

Laboratory Report Number: L17081212

Shane Lowe
CH2MHILL, Inc
CH2MHILL
Richmond Heights, MO 63117

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Michelle Taylor – Client Services Specialist
(740) 373-4071
Michelle.Taylor@microbac.com

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on September 07 2017



Leslie Bucina – Managing Director

State of Origin: NY
Accrediting Authority: Department of Health ID:10861
QAPP: WATERLOO



Microbac Laboratories * Ohio Valley Division
158 Starlite Drive, Marietta, OH 45750 * T: (740) 373-4071 F: (740) 373-4835 * www.microbac.com

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

The following discrepancies were noted:

Discrepancy	Resolution
The sample(s) were out of the acceptable pH range. CLS MW21-082217 : the pH is out on this sample ID due to the matrix of the sample. CLS	Please proceed. mrt

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114805	I	2.0		1001891773310004575000770011568871	X
0017089	I	2.0		1001891773310004575000770011611430	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	No
12	Were VOA samples free of headspace (less than 6mm)?	Yes

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
TB-082217	L17081212-01	08/22/2017 08:00	08/23/2017 10:41
MW02-082217	L17081212-02	08/22/2017 12:23	08/23/2017 10:41
MW02-082217	L17081212-03	08/22/2017 12:23	08/23/2017 10:41
MW02-082217-MS	L17081212-04	08/22/2017 12:23	08/23/2017 10:41
MW02-082217-MS	L17081212-05	08/22/2017 12:23	08/23/2017 10:41
MW02-082217-MSD	L17081212-06	08/22/2017 12:23	08/23/2017 10:41
MW02-082217-MSD	L17081212-07	08/22/2017 12:23	08/23/2017 10:41
MW21-082217	L17081212-08	08/22/2017 12:35	08/23/2017 10:41
MW21-082217	L17081212-09	08/22/2017 12:35	08/23/2017 10:41
FB-082217	L17081212-10	08/22/2017 12:40	08/23/2017 10:41
MW35-082217	L17081212-11	08/22/2017 15:28	08/23/2017 10:41
MW35-082217	L17081212-12	08/22/2017 15:28	08/23/2017 10:41
MW35-082217-MS	L17081212-13	08/22/2017 15:28	08/23/2017 10:41
MW35-082217-MS	L17081212-14	08/22/2017 15:28	08/23/2017 10:41
MW35-082217-MSD	L17081212-15	08/22/2017 15:28	08/23/2017 10:41
MW35-082217-MSD	L17081212-16	08/22/2017 15:28	08/23/2017 10:41
MW36-082217	L17081212-17	08/22/2017 15:50	08/23/2017 10:41
MW36-082217	L17081212-18	08/22/2017 15:50	08/23/2017 10:41
DUP-GW-082217	L17081212-19	08/22/2017 09:00	08/23/2017 10:41
DUP-GW-082217	L17081212-20	08/22/2017 09:00	08/23/2017 10:41



Login Number: L17081212
Department: Metals
Analyst: Kerri Buck

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6010

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration Verification: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG627342 - All acceptance criteria were met.

WG627086 - All acceptance criteria were met.

Matrix Spikes: WG627086 - Sample 02 was chosen by the client for MS/MSD analysis. Samples 04(MS) and 06(MSD) yielded noncompliant recoveries for two analytes. Sample 03 was chosen by the client for MS/MSD analysis. Samples 05(MS) and 07(MSD) met all acceptance criteria. Sample 11 was chosen by the client for MS/MSD analysis. Samples 13(MS) and 15(MSD) yielded noncompliant recoveries for three analytes. Sample 12 was chosen by the client for MS/MSD analysis. Samples 14(MS) and 16(MSD) met all acceptance criteria.

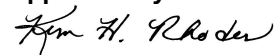
SAMPLES

Samples: WG627342 - Client sample 08 required dilution analysis in order to obtain a result for sodium within the linear range.

WG627086 - Client samples 02, 04(MS), and 06(MSD) required dilution analysis in order to obtain a result for sodium within the linear range.

