNED
Instrument: PE-EL2

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: BIJ2718
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

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: BIJ2718
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 ar

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: BJJ2833
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

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

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: BJJ2833
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

12/7/17

LDC #: 39937A4a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30097 Level III/IV Page: 1 of 2
Laboratory: BC Laboratories, Inc. Reviewer: B
2nd Reviewer: Q

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 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17

SDG #: 17-30097 Level III/IV Page: 2 of 2

Laboratory: BC Laboratories, Inc. Reviewer: VB

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 ≤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) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed 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 #: 39937A4a VALIDATION

SDG # 17-30097

VALIDATION FINDINGS WORKSHEET
Calibration

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

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

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

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/31/17	CCV (9:20)	Cr	88.9 (90-110)	1, 5	J / UJ / R (P) (1 = ND, 5 = Det)

Comments:

LDC #: 34937A4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JB
2nd Reviewer:

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 = Found x 100 / True

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 %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration) 10/30 7:10	Cr	50.774 ug/L	50.000ug/L	102%	102%	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV 3	ICP/MS (Continuing calibration) 10/31 9:51	Cr	40.051 ug/L	40.000ug/L	100%	100%	Y
	CVAA (Continuing calibration)						

Comments:

LDC #: 34937A4a
SDG #: 17-30097

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer:

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:

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

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 %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
	ICP interference check						
LCS	Laboratory control sample J2833	Cr	40.209 ug/L	40.000 ug/L	101%	101%	Y
MS	Matrix spike	Cr	0.882 (SSR-SR) 33.369 ug/L - SR= 32.487	40.000 ug/L	81.2%	81.2%	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.

LDC #: 39937A4a
SDG #: 17-30097

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JB
2nd reviewer:

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

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

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

Detected analyte results for Cr #4 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

From Raw Data: Cr = 1.084 ug/L

#	Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
	4	Cr	1.1	1.1	Y

Note:

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

12/7/17

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-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

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
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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-314.0

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: F110217A.seq-21.0000.txt
Sampled: 10/20/17 09:00
Prepared: 11/02/17 11:00
Analyzed: 11/02/17 17:08
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	4.2	1		EPA-314.0

12/7/17

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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-314.0

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: F110217A.seq-81.0000.txt
Sampled: 10/20/17 09:45
Prepared: 11/02/17 11:00
Analyzed: 11/03/17 11:27
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	3.8	1	J	EPA-314.0

12/7/17

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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: B[K0310
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

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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-314.0

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: F110217A.seq-29.0000.txt
Sampled: 10/20/17 12:15
Prepared: 11/02/17 11:00
Analyzed: 11/02/17 19:10
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

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-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

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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-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

12/19/17

Tidewater Inc.
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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-314.0

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: F110217A.seq-32.0000.txt
Sampled: 10/20/17 13:30
Prepared: 11/02/17 11:00
Analyzed: 11/02/17 19:56
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

12/12/17

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

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

11/19/17

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-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: BIJ2280
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: B[J2280
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

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-23-3

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: BIJ2280
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

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-23-2

Laboratory: BC Laboratories
SDG: 17-30097
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730097-05
File ID: 171021 0014 CR6-017
Sampled: 10/20/17 09:00
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: B[J2280
Sequence: 1719647
Calibration: UNASSIGNED
Instrument: KONE-1

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

12/7/17

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-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: 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 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: 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

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-3-4

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: BIJ2281
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

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: BIJ2281
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

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-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: BIJ2281
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

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-3-1

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

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: 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

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

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: 171021 0014 CR6-034
Sampled: 10/20/17 13:50
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: 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

LDC #: 39937A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30097 Level III/IV Page: 1 of 2
Laboratory: BC Laboratories, Inc. Reviewer: JB
2nd Reviewer: CV

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; 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-23-5MS	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: JB

2nd Reviewer: CL

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:

LDC #: 39937A6

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer: [illegible]

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 anaylzed 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 #: 39937Ac6

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer: A

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 #: 39937A4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

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+] [✓ ClO_4]
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
13-15	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC [✓ Cr6+] [✓ ClO_4]
16-18	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
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 39937A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of ClO_4^- 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 r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO_4	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	FOUND: 0.0492 mg/L	TRUE: 0.050000 mg/L	98.4%	99.6%	Y
11/2 18:24 Calibration verification	ClO_4	CCV_2	FOUND: 10.2926 ug/L	TRUE: 10.000 ug/L	103%	100%	Y
Calibration verification							

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

LDC #: 39937A4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer:

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 = Found / True x 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	ClO_4^-	10.292ca1 ug/L	10.000ug/L	103%	104%	Y
MS	Matrix spike sample 23-1	Cr^{6+}	ND (SSR-SR) 0.0517894mg/L	0.052632 mg/L	98.3%	99%	Y
MSD	Duplicate sample	Cr^{6+}	0.0532631 mg/L	~~FOUND~~! 0.0517894mg/L	2.81% RPD	1.14% RPD	Y

Comments: _____

LDC #: 39937A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JB
2nd reviewer:

METHOD: Inorganics, Method See Cover

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

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

Compound (analyte) results for ClO_4^- reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = mx + b$
$y = 0.005$
$m = 0.001264533$
$b = 1.5343E-5$

Recalculation:

$$ClO_4^- = \frac{0.005 - 1.5343E-5}{0.001264533}$$

$$= 3.946616 \text{ ug/L}$$

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
	4	ClO_4^-	4.2 ug/L	4.0 ug/L	Y
	4	Cr^{+6}	0.0010 mg/L	0.001 mg/L	Y

Note:

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 MS
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

12/7/17

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
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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

12/7/17

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

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
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 US
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 US
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	9.3400	93.4	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.8200	98.2	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.5300	95.3	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	273983	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	108906	9.62	107919	9.61	
1,4-Difluorobenzene (IS)	454368	7.38	447155	7.38	

* Values outside of QC limits

12/7/17

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

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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
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.
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Powell, OH 43065

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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:	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 U5
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

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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-4-5

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:	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	0.27	J
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	0.18	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	0.75	
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

12/7/17

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

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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:	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 UJ
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 UJ
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

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-4-5

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:	BIJ2682	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

12/7/17 dl

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 12:40:58PM
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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:	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 MS
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 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-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
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	0.78	
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

12/7/17

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:	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 UJ
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 UJ
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

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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:	B[J2682	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

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

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[J2682	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 UJ
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 12:40:58PM
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:	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	0.75	
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

12/17/17 ak

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:	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 US
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 US
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	9.4700	94.7	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.160	102	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9600	99.6	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	272023	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	105262	9.62	107919	9.61	
1,4-Difluorobenzene (IS)	434114	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-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:	BIJ2682	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

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-4-2

Laboratory:	BC Laboratories		SDG:	17-30166	
Client:	Tidewater Inc.		Project:	JPL- GW Monitoring Wells	
Matrix:	Water	Laboratory ID:	1730166-05	File ID:	26OCT43.D
Sampled:	10/23/17 09:30	Prepared:	10/26/17 08:05	Analyzed:	10/27/17 02:07
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 U5
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	0.39	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

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

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:	26OCT43.D
Sampled:	10/23/17 09:30	Prepared:	10/26/17 08:05	Analyzed:	10/27/17 02:07
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	0.33	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	1.3	
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

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-4-2

Laboratory:	BC Laboratories		SDG:	17-30166	
Client:	Tidewater Inc.		Project:	JPL- GW Monitoring Wells	
Matrix:	Water	Laboratory ID:	1730166-05	File ID:	26OCT43.D
Sampled:	10/23/17 09:30	Prepared:	10/26/17 08:05	Analyzed:	10/27/17 02:07
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 UJ
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 UJ
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	9.5000	95.0	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.090	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9200	99.2	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	267570	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	104165	9.62	107919	9.61	
1,4-Difluorobenzene (IS)	431927	7.38	447155	7.38	