Narrative ID: 128733

Approved By: Kim Rhodes





Login Number: L17081212
Department: Metals
Analyst: Ji Hu

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6020

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

Low Level Check: WG627096 - Due to the low level initial calibration verification failure for chromium on 24-Aug-2017 at 13:54, client samples 02 through 07 and QA/QC were reanalyzed on a later calibration which was compliant for chromium.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG627096 - All acceptance criteria were met.

WG627433 - All acceptance criteria were met.

Matrix Spikes: WG627096 - Sample 02 was chosen by the client for MS/MSD analysis. Samples 04 (MS) and 06 (MSD) met all acceptance criteria. Sample 03 was chosen by the client for MS/MSD analysis. Samples 05 (MS) and 07 (MSD) met all acceptance criteria. Sample 11 was chosen by the client for MS/MSD analysis. Samples 13 (MS) and 15 (MSD) met all acceptance criteria. Sample 12 was chosen by the client for MS/MSD analysis. Samples 14 (MS) and 16 (MSD) met all acceptance criteria.

SAMPLES

Samples: WG627433 - Due to the dark color of the digestate and high levels of nontarget analytes which can contribute to undercorrected interferences and instrument malfunctions, client samples 08 and 09 were analyzed at dilutions for all analytes.

Narrative ID: 128738

Approved By: Kerri Buck

K: K Buck



Login Number: L17081212
Department: General Chromatography
Analyst: Craig Smith

METHOD

Analysis EPA300.0/SW846 9056

HOLDING TIMES

Sample Analysis: Hold times for NO₂ and NO₃ are 48 hours and the hold times for F, Cl, Br, and SO₄ are 28 days. The hold time forms calculate the hold time based on 48 hours. All samples were analyzed in hold.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration Verification: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: The client did not specify an MS/MSD for this sample delivery group. The laboratory selected sample 02 for MS/MSD analysis and recoveries out of range were observed for chloride and sulfate. Please see the applicable QC report for a detailed presentation of the failures.

The parent sample's initial results for chloride and sulfate were greater than that of the MS/MSD spiking solution concentrations for those analytes.

SAMPLES

Samples: Sample 02 was analyzed at a dilution only due to its pre-run screen results for CL and SO₄ which were greater than their calibration range maxima.

Samples 08, 11, and 17 were analyzed at dilutions only due to their pre-run screen results for CL which were greater than 200 ppm. Any sample that has a single anion load greater than 200 ppm will be diluted in order to prevent damage to the ion chromatograph, which is caused by repeated overloading of the analytical column and oversaturation of the conductivity suppressor and/or detector.

MANUAL INTEGRATION: No manual integrations were required.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128684

Approved By: Eric Lawson

A handwritten signature in black ink, appearing to read "Eric C. Lawson", is written over a light gray rectangular background.



Login Number: L17081212
Department: Conventionals
Analyst: Todd Boyle

METHOD

Analysis EPA 310.2 (Alkalinity)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

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Narrative ID: 128837
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over the printed name.



Login Number: L17081212
Department: Conventionals
Analyst: Todd Boyle

METHOD

Analysis EPA 350.1/SM4500-NH3 B(NH3)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

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Narrative ID: 128838
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over a horizontal line.



Login Number: L17081212
Department: Conventional
Analyst: Tammy Morris

METHOD

Analysis EPA 353.2/SM4500-NO3 F (Nitrate)

HOLDING TIMES

Sample Analysis: The instrument used for the analysis of nitrate only analyzes for nitrate-nitrite (NO₃NO₂) which is the amount of total nitrate (NO₃) and nitrite (NO₂) combined. The NO₃ concentration is determined by analyzing for NO₃NO₂ and NO₂ and calculating NO₃ by the difference. An unpreserved bottle only has a 48 hour hold time for NO₃ and NO₂ separately. However if the bottle is preserved with sulfuric acid, the hold time for NO₃NO₂ is 28 days. The NO₂ was analyzed within 48 hours. The NO₃NO₂ was analyzed from a preserved container within 28 days..