* Values outside of QC limits

12/7/17 a

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-4-2

Laboratory:	BC Laboratories			SDG:	17-30166		
Client:	Tidewater Inc.			Project:	JPL- GW Monitoring Wells		
Matrix:	Water	Laboratory ID:	1730166-05	File ID:	26OCT43.D		
Sampled:	10/23/17 09:30	Prepared:	10/26/17 08:05	Analyzed:	10/27/17 02:07		
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
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-4-1

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
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 MS
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 CV

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
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 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[J2682	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 UJ
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 UJ
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

12/12/17 R

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[J2682	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

12/7/17

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-12-5

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:	B[J2682	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 U5
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-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

11/7/17 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
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

12/7/17 QA

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

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 US
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 US
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

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:	BIJ2682	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

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-12-4

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:	B[J2682	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 UJ
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

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-12-4

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
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 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
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 US
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 US
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	9.9100	99.1	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.280	103	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.5900	95.9	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	258071	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	101458	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	420578	7.38	447155	7.38	

* Values outside of QC limits

12/7/17 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-12-4

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
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

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:	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 LS
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-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 12:40:58PM
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[J2682	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

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[J2682	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 LCS
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 LCS
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

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

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:	BJJ2682	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

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 LCS
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

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:	B[J2682	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

12/7/17

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
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 US
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 US
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

12/7/17 a

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Project Number: 4Q17
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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
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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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:	B[J2682	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 UJ
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

11/7/17

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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:	B[J2682	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

12/5/17 Q

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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
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 V5
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 V5
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	10.160	102	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.4500	94.5	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	252147	6.57	279719	6.57	
Chlorobenzene-d5 (IS)	104530	9.61	107919	9.61	
1,4-Difluorobenzene (IS)	423265	7.38	447155	7.38	

* Values outside of QC limits

12/7/17 a

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Powell, OH 43065

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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
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 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:	B[J2682	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 U5
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 QL

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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:	BIJ2682	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

12/17/17 Q

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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:	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 UJ
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 UJ
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

12/7/17 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:	B[J2682	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

12/17/17

LDC #: 39937B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/04/17
SDG #: 17-30166 Level III/IV Page: 1 of 1
Laboratory: BC Laboratories, Inc. Reviewer: SW
2nd Reviewer:

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% r 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					

- BJ2682-BLK1

LDC #: 34937B1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

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 B1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

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
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	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	WWWW. 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. Hexachloroethane
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. Methyl iodide

LDC #: 39937 B1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

METHOD: GC/MS VOA (EPA Method 524.2)

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

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were all percent differences (%D) ≤ 30% ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
	10/26/17	26 Oct 05	Y1	30.6	BJ2682-BLK1	J/UJ/A
		26 Oct 06	Z1	38.6	↓	↓
	10/26/17	26Oct35	B	47.7	All (-Blk)(ND)	
		26Oct36	Z1	51.8	↓	
			ZZZZ	82.6	↓	

LDC #: 39937 B1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: GC/MS VOA (EPA Method 524.2)

(Y) N N/A Were field duplicate pairs identified in this SDG?
Y (N) N/A Were target compounds detected in the field duplicate pairs?

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

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

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

LDC #: 39937B1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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

LDC # 39937B1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer:

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:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(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 #: 39937B7

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: #11

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	10.0	10.16	102	102	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

Reviewer: JVG
2nd Reviewer: A

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy 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 = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: BJ2682-BS1

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	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		↓	23.04	↓	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.

LDC #: 34937B1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Compound results reported with a positive detect were recalculated and verified using the following equation:

$$\text{Concentration} = \frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
RRF	=	Relative response factor of the calibration standard.
V_o	=	Volume or weight of sample purged in milliliters (ml) or grams (g).
Df	=	Dilution factor.
%S	=	Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. MD / LCS, TCE:

Conc. = (350294)(16.0)( )( ) / (459348)(0.296404)( )( )

= 25.73 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Acceptable (Y/N)
			25.73		

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: BJJ2845
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

12/7/17

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-4-4

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-03
File ID: PE_EL2_171030-039
Sampled: 10/23/17 08:00
Prepared: 10/27/17 08:30
Analyzed: 10/30/17 09:04
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	0.56	1	J J	EPA-200.8

12/7/17 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

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: PE_EL2_171030-040
Sampled: 10/23/17 08:30
Prepared: 10/27/17 08:30
Analyzed: 10/30/17 09:07
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	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: BJJ2845
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	J3	EPA-200.8

12/7/17 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-4-1

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-06
File ID: PE_EL2_171030-042
Sampled: 10/23/17 10:00
Prepared: 10/27/17 08:30
Analyzed: 10/30/17 09:14
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	0.50	1	U U5	EPA-200.8

12/17/17

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-12-5

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-07
File ID: PE_EL2_171030-043
Sampled: 10/23/17 11:00
Prepared: 10/27/17 08:30
Analyzed: 10/30/17 09:17
Solids: 0.00
Preparation: EPA 200.2
Initial/Final: 50 ml / 50 ml
Batch: BIJ2845
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	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-12-4

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-08
File ID: PE_EL2_171030-044
Sampled: 10/23/17 11:30
Prepared: 10/27/17 08:30
Analyzed: 10/30/17 09:21
Solids: 0.00
Preparation: EPA 200.2
Initial/Final: 50 ml / 50 ml
Batch: B[J2845
Sequence: 1719868
Calibration: UNASSIGNED
Instrument: PE-EL2

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

12/17/17

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

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: BIJ2845
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	J	EPA-200.8

12/17/17

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-12-3

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-10
File ID: PE_EL2_171101-175
Sampled: 10/23/17 12:30
Prepared: 10/30/17 08:30
Analyzed: 11/01/17 20:55
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	0.50	1	U	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

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: PE_EL2_171101-176
Sampled: 10/23/17 12:50
Prepared: 10/30/17 08:30
Analyzed: 11/01/17 20:58
Solids: 0.00
Preparation: EPA 200.2
Initial/Final: 50 ml / 50 ml
Batch: BIJ2969
Sequence: 1720126
Calibration: UNASSIGNED
Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.72	1	J	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: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-12
File ID: PE_EL2_171101-177
Sampled: 10/23/17 13:30
Prepared: 10/30/17 08:30
Analyzed: 11/01/17 21:02
Solids: 0.00
Preparation: EPA 200.2
Initial/Final: 50 ml / 50 ml
Batch: BIJ2969
Sequence: 1720126
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 VJ	EPA-200.8

12/17/17 Y

LDC #: 39937B4a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30166 Level III/IV Page: 1 of 1
Laboratory: BC Laboratories, Inc. Reviewer: JB
2nd Reviewer: [illegible]

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 MS/D 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	7, 8
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:

LDC #: 39937B4a

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer: [illegible]

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 ≤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) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.		✓		
VII. Laboratory control samples				
Was an LCS anaylzed 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
Duplicate Analysis

Reviewer: JB
2nd Reviewer:

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

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

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L. for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

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

#	Date	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
		MW-15 Dup From 17-30324	W	Cr	28 (20)		All	J/UJ/A (ND/Det)

Comments:

LDC#: 39937B4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: VB
2nd Reviewer: ~~X~~

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

LDC #: 34937B1a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JB
2nd Reviewer: [illegible]

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 = Found x 100 / True

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 %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration) 10/30 7:10	Cr	50.774 ug/L	50.000 ug/L	102%	102%	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV$_D$	ICP/MS (Continuing calibration) 11/1 21:12	Cr	38.022 ug/L	40.000 ug/L	95.1%	95.1%	Y
	CVAA (Continuing calibration)						

Comments:

LDC #: 39937B4a
SDG #: 17-30166

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer: [illegible]

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:

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

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 %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
	ICP interference check						
LCS	2845 Laboratory control sample	Cr	38.993 ug/L	40.000ug/L	97.5%	97.5%	Y
MS	Matrix spike	Cr	28.623 (SSR-SR) 73.984 - 28.623 = 45.363 ug/L	40.000ug/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	28.623ug/L	5%D	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.

LDC #: 39937B4a
SDG #: 17-30166

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JB
2nd reviewer:

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

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

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

Detected analyte results for Cr were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

From Raw Data = 0.716 ug/L

#	Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
	10	Cr	0.72	0.72	Y

Note:

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: 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

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-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: B[J2462
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

12/7/17 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-4-3

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-04
File ID: 171023 2000 CR6-011
Sampled: 10/23/17 08:30
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

12/17/17

Tidewater Inc.
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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

12/7/17 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-7196

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: 171023 2000 CR6-012
Sampled: 10/23/17 10:00
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: 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

12/7/17

Tidewater Inc.
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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-12-5

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-07
File ID: 171023 2000 CR6-015
Sampled: 10/23/17 11:00
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[J2462
Sequence: 1719600
Calibration: UNASSIGNED
Instrument: KONE-1

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

12/17/17 8

Tidewater Inc.
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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-12-4

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-08
File ID: 171023 2000 CR6-016
Sampled: 10/23/17 11:30
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: 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

12/17/17

Tidewater Inc.
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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

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: 171023 2000 CR6-017
Sampled: 10/23/17 11:40
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: BJJ2462
Sequence: 1719600
Calibration: UNASSIGNED
Instrument: KONE-1

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

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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[J2462
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

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Tidewater Inc.
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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: B[J2463
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

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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

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: 171023 2000 CR6-019
Sampled: 10/23/17 13:30
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: 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 Q

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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-4-5

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-02
File ID: F110217A.seq-98.0000.txt
Sampled: 10/23/17 07:40
Prepared: 11/03/17 01:00
Analyzed: 11/03/17 18:43
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 JL

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-4-4

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-03
File ID: F110217A.seq-99.0000.txt
Sampled: 10/23/17 08:00
Prepared: 11/03/17 01:00
Analyzed: 11/03/17 18:58
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 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

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

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

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: F110217A.seq-101.0000.txt
Sampled: 10/23/17 09:30
Prepared: 11/03/17 01:00
Analyzed: 11/03/17 19:29
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	3.8	1	J	EPA-314.0

12/17/17 8

Tidewater Inc.
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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-4-1

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-06
File ID: F110217A.seq-102.0000.txt
Sampled: 10/23/17 10:00
Prepared: 11/03/17 01:00
Analyzed: 11/03/17 19:44
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 JK

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-12-5

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-07
File ID: F110217A.seq-103.0000.txt
Sampled: 10/23/17 11:00
Prepared: 11/03/17 01:00
Analyzed: 11/03/17 20:00
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	1.5	1	J	EPA-314.0

12/17/17

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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-12-4

Laboratory: BC Laboratories
SDG: 17-30166
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730166-08
File ID: F110217A.seq-104.0000.txt
Sampled: 10/23/17 11:30
Prepared: 11/03/17 01:00
Analyzed: 11/03/17 20:15
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	2.1	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.
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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

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

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
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/23/17 13:30
Solids: 0.00
Batch: B[K0311 Sequence: 1720402

SDG: 17-30166
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730166-12
Prepared: 11/03/17 01:00
Preparation: No Prep
Calibration: UNASSIGNED

File ID: F110217A.seq-110.0000.txt
Analyzed: 11/03/17 21:47
Initial/Final: 20 ml / 20 ml
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 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30166 Level III/IV Page: 1 of 2
Laboratory: BC Laboratories, Inc. Reviewer: KJ
2nd Reviewer: A

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) (15,16)
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: 2of 2

Laboratory: BC Laboratories, Inc. Reviewer: JB

2nd Reviewer: A

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:

LDC #: 39937 B6

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer: [illegible]

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 anaylzed 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 #: 39937B6

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer:

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.		/		

DC #: 39937B4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

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+] [✓ ClO_4]
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
12-17	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
	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# 39937B6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

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 #: 39937B4

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of ClO_4^- 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 r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO_4^-	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	FOUND: 0.0497	TRUE: 0.050000 mg/L	99.47.	99.37.	Y
21:01 Calibration verification	ClO_4^-	CCV_6	FOUND: 9.50180 ug/L	TRUE: 10.000 ug/L	95.07.	97.87.	Y
Calibration verification							

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

LDC #: 39937B4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer:

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 = Found / True x 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	ClO_4^-	9.5018 ug/L	10.000ug/L	95.0%	97.6%	Y
MS	Matrix spike sample	Cr^{6+}	(SSR-SR) 0.0478947 mg/L	0.052632 mg/L	91%	90%	Y
MSD	Duplicate sample	Cr^{6+}	0.0478947 mg/L	FOUND: 0.0478947 mg/L	0 RPD	0.702%	Y

Comments: _____

LDC #: 39937B4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JB
2nd reviewer:

METHOD: Inorganics, Method See Cover

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

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

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

Concentration = Recalculation:

NA: Sample ND

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)

Note: _____

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: B[J2684 | 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 UJ
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 R

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:	BIJ2684	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

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
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 UJ
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	10.390	104	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.110	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.110	101	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	252727	6.57	273259	6.57	
Chlorobenzene-d5 (IS)	98863	9.61	105852	9.61	
1,4-Difluorobenzene (IS)	415217	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

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
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-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:	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 UJ
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

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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:	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

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-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:	B[J2684	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 KJ
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

12/17/17 K

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:	BJJ2684	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

12/7/17

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
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 1:42:43PM
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
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 UJ
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 ak

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
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-8

Laboratory:	BC Laboratories		SDG:	17-30324	
Client:	Tidewater Inc.		Project:	JPL- GW Monitoring Wells	
Matrix:	Water	Laboratory ID:	1730324-04	File ID:	27OCT37.D
Sampled:	10/24/17 11:58	Prepared:	10/27/17 07:00	Analyzed:	10/27/17 23:06
Solids:		Preparation:	EPA 5030 Water MS	Initial/Final:	25 ml / 25 ml
Batch:	B[J2684	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

12/17/17 JL

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-8

Laboratory:	BC Laboratories			SDG:	17-30324
Client:	Tidewater Inc.			Project:	JPL- GW Monitoring Wells
Matrix:	Water	Laboratory ID:	1730324-04	File ID:	27OCT37.D
Sampled:	10/24/17 11:58	Prepared:	10/27/17 07:00	Analyzed:	10/27/17 23:06
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
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	0.29	J
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 1:42:43PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-8

Laboratory:	BC Laboratories		SDG:	17-30324	
Client:	Tidewater Inc.		Project:	JPL- GW Monitoring Wells	
Matrix:	Water	Laboratory ID:	1730324-04	File ID:	27OCT37.D
Sampled:	10/24/17 11:58	Prepared:	10/27/17 07:00	Analyzed:	10/27/17 23:06
Solids:		Preparation:	EPA 5030 Water MS	Initial/Final:	25 ml / 25 ml
Batch:	B[J2684	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 U5
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

ORGANIC ANALYSIS DATA SHEET
EPA-524.2

MW-8

Laboratory:	BC Laboratories		SDG:	17-30324	
Client:	Tidewater Inc.		Project:	JPL- GW Monitoring Wells	
Matrix:	Water	Laboratory ID:	1730324-04	File ID:	27OCT37.D
Sampled:	10/24/17 11:58	Prepared:	10/27/17 07:00	Analyzed:	10/27/17 23:06
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
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 JK

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:	B[J2684	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

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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

12/12/17 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:	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 UJ
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

12/7/17 JF

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
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-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[J2684	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 US
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-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:	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	0.26	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

12/07/17 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-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:	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 NJ
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

12/01/17 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

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:	BIJ2684	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

12/12/17

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:	B[J2685	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 VS
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

12/17/17 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

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:	BJJ2685	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	0.35	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

12/7/17

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:	BJJ2685	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 UJ
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

12/7/17

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:	BJJ2685	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

LDC #: 39937C1 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/05/17
SDG #: 17-30324 Level III/IV Page: 1 of 1
Laboratory: BC Laboratories, Inc. Reviewer: DC
2nd Reviewer: CJ

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% r ICV ≤ 30%
IV.	Continuing calibration	SW	CCV ≤ 38%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N A	
IX.	Laboratory control samples	A	LCS
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; 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	TB-7-102417		1730324-01	Water	10/24/17
2	MW-5	D	1730324-02	Water	10/24/17
3	DUP-6-4Q17	D	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					
13	BJ2684-BLK1		1719744-CCB2		
	BJ2685-1				

LDC #: 34937C1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

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 #: 39937C1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

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. Hexachloroethane	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. Methyl iodide	Z2.