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: The samples were diluted to reduce matrix interference. The reporting limits are elevated accordingly.

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Narrative ID: 128818
Approved By: Deanna Hesson

Dannat/sson



Login Number: L17081212
Department: Conventionals
Analyst: Todd Boyle

METHOD

Analysis EPA 365.4 (Phosphorus)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

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Narrative ID: 128839
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over the printed name.



Login Number: L17081212
Department: Conventional
Analyst: Dorothy Payne

METHOD

Analysis EPA 365.2/SM4500-P E (Orthophosphate)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

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Narrative ID: 128841
Approved By: Deanna Hesson

A handwritten signature in cursive script, appearing to read "Deanna Hesson", written in black ink.



Login Number: L17081212
Department: Conventionals
Analyst: Ethan Tidd

METHOD

Analysis SW-846 9030/EPA 376.1/SM4500-S(-2) F (Sulfide)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

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Narrative ID: 128843
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over the printed name.



Login Number: L17081212
Department: Conventionals
Analyst: April Greene

METHOD

Analysis EPA 160.1/SM2540 C(Total Dissolved Solids)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

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Narrative ID: 128844
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over a horizontal line.



Login Number: L17081212
Department: Conventionals
Analyst: Todd Boyle

METHOD

Analysis EPA 351.2(TKN)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

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Narrative ID: 128840
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over a horizontal line.



Login Number: L17081212
Department: Conventionals
Analyst: Ethan Tidd

METHOD

Analysis Water: EPA 415.1/SM5310C/SW846 9060 (Total Organic Carbon)
Soil: Lloyd-Khan Methodology

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

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Narrative ID: 128842
Approved By: Deanna Hesson

A handwritten signature in cursive script, appearing to read "Deanna Hesson", written in black ink.

Certificate of Analysis

Sample #: L17081212-01	PrePrep Method: N/A	Instrument: HPMS9
Client ID: TB-082217	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260C	Cal Date: 08/14/2017 14:15
Workgroup #: WG627475	Analyst: JDS	Run Date: 08/28/2017 17:45
Collect Date: 08/22/2017 08:00	Dilution: 1	File ID: 9M982221
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	2.00
1,1,2-Trichloroethane	79-00-5		U	1.00	0.500
1,1-Dichloroethane	75-34-3		U	1.00	0.500
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,3-Trichlorobenzene	87-61-6		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.500
1,2-Dichlorobenzene	95-50-1		U	1.00	0.500
1,2-Dichloroethane	107-06-2		U	1.00	0.500
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.500
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.500
1,2-Dichloropropane	78-87-5		U	1.00	0.500
1,3-Dichlorobenzene	541-73-1		U	1.00	0.500
1,4-Dichlorobenzene	106-46-7		U	1.00	0.500
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1	4.91	J	10.0	2.50
Benzene	71-43-2		U	1.00	0.500
Bromochloromethane	74-97-5		U	1.00	0.500
Bromodichloromethane	75-27-4		U	1.00	0.500
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.500
Chlorobenzene	108-90-7		U	1.00	0.500
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.500
Chloromethane	74-87-3		U	1.00	0.500
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Cyclohexane	110-82-7		U	5.00	1.00
Dibromochloromethane	124-48-1		U	1.00	0.500
Dichlorodifluoromethane	75-71-8		U	2.00	0.500
Ethyl benzene	100-41-4		U	1.00	0.500
Isopropylbenzene	98-82-8		U	1.00	0.500
Methyl acetate	79-20-9		U	5.00	1.00
Methyl tert-butyl ether	1634-04-4		U	1.00	0.500
Methylcyclohexane	108-87-2		U	5.00	1.00
Methylene chloride	75-09-2		U	5.00	0.500
m,p-Xylene	179601-23-1		U	1.00	0.500
o-Xylene	95-47-6		U	1.00	0.500
Styrene	100-42-5		U	1.00	0.500
Tetrachloroethene	127-18-4		U	1.00	0.500
Toluene	108-88-3		U	1.00	0.500
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6		U	1.00	0.500
Trichlorofluoromethane	75-69-4		U	1.00	0.500
Vinyl chloride	75-01-4		U	1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	103	80	120		
Dibromofluoromethane	101	86	118		
p-Bromofluorobenzene	112	86	115		
Toluene-d8	105	88	110		
J	The analyte was positively identified, but the quantitation was below the RL.				
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-02