LDC #: 39937C1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

METHOD: GC/MS VOA (EPA Method 524.2)

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

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y (N) N/A Were all percent differences (%D) ≤ 30% ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
	10/27/17	27Oct02	B	39.7	1, 2, 5-11, MB1, MB2	(ND) J/UJ/A
		27Oct03	Z1	56.7	↓	↓
	10/27/17	27Oct33	ZZZZ	77.0	3, 4, 1719744-CCB2	(ND) ↓

CONCAL.wpd

LDC #: 39937C1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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

LDC # 39937C1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer:

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:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(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 #: 39937C1

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	10.0	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 #: 39937C1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

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 Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	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	26.49	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 #: 36937C1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVG
2nd Reviewer: 4

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy 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 = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: BJ2684-BS1

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	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.

LDC #: 39937C1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Compound results reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample purged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 4 , KK :

Conc. = $\frac{(52471)(10)(\quad)}{(250917)(0.74820333)(\quad)}$

= 0.291 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Acceptable (Y/N)
			0.29		

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: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/24/17 11:13
Solids: 0.00
Batch: BIJ2969 Sequence: 1720126

SDG: 17-30324
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730324-02
Prepared: 10/30/17 08:30
Preparation: EPA 200.2
Calibration: UNASSIGNED

File ID: PE_EL2_171101-171
Analyzed: 11/01/17 20:37
Initial/Final: 50 ml / 50 ml
Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.96	1	J J	EPA-200.8

12/07/17

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: B[J2969
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	J J	EPA-200.8

12/17/17 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-8

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/24/17 11:58
Solids: 0.00
Batch: BJ2969 Sequence: 1720126

SDG: 17-30324
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730324-04
Prepared: 10/30/17 08:30
Preparation: EPA 200.2
Calibration: UNASSIGNED

File ID: PE_EL2_171101-173
Analyzed: 11/01/17 20:43
Initial/Final: 50 ml / 50 ml
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
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/24/17 12:39
Solids: 0.00
Batch: BJ2969 Sequence: 1720126

SDG: 17-30324
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730324-05
Prepared: 10/30/17 08:30
Preparation: EPA 200.2
Calibration: UNASSIGNED

File ID: PE_EL2_171101-161
Analyzed: 11/01/17 19:47
Initial/Final: 50 ml / 50 ml
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

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
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/24/17 13:14
Solids: 0.00
Batch: BJ2969 Sequence: 1720126

Laboratory ID: 1730324-06
Prepared: 10/30/17 08:30
Preparation: EPA 200.2

SDG: 17-30324
Project: JPL- GW Monitoring Wells
File ID: PE_EL2_171101-174
Analyzed: 11/01/17 20:47
Initial/Final: 50 ml / 50 ml
Calibration: UNASSIGNED Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	2.6	1	J	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

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: BIJ3118
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

12/7/17 Q

LDC #: 39937C4a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30324 Level III/IV Page: 1 of 1
Laboratory: BC Laboratories, Inc. Reviewer: JB
2nd Reviewer: Q

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:

LDC #: 39937C4a

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer:

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 ≤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) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓	✓		
VII. Laboratory control samples				
Was an LCS anaylzed 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
Duplicate Analysis

Reviewer: JB
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L. for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

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

#	Date	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
		9	W	Cr	28.0 (20)		1-5	J/UJ/A (Det)

Comments:

LDC#: 39937C4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JB
2nd Reviewer: [illegible]

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

LDC #: 39937C4c

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JB
2nd Reviewer: [illegible]

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 = Found x 100 / True

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 %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration) 10131 7:40	Cr	50.410 ug/L	50.000 ug/L	101%	101%	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV 6	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 #: 39937C4c
SDG #: H-30324

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer: CL

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:

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

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 %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
	ICP interference check						
LCS	3118 Laboratory control sample	Cr	38.236 ug/L	40.000 ug/L	95.6%	95.6%	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	3.0%	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.

LDC #: 39937C4a
SDG #: 17-30324

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: UB
2nd reviewer:

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

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

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

Detected analyte results for Cr were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

From Raw Data = 13.991 ug/L

#	Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
	3	Cr	14	14	Y

Note:

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

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-5

Laboratory: BC Laboratories
SDG: 17-30324
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730324-02
File ID: 171024 2137 CR6-009
Sampled: 10/24/17 11:13
Prepared: 10/24/17 21:37
Analyzed: 10/24/17 21:37
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2847
Sequence: 1719769
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

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-7196

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: 171024 2137 CR6-010
Sampled: 10/24/17 11:23
Prepared: 10/24/17 21:37
Analyzed: 10/24/17 21:37
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2847
Sequence: 1719769
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

12/7/17 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-7196

MW-8

Laboratory: BC Laboratories
SDG: 17-30324
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730324-04
File ID: 171024 2137 CR6-011
Sampled: 10/24/17 11:58
Prepared: 10/24/17 21:37
Analyzed: 10/24/17 21:37
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJ2847
Sequence: 1719769
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

12/7/17 Q

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

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-7196

MW-15

Laboratory: BC Laboratories
SDG: 17-30324
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730324-05
File ID: 171024 2137 CR6-005
Sampled: 10/24/17 12:39
Prepared: 10/24/17 21:37
Analyzed: 10/24/17 21:37
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2847
Sequence: 1719769
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

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-7196

MW-10

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/24/17 13:14
Solids: 0.00
Batch: BJJ2847 Sequence: 1719769

SDG: 17-30324
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730324-06
Prepared: 10/24/17 21:37
Preparation: No Prep
Calibration: UNASSIGNED

File ID: 171024 2137 CR6-025
Analyzed: 10/24/17 22:10
Initial/Final: 20 ml / 20 ml
Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0020	1		EPA-7196

11/17/17 Q

Tidewater Inc.
3761 Attucks Drive
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Reported: 11/17/2017 1:45:51PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-6

Laboratory: BC Laboratories
SDG: 17-30324
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730324-07
File ID: 171024 2137 CR6-017
Sampled: 10/24/17 14:02
Prepared: 10/24/17 21:37
Analyzed: 10/24/17 21:41
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2848
Sequence: 1719769
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 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-5

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/24/17 11:13
Solids: 0.00
Batch: B[K0383 Sequence: 1720418

SDG: 17-30324
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730324-02
Prepared: 11/04/17 02:00
Preparation: No Prep
File ID: F110417.seq-17.0000.txt
Analyzed: 11/04/17 12:21
Initial/Final: 20 ml / 20 ml
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 1:45:51PM
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

12/7/17 g

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-8

Laboratory: BC Laboratories
SDG: 17-30324
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730324-04
File ID: F110417.seq-19.0000.txt
Sampled: 10/24/17 11:58
Prepared: 11/04/17 02:00
Analyzed: 11/04/17 12:52
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	1.2	1	J	EPA-314.0