PrePrep Method: N/A

Instrument: HPMS9

Client ID: MW02-082217

Prep Method: 5030B/5030C/5035A

Prep Date: N/A

Matrix: Water

Analytical Method: 8260B

Cal Date: 08/14/2017 14:15

Workgroup #: WG627475

Analyst: JDS

Run Date: 08/28/2017 20:15

Collect Date: 08/22/2017 12:23

Dilution: 1

File ID: 9M982226

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	RL	MDL
Sulfur dioxide		73.5		0.000	0.000
unknown		34.1		0.000	0.000
unknown		13.5		0.000	0.000
unknown		8.36		0.000	0.000
unknown		64.6		0.000	0.000

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
unknown		26.6		0.000	0.000
unknown		18.9		0.000	0.000
unknown		23.0		0.000	0.000
unknown		14.9		0.000	0.000
unknown		8.35		0.000	0.000

Sample #: L17081212-02

PrePrep Method: N/A

Instrument: HPMS9

Client ID: MW02-082217

Prep Method: 5030B/5030C/5035A

Prep Date: N/A

Matrix: Water

Analytical Method: 8260C

Cal Date: 08/14/2017 14:15

Workgroup #: WG627475

Analyst: JDS

Run Date: 08/28/2017 20:15

Collect Date: 08/22/2017 12:23

Dilution: 1

File ID: 9M982226

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	2.00
1,1,2-Trichloroethane	79-00-5		U	1.00	0.500
1,1-Dichloroethane	75-34-3		U	1.00	0.500
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,3-Trichlorobenzene	87-61-6		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.500
1,2-Dichlorobenzene	95-50-1		U	1.00	0.500
1,2-Dichloroethane	107-06-2		U	1.00	0.500
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.500
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.500
1,2-Dichloropropane	78-87-5		U	1.00	0.500
1,3-Dichlorobenzene	541-73-1		U	1.00	0.500
1,4-Dichlorobenzene	106-46-7		U	1.00	0.500
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1	3.23	J	10.0	2.50
Benzene	71-43-2		U	1.00	0.500
Bromochloromethane	74-97-5		U	1.00	0.500
Bromodichloromethane	75-27-4		U	1.00	0.500
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Carbon disulfide	75-15-0	18.9		1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.500
Chlorobenzene	108-90-7		U	1.00	0.500
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3	1.07		1.00	0.500
Chloromethane	74-87-3		U	1.00	0.500
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.500
Cyclohexane	110-82-7		U	5.00	1.00
Dibromochloromethane	124-48-1		U	1.00	0.500
Dichlorodifluoromethane	75-71-8		U	2.00	0.500
Ethyl benzene	100-41-4		U	1.00	0.500
Isopropylbenzene	98-82-8		U	1.00	0.500
Methyl acetate	79-20-9		U	5.00	1.00
Methyl tert-butyl ether	1634-04-4		U	1.00	0.500
Methylcyclohexane	108-87-2		U	5.00	1.00
Methylene chloride	75-09-2	0.896	J	5.00	0.500
m,p-Xylene	179601-23-1		U	1.00	0.500
o-Xylene	95-47-6		U	1.00	0.500
Styrene	100-42-5		U	1.00	0.500
Tetrachloroethene	127-18-4		U	1.00	0.500
Toluene	108-88-3		U	1.00	0.500
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6		U	1.00	0.500
Trichlorofluoromethane	75-69-4		U	1.00	0.500
Vinyl chloride	75-01-4		U	1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	104	80	120		
Dibromofluoromethane	102	86	118		
p-Bromofluorobenzene	108	86	115		
Toluene-d8	102	88	110		
J	The analyte was positively identified, but the quantitation was below the RL.				
U	Not detected at or above adjusted sample detection limit.				