12/17/17

Tidewater Inc.
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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: BIK0383
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 a

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

12/17/17

Tidewater Inc.
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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-6

Laboratory: BC Laboratories
SDG: 17-30324
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730324-07
File ID: F110417.seq-29.0000.txt
Sampled: 10/24/17 14:02
Prepared: 11/04/17 02:00
Analyzed: 11/04/17 15:25
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJK0385
Sequence: 1720418
Calibration: UNASSIGNED
Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	3.3	1	J	EPA-314.0

12/07/17

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-300.0

MW-8

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/24/17 11:58
Solids: 0.00
Batch: BIJ2595 Sequence: 1720013

SDG: 17-30324
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730324-04
Prepared: 10/24/17 23:30
Preparation: No Prep
File ID: E102417A.seq-35
Analyzed: 10/25/17 08:40
Initial/Final: 20 ml / 20 ml
Calibration: UNASSIGNED Instrument: IC5

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
16887-00-6	Chloride	19	1		EPA-300.0
14797-55-8	Nitrate as N	3.7	1		EPA-300.0
14808-79-8	Sulfate	46	1		EPA-300.0

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-365.1

MW-8

Laboratory: BC Laboratories
SDG: 17-30324
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730324-04
File ID: 171025 1011 PO4-074
Sampled: 10/24/17 11:58
Prepared: 10/25/17 10:11
Analyzed: 10/25/17 10:52
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJ2889
Sequence: 1719787
Calibration: UNASSIGNED
Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.017	1	U	EPA-365.1

12/17/17

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

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-353.2

MW-8

Laboratory: BC Laboratories
SDG: 17-30324
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730324-04
File ID: 171025 0829 NO2-032
Sampled: 10/24/17 11:58
Prepared: 10/25/17 08:29
Analyzed: 10/25/17 09:08
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2890
Sequence: 1719790
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

12/1/17 R

LDC #: 39937C6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30324 Level III/IV Page: 1 of 2
Laboratory: BC Laboratories, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

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	LCS
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; 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-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 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17

SDG #: 17-30324 Level III/IV Page: 2 of 2

Laboratory: BC Laboratories, Inc. 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:

LDC #: 39937C6

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer: CJ

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 anaylzed 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 #: 39937C6

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer:

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 #: 39937C4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

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
QC	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 #: 39937C6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: VB
2nd Reviewer: [illegible]

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 r or r^2	Reported r or r^2	Acceptable (Y/N)
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	NO2	ICV	FOUND: 0.4924 mg/L	TRUE: 0.50000 mg/L	98.57.	98.97.	Y
14:54 Calibration verification	ClO4	CCV3	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.

LDC #: 39937C6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer: [signature]

METHOD: Inorganics, Method See Cover

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

%R = Found / True x 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Cr^{6+}	0.0508 mg/L	0.050000 mg/L	102%	101%	Y
MS	Matrix spike sample	$OPhos.^{-}$	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: _____

LDC #: 39937C4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method See Cover

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

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

Compound (analyte) results for SO4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$$SO_4 = \frac{\sqrt{4 \times a \times (Area - c) + b^2} - b}{2a}$$

where
a = 0.0001
b = 0.1365
c = −0.0277
! Area = 4.518

$SO_4 = 46.378$ mg/L

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
	3	SO4	46 mg/L	46 mg/L	Y
		ClO4	1.2 ug/L	1.6 ug/L	Y

Note:

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:	BIJ2864	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

12/7/17 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

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:	B[J2864	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 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

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:	B[J2864	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 UJ
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

12/7/17 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

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:	B[J2864	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

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:	B[J2864	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	0.21	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

12/1/17

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
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

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:	BIJ2864	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 UJ
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

12/7/17 R

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
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 1:55:45PM
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
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

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-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:	B[J2864	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

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:	B[J2864	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 UJ
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

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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-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
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

12/12/17

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:	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	0.47	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

11/7/17 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:	BIJ2864	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

12/12/17 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:	BIJ2864	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 US
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

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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

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
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

12/7/17 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-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

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:	B[J2864	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

12/7/17 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-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:	B[J2864	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 UJ
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	10.280	103	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9000	99.0	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.6600	96.6	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	250810	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	100434	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	418716	7.38	427034	7.38	

* Values outside of QC limits

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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:	B[J2864	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 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:	B[J2864	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

12/7/17 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:	BIJ2864	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

12/7/17 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
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 UJ
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	10.210	102	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.8700	98.7	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.8300	98.3	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	249606	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	95788	9.61	105600	9.61	
1,4-Difluorobenzene (IS)	412509	7.38	427034	7.38	

* 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-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:	BIJ2864	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

12/7/17 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:	B[J2864	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

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:	B[J2864	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

12/7/17 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:	BIJ2864	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 U5
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

12/11/17 a

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
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-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:	BIJ2864	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 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:	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

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:	BIJ2864	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 UJ
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 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:	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

12/12/17 CL

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:	B[J2864	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

12/17/17 a

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:	B[J2864	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

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:	B[J2864	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 U5
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	10.560	106	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9300	99.3	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.050	100	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	245781	6.57	265548	6.57	
Chlorobenzene-d5 (IS)	95552	9.62	105600	9.61	
1,4-Difluorobenzene (IS)	408395	7.38	427034	7.38	

* Values outside of QC limits

12/7/17 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

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:	BIJ2864	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 K

LDC #: 39937D1 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/05/17
SDG #: 17-30445 Level III Page: 1 of 1
Laboratory: BC Laboratories, Inc. Reviewer: SW
2nd Reviewer: [illegible]

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% r ICV ≤ 30%
IV.	Continuing calibration	SW	CCV ≤ 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	D1	1730445-03	Water	10/25/17
4	DUP-7-4Q17	D1	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	D2	1730445-07	Water	10/25/17
8	DUP-8-4Q17	D2	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-BLK1				

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. Hexachloroethane	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. Methyl iodide	Z2.

LDC #: 39937D1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

METHOD: GC/MS VOA (EPA Method 524.2)

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

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y (N) N/A Were all percent differences (%D) ≤ 30% ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
	10/27/17	27Oct33	ZZZZ	77.0	All (ND)	J/UJ/A

LDC #: 39937 D1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: GC/MS VOA (EPA Method 524.2)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A 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: BIJ2974
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

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-16

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-03
File ID: PE_EL2_171102-037
Sampled: 10/25/17 09:35
Prepared: 10/30/17 08:30
Analyzed: 11/02/17 08:58
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	490	1	J	EPA-200.8

12/7/17

Tidewater Inc.
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Reported: 11/17/2017 2:00:29PM
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Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

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: PE_EL2_171102-038
Sampled: 10/25/17 09:45
Prepared: 10/30/17 08:30
Analyzed: 11/02/17 09:01
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	1100	1	J	EPA-200.8

12/17/17

Tidewater Inc.
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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-7

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/25/17 10:37
Solids: 0.00
Batch: BJJ2974 Sequence: 1720154

SDG: 17-30445
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730445-05
Prepared: 10/30/17 08:30
Preparation: EPA 200.2
Calibration: UNASSIGNED

File ID: PE_EL2_171102-039
Analyzed: 11/02/17 09:05
Initial/Final: 50 ml / 50 ml
Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	1200	1	J	EPA-200.8

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Tidewater Inc.
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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-9

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-06
File ID: PE_EL2_171102-040
Sampled: 10/25/17 11:50
Prepared: 10/30/17 08:30
Analyzed: 11/02/17 09:08
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	8.9	1	J	EPA-200.8

12/17/17 CL

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[J2974
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 U5	EPA-200.8

12/17/17 CA

Tidewater Inc.
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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	EPA-200.8

12/17/17

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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

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: PE_EL2_171102-043
Sampled: 10/25/17 13:20
Prepared: 10/30/17 08:30
Analyzed: 11/02/17 09:18
Solids: 0.00
Preparation: EPA 200.2
Initial/Final: 50 ml / 50 ml
Batch: BIJ2974
Sequence: 1720154
Calibration: UNASSIGNED
Instrument: PE-EL2

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
7440-47-3	Total Recoverable Chromium	0.90	1	J	EPA-200.8

12/7/17 R

LDC #: 39937D4a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30445 Level III Page: 1 of 1
Laboratory: BC Laboratories, Inc. Reviewer: JB
2nd Reviewer:

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	LCS
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; 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				

Notes:

LDC #: 39937D4a
SDG # 17-30445

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: JB
2nd Reviewer: [signature]

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

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

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	11/2/17	CCV (9:32)	Cr	89.8 (90-110)	2-8	J/UJ/P (Det)

Comments:

LDC #: 39937D4a
SDG #: 17-30445

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd reviewer:

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

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Sample: 8 Field Blank / Trip Blank / Rinsate / Other EB (circle one)

Analyte	Concentration Units (ug/L)
Cr	0.90

Sample: _____ Field Blank / Trip Blank / Rinsate / Other_____ (circle one)

Analyte	Concentration Units ( )

LDC #: 39937D4a

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: JB
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L. for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

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

#	Date	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
		11	W	Cr	20.8 (20)		All	J/UJ/A (Det)

Comments:

LDC#: 39937D4a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: VB
2nd Reviewer:

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
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/25/17 08:40
Solids: 0.00
Batch: BIJ2908 Sequence: 1719840

SDG: 17-30445
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730445-02
Prepared: 10/25/17 21:45
Preparation: No Prep
Calibration: UNASSIGNED

File ID: 171025 2145 CR6-021
Analyzed: 10/25/17 21:45
Initial/Final: 20 ml / 20 ml
Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0036	1		EPA-7196

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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: B[J2908
Sequence: 1719840
Calibration: UNASSIGNED
Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
18540-29-9	Hexavalent Chromium	0.0017	1	J	EPA-7196

12/17/17

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Project Number: 4Q17
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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

12/7/17

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Project Number: 4Q17
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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

12/17/17

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Project Number: 4Q17
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INORGANIC ANALYSIS DATA SHEET
EPA-7196

MW-9

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-06
File ID: 171025 2145 CR6-028
Sampled: 10/25/17 11:50
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	0.00070	1	U	EPA-7196

12/12/17 Q

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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[J2908
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

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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-8-4Q17

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-08
File ID: 171025 2145 CR6-032
Sampled: 10/25/17 13:14
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[J2908
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

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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

EB-7-102517

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/25/17 13:20
Solids: 0.00
Batch: B[J2908
Sequence: 1719840

SDG: 17-30445
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730445-09
Prepared: 10/25/17 21:45
Preparation: No Prep
Calibration: UNASSIGNED
File ID: 171025 2145 CR6-033
Analyzed: 10/25/17 21:48
Initial/Final: 20 ml / 20 ml
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 K

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-365.1

MW-13

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-02
File ID: 171026 0907 PO4-050
Sampled: 10/25/17 08:40
Prepared: 10/26/17 09:07
Analyzed: 10/26/17 09:28
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: B[J2901
Sequence: 1719851
Calibration: UNASSIGNED
Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.066	1		EPA-365.1

12/7/17

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-365.1

MW-16

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-03
File ID: 171026 0907 PO4-054
Sampled: 10/25/17 09:35
Prepared: 10/26/17 09:07
Analyzed: 10/26/17 09:28
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2901
Sequence: 1719851
Calibration: UNASSIGNED
Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.25	1		EPA-365.1

12/7/17 9

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-365.1

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 0907 PO4-055
Sampled: 10/25/17 10:37
Prepared: 10/26/17 09:07
Analyzed: 10/26/17 09:28
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2901
Sequence: 1719851
Calibration: UNASSIGNED
Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
---	ortho-Phosphate as P	0.021	1	J	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

INORGANIC ANALYSIS DATA SHEET
EPA-353.2

MW-13

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-02
File ID: 171026 0809 NO2-025
Sampled: 10/25/17 08:40
Prepared: 10/26/17 08:09
Analyzed: 10/26/17 08:37
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2906
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

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-16

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-03
File ID: 171026 0809 NO2-029
Sampled: 10/25/17 09:35
Prepared: 10/26/17 08:09
Analyzed: 10/26/17 08:37
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ2906
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

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[J2906
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

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-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 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

INORGANIC ANALYSIS DATA SHEET
EPA-300.0

MW-7

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-05
File ID: B102617.seq-11
Sampled: 10/25/17 10:37
Prepared: 10/26/17 12:00
Analyzed: 10/26/17 15:35
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	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

12/7/17

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

11/17

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-16

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-03
File ID: F110617.seq-22.0000.txt
Sampled: 10/25/17 09:35
Prepared: 11/06/17 10:00
Analyzed: 11/06/17 15:43
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	0.83	1	J	EPA-314.0

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-314.0

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: F110617.seq-23.0000.txt
Sampled: 10/25/17 09:45
Prepared: 11/06/17 10:00
Analyzed: 11/06/17 15:59
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	0.84	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

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

MW-7

Laboratory: BC Laboratories
SDG: 17-30445
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730445-05
File ID: F110617.seq-24.0000.txt
Sampled: 10/25/17 10:37
Prepared: 11/06/17 10:00
Analyzed: 11/06/17 16:14
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	4.2	1		EPA-314.0

12/7/17

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

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-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

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

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

12/17/17

LDC #: 39937D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30445 Level III Page: 1 of 1
Laboratory: BC Laboratories, Inc. Reviewer: 3
2nd Reviewer:

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	LCS
IX.	Field duplicates	SW	(2,3) (6,7)
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 #: 39937D4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Parameter
1,2,4	pH TDS [✓ Cl] F [✓ NO_3] [✓ NO_2] [✓ SO_4] [✓ O-PO_4] Alk CN NH_3 TKN TOC Cr6+ ClO_4
1-8	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
QC	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
9,10	pH TDS [✓ Cl] F [✓ NO_3] [✓ NO_2] [✓ SO_4] [✓ O-PO_4] Alk CN NH_3 TKN TOC [✓ Cr6+] [✓ ClO_4]
11	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 #: 39937DQ
SDG #: 17-30445

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: KB
2nd reviewer: CL

METHOD: Inorganics

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Sample: 8 Field Blank / Trip Blank / Rinsate / Other EB (circle one)

Analyte	Concentration Units mg/L
Cr6+	0.0012

Sample: _____ Field Blank / Trip Blank / Rinsate / Other_____ (circle one)

Analyte	Concentration Units ( )

LDC# 39937D6

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: VB

2nd Reviewer:

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:	B[J2865	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 UJ

12/17/17 Q

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

Reported: 11/17/2017 4:27:57PM
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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:	B[J2865	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

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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:	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 U5
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	9.9400	99.4	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.130	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.2300	92.3	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	247363	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	99035	9.61	99516	9.61	
1,4-Difluorobenzene (IS)	405705	7.38	415323	7.38	

* Values outside of QC limits

12/7/17 Q

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

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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:	BIJ2865	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

12/7/17

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:	B[J2865	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 UJ

12/7/17 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		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:	B[J2865	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

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
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 UJ
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	10.080	101	75 - 125	
Toluene-d8 (Surrogate)	10.000	10.380	104	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.560	106	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	250084	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	93526	9.61	99516	9.61	
1,4-Difluorobenzene (IS)	396012	7.38	415323	7.38	

* Values outside of QC limits

12/7/17

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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:	B[J2865	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 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
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 VS

12/7/17 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

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
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 UJ
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

12/12/17

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-11-4

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:	BIJ2865	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-11-3

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
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 UJ

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
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 D