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 19:51
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.195123
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2	198		0.500	0.250
Iron, Total	7439-89-6	0.423		0.100	0.0500
Magnesium, Total	7439-95-4	22.5		0.500	0.250
Manganese, Total	7439-96-5	0.0588		0.0100	0.00500
Potassium, Total	7440-09-7	7.96		1.00	0.500
Silica, Calculated as SiO ₂		31.2		2.14	1.07
Silicon, Total	7440-21-3	14.6		1.00	0.500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/28/2017 11:39
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/28/2017 13:33
Collect Date: 08/22/2017 12:23	Dilution: 5	File ID: T4.082817.133303
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sodium, Total	7440-23-5	422		2.50	1.25
J	The analyte was positively identified, but the quantitation was below the RL.				
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:18
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.151808
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.00117		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:10
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.131019
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Total	7440-47-3	0.00432		0.00200	0.00100

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: IC2
Client ID: MW02-082217	Prep Method: 300.0	Prep Date: 08/23/2017 17:30
Matrix: Water	Analytical Method: 300.0	Cal Date: 04/11/2017 18:31
Workgroup #: WG627007	Analyst: CAS	Run Date: 08/23/2017 20:04
Collect Date: 08/22/2017 12:23	Dilution: 10	File ID: I2_082317-11
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	144		2.00	1.00
Sulfate	14808-79-8	651		10.0	5.00

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW02-082217	Prep Method: 310.2	Prep Date: N/A
Matrix: Water	Analytical Method: 310.2	Cal Date: 08/28/2017 11:13
Workgroup #: WG627416	Analyst: TB	Run Date: 08/28/2017 11:20
Collect Date: 08/22/2017 12:23	Dilution: 2	File ID: S2170828001.020
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Alkalinity, Total (as CaCO3)	11-43-8	482		40.0	20.0

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW02-082217	Prep Method: 350.1	Prep Date: N/A
Matrix: Water	Analytical Method: 350.1	Cal Date: 08/24/2017 17:42
Workgroup #: WG627134	Analyst: TB	Run Date: 08/24/2017 17:49
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: S2170824003.014
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.81		0.100	0.0500

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW02-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 12:23	Dilution: 50	File ID: S217082916543901
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate-Nitrite (as N)			U	2.50	1.25
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW02-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 12:23	Dilution: 50	File ID: S217082916543501
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate (as N)	14797-55-8		U	2.50	1.25
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW02-082217	Prep Method: 365.4	Prep Date: N/A
Matrix: Water	Analytical Method: 365.4	Cal Date: 08/25/2017 12:10
Workgroup #: WG627266	Analyst: TB	Run Date: 08/25/2017 12:14
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: SC170825002.013
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Phosphorus, Total	7723-14-0	0.182	J	0.200	0.100
J	The analyte was positively identified, but the quantitation was below the RL.				

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: V-1200
Client ID: MW02-082217	Prep Method: SM4500-P-E-1999	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-P-E-1999	Cal Date: 06/07/2017 15:45
Workgroup #: WG626980	Analyst: DLP	Run Date: 08/23/2017 14:15
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: 00.1708231415-06
Sample Tag:	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Orthophosphate	14265-44-2	0.310		0.0500	0.0250

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: BURET
Client ID: MW02-082217	Prep Method: SM4500-S-(-2)-F-2000	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-S-(-2)-F-2000	Cal Date:
Workgroup #: WG626985	Analyst: EPT	Run Date: 08/23/2017 15:10
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: ET.1708231510-05
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sulfide	18496-25-8	7.54		1.00	0.500

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: OVEN
Client ID: MW02-082217	Prep Method: 160.1/SM2540C	Prep Date: N/A
Matrix: Water	Analytical Method: SM2540-C-1997	Cal Date:
Workgroup #: WG626984	Analyst: ADG	Run Date: 08/23/2017 15:48
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: EN.1708231548-11
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		1780		20.0	10.0

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW02-082217	Prep Method: 351.2	Prep Date: N/A
Matrix: Water	Analytical Method: 351.2	Cal Date: 08/25/2017 10:53
Workgroup #: WG627196	Analyst: TB	Run Date: 08/25/2017 11:00
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: SC170825001.015
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Total Kjeldahl	7727-37-9	2.41		0.200	0.100

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: TOC-VWP
Client ID: MW02-082217	Prep Method: SM5310-C-2011	Prep Date: N/A
Matrix: Water	Analytical Method: SM5310-C-2011	Cal Date: 02/10/2017 10:25
Workgroup #: WG627108	Analyst: EPT	Run Date: 08/24/2017 16:26
Collect Date: 08/22/2017 12:23	Dilution: 5	File ID: TC08242017.009
Sample Tag: DL01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	13.8		5.00	2.50

Sample #: L17081212-03	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 19:55
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.195508
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Iron, Dissolved	7439-89-6	0.0700	J	0.100	0.0500
Manganese, Dissolved	7439-96-5	0.0638		0.0100	0.00500
J	The analyte was positively identified, but the quantitation was below the RL.				
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-03	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:13
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.131325
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Dissolved	7440-47-3	0.00385		0.00200	0.00100

Sample #: L17081212-03	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:21
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.152114
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.00109		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: HPMS9
Client ID: MW02-082217-MS	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 08/14/2017 14:15
Workgroup #: WG627475	Analyst: JDS	Run Date: 08/28/2017 16:14
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: 9M982218
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	RL	MDL
unknown		92.1		0.000	0.000
unknown		40.4		0.000	0.000
unknown		16.2		0.000	0.000
unknown		14.6		0.000	0.000
unknown		7.78		0.000	0.000

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: HPMS9
Client ID: MW02-082217-MS	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260C	Cal Date: 08/14/2017 14:15
Workgroup #: WG627475	Analyst: JDS	Run Date: 08/28/2017 16:14
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: 9M982218
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6	19.0		1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5	22.0		1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	22.2		5.00	2.00
1,1,2-Trichloroethane	79-00-5	20.9		1.00	0.500
1,1-Dichloroethane	75-34-3	18.7		1.00	0.500
1,1-Dichloroethene	75-35-4	17.6		1.00	0.500
1,2,3-Trichlorobenzene	87-61-6	24.6		1.00	0.500
1,2,4-Trichlorobenzene	120-82-1	21.7		1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8	20.3		5.00	1.00
1,2-Dibromoethane	106-93-4	20.8		1.00	0.500
1,2-Dichlorobenzene	95-50-1	22.4		1.00	0.500
1,2-Dichloroethane	107-06-2	19.1		1.00	0.500
cis-1,2-Dichloroethene	156-59-2	19.6		1.00	0.500
trans-1,2-Dichloroethene	156-60-5	18.3		1.00	0.500
1,2-Dichloropropane	78-87-5	20.0		1.00	0.500
1,3-Dichlorobenzene	541-73-1	22.5		1.00	0.500
1,4-Dichlorobenzene	106-46-7	22.6		1.00	0.500
2-Butanone	78-93-3	18.5		10.0	2.50
2-Hexanone	591-78-6	19.0		10.0	2.50