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
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 U5
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	10.270	103	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.8600	98.6	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.9800	99.8	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	239711	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	91043	9.62	99516	9.61	
1,4-Difluorobenzene (IS)	401295	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:	BIJ2865	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

12/12/17

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-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 U5

11/17/17 CR

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:	B[J2865	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

12/12/17

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
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 UJ
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

Tidewater Inc.
3761 Attucks Drive
Powell, OH 43065

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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:	B[J2865	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-11-1

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:	BIJ2865	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 UJ

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:	B[J2865	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

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:	B[J2865	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 UJ
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	10.550	106	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)	239953	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	94103	9.61	99516	9.61	
1,4-Difluorobenzene (IS)	396935	7.38	415323	7.38	

* Values outside of QC limits

12/7/17

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-11-1

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
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 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:	BIJ2865	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	5.7	
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 U5

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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-21-5

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		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:	BIJ2865	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 U5
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	10.120	101	75 - 125	
Toluene-d8 (Surrogate)	10.000	9.9700	99.7	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	9.2400	92.4	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	240725	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	95539	9.62	99516	9.61	
1,4-Difluorobenzene (IS)	391685	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-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:	BIJ2865	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-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:	B[J2865	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	4.6	
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 U

12/7/17

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-21-4

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:	BIJ2865	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

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
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 U5
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	10.130	101	80 - 120	
4-Bromofluorobenzene (Surrogate)	10.000	10.150	102	80 - 120	

INTERNAL STANDARD	AREA	RT	REF AREA	REF RT	Q
Pentafluorobenzene (IS)	240125	6.57	255124	6.57	
Chlorobenzene-d5 (IS)	87879	9.61	99516	9.61	
1,4-Difluorobenzene (IS)	377901	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-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:	B[J2865	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

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:	B[J2865	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 US

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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-21-3

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:	B[J2865	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

12/7/17

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:	B[J2865	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 L5
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 a

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:	B[J2865	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-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:	B[J2865	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

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:	B[J2865	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

12/12/17 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-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:	BIJ2865	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 UJ
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

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-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:	B[J2865	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

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:	B[J2865	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 UJ

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:	BIJ2865	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

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:	BIJ2865	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 U5
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

11/7/17

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:	B[J2865	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

LDC #: 39937E1 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/05/17

SDG #: 17-30577 Level III/IV Page: 1 of 1

Laboratory: BC Laboratories, Inc. Reviewer: JVG

2nd Reviewer: [illegible]

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% r² ICV ≤ 30%
IV.	Continuing calibration	SW	CCV ≤ 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 ~~CCB~~ (2) 1719744-CCB3

LDC #: 39937E1

VALIDATION FINDINGS CHECKLIST

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

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 #: 39937E1

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

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. Hexa chloro ethane	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1. Methyl iodide	Z2.

LDC #: 31937 E1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

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

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were all percent differences (%D) ≤ 30% ?

#	Date	Standard ID	Compound	Finding %D (Limit: <30.0%)	Associated Samples	Qualifications
	10/27/17	270ct 33	ZZZ	77.0	10, 12, 13, BLK1 (ND)	J/UJ/A
	10/28/17	270ct 61	00	31.2	1-9, 11, 1719744-ccb3 (ND)	
		270ct 62	ZZZ	98.4		

LDC #: 39937E1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

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

LDC # 39937E1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer:

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:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(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 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: 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 #: 39937 E1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

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 = I MSC - MSDC I * 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 Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	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	2.07
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

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy 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 = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry 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 Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	25.0	NA	27.63	NA	110	110				
Trichloroethene			27.64		111	111				
Benzene			26.51		106	106				
Toluene			25.47		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.

LDC #: 39937E1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Compound results reported with a positive detect were recalculated and verified using the following equation:

$$\text{Concentration} = \frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
RRF	=	Relative response factor of the calibration standard.
V_o	=	Volume or weight of sample purged in milliliters (ml) or grams (g).
Df	=	Dilution factor.
%S	=	Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 8, TCE:

Conc. = (2683)(10.0)( )
(377401)(0.296404)( )( )

= 0.2395

≈ 0.24 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Acceptable (Y/N)
			0.24		

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
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/26/17 09:30
Solids: 0.00
Batch: BJJ3121 Sequence: 1720762

SDG: 17-30577
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730577-03RE1
Prepared: 10/31/17 08:30
Preparation: EPA 200.2
File ID: PE_EL2_171110-095
Analyzed: 11/10/17 13:03
Initial/Final: 50 ml / 50 ml
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

12/7/17

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-11-3

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/26/17 10:00
Solids: 0.00
Batch: BJJ3121 Sequence: 1720762

SDG: 17-30577
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730577-04RE1
Prepared: 10/31/17 08:30
Preparation: EPA 200.2
File ID: PE_EL2_171110-096
Analyzed: 11/10/17 13:06
Initial/Final: 50 ml / 50 ml
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

INORGANIC ANALYSIS DATA SHEET
EPA-200.8

MW-11-2

Laboratory: BC Laboratories
SDG: 17-30577
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730577-05RE1
File ID: PE_EL2_171110-097
Sampled: 10/26/17 10:30
Prepared: 10/31/17 08:30
Analyzed: 11/10/17 13:09
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 JL

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-11-1

Laboratory: BC Laboratories
SDG: 17-30577
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730577-06RE1
File ID: PE_EL2_171110-098
Sampled: 10/26/17 07:50
Prepared: 10/31/17 08:30
Analyzed: 11/10/17 13:13
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 k

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: BIJ3121
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

12/7/17 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: BIJ3121
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

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-21-3

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: BC Laboratories
SDG: 17-30577
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730577-10RE1
File ID: PE_EL2_171110-084
Sampled: 10/26/17 13:00
Prepared: 10/31/17 08:30
Analyzed: 11/10/17 12:21
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 Q

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: 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

LDC #: 39937E4a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30577 Level III/IV Page: 1 of 1
Laboratory: BC Laboratories, Inc. Reviewer: JB
2nd Reviewer:

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 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-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. 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 ≤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) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed 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 #: 39937E4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JB
2nd Reviewer: Q

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 = Found x 100 / True

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 %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Cr	51.742ug/L	50.000ug/L	103%	103%	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Cr	38.425ug/L	40.000ug/L	96.1%	96.1%	Y
	CVAA (Continuing calibration)						

Comments:

LDC #: 39937E4a
SDG #: 17-30577

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: VB
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:

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

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 %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
IFB	ICP interference check	Cr	19.323 ug/L	20.000 ug/L	96.6%	96.6%	Y
LCS	Laboratory control sample	Cr	37.641 ug/L	40.000 ug/L	94.1%	94.1%	Y
MS	Matrix spike	Cr	ND (SSR-SR) 33.199 ug/L	40.000 ug/L	83.0%	83.0%	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.