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
4-Methyl-2-pentanone	108-10-1	18.5		10.0	2.50
Acetone	67-64-1	20.6		10.0	2.50
Benzene	71-43-2	18.6		1.00	0.500
Bromochloromethane	74-97-5	19.4		1.00	0.500
Bromodichloromethane	75-27-4	19.3		1.00	0.500
Bromoform	75-25-2	16.3		1.00	0.500
Bromomethane	74-83-9	15.7		1.00	0.500
Carbon disulfide	75-15-0	50.8		1.00	0.500
Carbon tetrachloride	56-23-5	18.8		1.00	0.500
Chlorobenzene	108-90-7	21.3		1.00	0.500
Chloroethane	75-00-3	20.7		1.00	0.500
Chloroform	67-66-3	21.2		1.00	0.500
Chloromethane	74-87-3	18.8		1.00	0.500
cis-1,3-Dichloropropene	10061-01-5	21.3		1.00	0.500
Cyclohexane	110-82-7	18.9		5.00	1.00
Dibromochloromethane	124-48-1	20.1		1.00	0.500
Dichlorodifluoromethane	75-71-8	21.7		2.00	0.500
Ethyl benzene	100-41-4	21.4		1.00	0.500
Isopropylbenzene	98-82-8	21.5		1.00	0.500
Methyl acetate	79-20-9	17.6		5.00	1.00
Methyl tert-butyl ether	1634-04-4	19.3		1.00	0.500
Methylcyclohexane	108-87-2	20.4		5.00	1.00
Methylene chloride	75-09-2	19.5		5.00	0.500
m,p-Xylene	179601-23-1	45.0		1.00	0.500
o-Xylene	95-47-6	22.0		1.00	0.500
Styrene	100-42-5	19.1		1.00	0.500
Tetrachloroethene	127-18-4	20.5		1.00	0.500
Toluene	108-88-3	20.5		1.00	0.500
trans-1,3-Dichloropropene	10061-02-6	20.1		1.00	0.500
Trichloroethene	79-01-6	19.1		1.00	0.500
Trichlorofluoromethane	75-69-4	19.3		1.00	0.500
Vinyl chloride	75-01-4	16.5		1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	102	80	120	
Dibromofluoromethane	103	86	118	
p-Bromofluorobenzene	104	86	115	
Toluene-d8	104	88	110	

Certificate of Analysis

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 19:58
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.195852
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	6.09		0.200	0.100
Calcium, Total	7440-70-2	209		0.500	0.250
Iron, Total	7439-89-6	2.88		0.100	0.0500
Magnesium, Total	7439-95-4	29.1		0.500	0.250
Manganese, Total	7439-96-5	0.356		0.0100	0.00500
Potassium, Total	7440-09-7	41.4		1.00	0.500
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/28/2017 11:39
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/28/2017 13:36
Collect Date: 08/22/2017 12:23	Dilution: 5	File ID: T4.082817.133644
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sodium, Total	7440-23-5	498		2.50	1.25

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:16
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.131630
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Total	7440-47-3	0.130		0.00200	0.00100

Certificate of Analysis

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:30
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.153034
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.129		0.00100	0.000500

Sample #: L17081212-05	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:02
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.200232
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	6.15		0.200	0.100
Iron, Dissolved	7439-89-6	2.50		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.364		0.0100	0.00500

Sample #: L17081212-05	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:19
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.131935
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Dissolved	7440-47-3	0.126		0.00200	0.00100

Sample #: L17081212-05	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:33
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.153339
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.130		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: HPMS9
Client ID: MW02-082217-MSD	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 08/14/2017 14:15
Workgroup #: WG627475	Analyst: JDS	Run Date: 08/28/2017 16:44
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: 9M982219
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	RL	MDL
unknown		45.2		0.000	0.000
unknown		33.6		0.000	0.000
unknown		16.1		0.000	0.000
unknown		13.7		0.000	0.000
unknown		8.09		0.000	0.000

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: HPMS9
Client ID: MW02-082217-MSD	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260C	Cal Date: 08/14/2017 14:15
Workgroup #: WG627475	Analyst: JDS	Run Date: 08/28/2017 16:44
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: 9M982219
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6	18.4		1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5	21.8		1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	20.4		5.00	2.00
1,1,2-Trichloroethane	79-00-5	20.6		1.00	0.500
1,1-Dichloroethane	75-34-3	17.9		1.00	0.500
1,1-Dichloroethene	75-35-4	17.1		1.00	0.500
1,2,3-Trichlorobenzene	87-61-6	23.3		1.00	0.500
1,2,4-Trichlorobenzene	120-82-1	20.0		1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8	20.0		5.00	1.00
1,2-Dibromoethane	106-93-4	20.2		1.00	0.500
1,2-Dichlorobenzene	95-50-1	21.6		1.00	0.500
1,2-Dichloroethane	107-06-2	18.7		1.00	0.500
cis-1,2-Dichloroethene	156-59-2	19.0		1.00	0.500
trans-1,2-Dichloroethene	156-60-5	17.5		1.00	0.500
1,2-Dichloropropane	78-87-5	19.1		1.00	0.500
1,3-Dichlorobenzene	541-73-1	21.3		1.00	0.500
1,4-Dichlorobenzene	106-46-7	21.1		1.00	0.500
2-Butanone	78-93-3	19.3		10.0	2.50

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
2-Hexanone	591-78-6	19.3		10.0	2.50
4-Methyl-2-pentanone	108-10-1	18.9		10.0	2.50
Acetone	67-64-1	21.1		10.0	2.50
Benzene	71-43-2	18.2		1.00	0.500
Bromochloromethane	74-97-5	18.6		1.00	0.500
Bromodichloromethane	75-27-4	18.7		1.00	0.500
Bromoform	75-25-2	15.8		1.00	0.500
Bromomethane	74-83-9	9.52		1.00	0.500
Carbon disulfide	75-15-0	41.1		1.00	0.500
Carbon tetrachloride	56-23-5	18.0		1.00	0.500
Chlorobenzene	108-90-7	20.4		1.00	0.500
Chloroethane	75-00-3	19.9		1.00	0.500
Chloroform	67-66-3	20.7		1.00	0.500
Chloromethane	74-87-3	17.9		1.00	0.500
cis-1,3-Dichloropropene	10061-01-5	20.1		1.00	0.500
Cyclohexane	110-82-7	17.7		5.00	1.00
Dibromochloromethane	124-48-1	19.6		1.00	0.500
Dichlorodifluoromethane	75-71-8	19.9		2.00	0.500
Ethyl benzene	100-41-4	20.7		1.00	0.500
Isopropylbenzene	98-82-8	20.3		1.00	0.500
Methyl acetate	79-20-9	17.7		5.00	1.00
Methyl tert-butyl ether	1634-04-4	18.8		1.00	0.500
Methylcyclohexane	108-87-2	18.4		5.00	1.00
Methylene chloride	75-09-2	19.5		5.00	0.500
m,p-Xylene	179601-23-1	43.0		1.00	0.500
o-Xylene	95-47-6	21.0		1.00	0.500
Styrene	100-42-5	18.4		1.00	0.500
Tetrachloroethene	127-18-4	19.0		1.00	0.500
Toluene	108-88-3	19.8		1.00	0.500
trans-1,3-Dichloropropene	10061-02-6	19.8		1.00	0.500
Trichloroethene	79-01-6	18.2		1.00	0.500
Trichlorofluoromethane	75-69-4	18.6		1.00	0.500
Vinyl chloride	75-01-4	15.6		1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	101	80	120		
Dibromofluoromethane	101	86	118		
p-Bromofluorobenzene	103	86	115		
Toluene-d8	101	88	110		

Certificate of Analysis

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:06
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.200605
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	6.12		0.200	0.100
Calcium, Total	7440-70-2	206		0.500	0.250
Iron, Total	7439-89-6	2.85		0.100	0.0500
Magnesium, Total	7439-95-4	28.1		0.500	0.250
Manganese, Total	7439-96-5	0.356		0.0100	0.00500
Potassium, Total	7440-09-7	41.3		1.00	0.500
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/28/2017 11:39
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/28/2017 13:40
Collect Date: 08/22/2017 12:23	Dilution: 5	File ID: T4.082817.134023
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sodium, Total	7440-23-5	475		2.50	1.25

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:36
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.153645
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.130		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:22
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.132241
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Total	7440-47-3	0.129		0.00200	0.00100

Sample #: L17081212-07	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:09
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.200942
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	5.82		0.200	0.100
Iron, Dissolved	7439-89-6	2.38		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.342		0.0100	0.00500

Sample #: L17081212-07	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:39
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.153950
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.130		0.00100	0.000500

Sample #: L17081212-07	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:25
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.132546
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Dissolved	7440-47-3	0.128		0.00200	0.00