LDC #: 39937E4a
SDG #: 17-30577

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JB
2nd reviewer:

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

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

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

Detected analyte results for Cr were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

Cr From Raw Data = 1.029 ug/L

#	Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
	7	Cr	1.0	1.0	Y

Note:

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: BC Laboratories
SDG: 17-30577
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730577-02
File ID: 171027 0104 CR6-020
Sampled: 10/26/17 08:45
Prepared: 10/27/17 01:04
Analyzed: 10/27/17 01:04
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	0.00070	1	U	EPA-7196

12/7/17

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-11-4

Laboratory: BC Laboratories
SDG: 17-30577
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730577-03
File ID: 171027 0104 CR6-021
Sampled: 10/26/17 09:30
Prepared: 10/27/17 01:04
Analyzed: 10/27/17 01:04
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

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-11-3

Laboratory: BC Laboratories
SDG: 17-30577
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730577-04
File ID: 171027 0104 CR6-022
Sampled: 10/26/17 10:00
Prepared: 10/27/17 01:04
Analyzed: 10/27/17 01:04
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: B[J2899
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

12/7/17 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-11-2

Laboratory: BC Laboratories
SDG: 17-30577
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730577-05
File ID: 171027 0104 CR6-023
Sampled: 10/26/17 10:30
Prepared: 10/27/17 01:04
Analyzed: 10/27/17 01:04
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: B[J2899
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

INORGANIC ANALYSIS DATA SHEET
EPA-7196

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: 171027 0104 CR6-087
Sampled: 10/26/17 07:50
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 U5	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

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: B[J2899
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

12/7/17

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-21-4

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: B[J2899
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

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

INORGANIC ANALYSIS DATA SHEET
EPA-7196

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: 171027 0104 CR6-029
Sampled: 10/26/17 12:35
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: B[J2899
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

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: BJJ2899
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

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

INORGANIC ANALYSIS DATA SHEET
EPA-7196

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: 171027 0104 CR6-030
Sampled: 10/26/17 13:30
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: B[J2899
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

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

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

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: F110717.seq-7.0000.txt
Sampled: 10/26/17 08:45
Prepared: 11/06/17 23:00
Analyzed: 11/07/17 02:12
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJK0554
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

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

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

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: F110717.seq-8.0000.txt
Sampled: 10/26/17 09:30
Prepared: 11/06/17 23:00
Analyzed: 11/07/17 02:28
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BIK0554
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

12/7/17 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-314.0

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: F110717.seq-9.0000.txt
Sampled: 10/26/17 10:00
Prepared: 11/06/17 23:00
Analyzed: 11/07/17 02:43
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

12/7/17 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-314.0

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: F110717.seq-10.0000.txt
Sampled: 10/26/17 10:30
Prepared: 11/06/17 23:00
Analyzed: 11/07/17 02:58
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BIK0554
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

12/7/17 R

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: BJK0554
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

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

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: F110717.seq-12.0000.txt
Sampled: 10/26/17 11:30
Prepared: 11/06/17 23:00
Analyzed: 11/07/17 03:29
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BIK0554
Sequence: 1720697
Calibration: UNASSIGNED
Instrument: IC6

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

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

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: F110717.seq-15.0000.txt
Sampled: 10/26/17 12:10
Prepared: 11/06/17 23:00
Analyzed: 11/07/17 04:15
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	1.4	1	J	EPA-314.0

12/17/17 g

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-21-3

Laboratory: BC Laboratories
SDG: 17-30577
Client: Tidewater Inc.
Project: JPL- GW Monitoring Wells
Matrix: Water
Laboratory ID: 1730577-09
File ID: F110717.seq-16.0000.txt
Sampled: 10/26/17 12:35
Prepared: 11/06/17 23:00
Analyzed: 11/07/17 04:31
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	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

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

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: F110717.seq-17.0000.txt
Sampled: 10/26/17 13:00
Prepared: 11/06/17 23:00
Analyzed: 11/07/17 04:46
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BIK0554
Sequence: 1720697
Calibration: UNASSIGNED
Instrument: IC6

CAS NO.	Analyte	Concentration (ug/L)	Dilution Factor	Q	Method
14797-73-0	Perchlorate	1.3	1	J	EPA-314.0

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

INORGANIC ANALYSIS DATA SHEET
EPA-314.0

EB-8-102617

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/26/17 13:30
Solids: 0.00
Batch: BJK0554 Sequence: 1720697

SDG: 17-30577
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730577-11
Prepared: 11/06/17 23:00
Preparation: No Prep
File ID: F110717.seq-21.0000.txt
Analyzed: 11/07/17 05:47
Initial/Final: 20 ml / 20 ml
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 2:44:04PM
Project: JPL- GW Monitoring Wells
Project Number: 4Q17
Project Manager: David Conner

INORGANIC ANALYSIS DATA SHEET
EPA-365.1

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: 171027 1041 PO4-068
Sampled: 10/26/17 07:50
Prepared: 10/27/17 10:41
Analyzed: 10/27/17 10:41
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BJJ3060
Sequence: 1720077
Calibration: UNASSIGNED
Instrument: KONE-1

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

INORGANIC ANALYSIS DATA SHEET
EPA-353.2

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: 171027 0900 NO2-037
Sampled: 10/26/17 07:50
Prepared: 10/27/17 09:00
Analyzed: 10/27/17 09:53
Solids: 0.00
Preparation: No Prep
Initial/Final: 20 ml / 20 ml
Batch: BIJ3058
Sequence: 1720070
Calibration: UNASSIGNED
Instrument: KONE-1

CAS NO.	Analyte	Concentration (mg/L)	Dilution Factor	Q	Method
14797-65-0	Nitrite as N	0.033	1	J	EPA-353.2

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

INORGANIC ANALYSIS DATA SHEET
EPA-300.0

MW-11-1

Laboratory: BC Laboratories
Client: Tidewater Inc.
Matrix: Water
Sampled: 10/26/17 07:50
Solids: 0.00
Batch: BJJ2926 Sequence: 1720700

SDG: 17-30577
Project: JPL- GW Monitoring Wells
Laboratory ID: 1730577-06
Prepared: 10/27/17 20:00
Preparation: No Prep
Calibration: UNASSIGNED

File ID: B102717A.seq-12
Analyzed: 10/27/17 23:46
Initial/Final: 20 ml / 20 ml
Instrument: IC2

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

LDC #: 39937E6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17
SDG #: 17-30577 Level III/IV Page: 1 of 2
Laboratory: BC Laboratories, Inc. Reviewer: SB
2nd Reviewer:

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, 16
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 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/12/17

SDG #: 17-30577 Level III/IV Page: 2 of 2

Laboratory: BC Laboratories, Inc. Reviewer: B

2nd Reviewer:

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:

LDC #: 39937E6

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer: [illegible]

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 anaylzed 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 #: 39937E6

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer:

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 #: 39937E6

VALIDATION FINDINGS WORKSHEET

Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Parameter
5	pH TDS [✓ Cl] F [✓ NO_3] [✓ NO_2] [✓ 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
QC	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
	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
Technical Holding Times

Reviewer: JB
2nd reviewer:

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	SW 7196						
Parameters:	Hexavalent Chromium						
Technical holding time:	24 Hours.						
Sample ID	Sampling date	Analysis date	Total Time	Qualifier	Analysis date	Total Time	Qualifier
5	10/26/17 7:50	10/27/17 8:23	24.55	J/UJP(ND)			

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 ClO_4^- 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 r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO_4^-	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	Cr^{6+}	ICV	FOUND: 0.048 mg/L	TRUE: 0.050000 mg/L	96.6%	97.2%	Y
3:45 Calibration verification	ClO_4	CCV1	FOUND: 9.71361 ug/L	TRUE: 10.000 ug/L	97%	108%	Y
Calibration verification							

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

LDC #: 39937E6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer: [illegible]

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 = Found / True x 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 = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	ClO_4^-	9.7136ug/L	10.000ug/L	97%	94.0%	Y
MS	Matrix spike sample	Cr^{6+}	ND (SSR-SR) 0.0537894mg/L	0.052632mg/L	102%	101%	Y
MSD	Duplicate sample	Cr^{6+}	0.0537894mg/L	Found: 0.0537894mg/L	0RPD	0.598RPD	Y

Comments: _____

LDC #: 39937E4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method See Cover

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

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

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

Concentration =

$y = mx + b$

$y = 0.001$ (rounding)

$m = 0.71458127 2$

$b = +0.00045436 8$

Recalculation:

$$Cr^{6+} = \frac{0.001 - 0.00045436 8}{0.71458127 2}$$

$$= 0.0008 \text{ mg/L}$$

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
	7	ClO4	1.4 ug/L	1.6 ug/L	y
		Cr^{6+}	0.001 mg/L	0.0010 mg/L	y

Note: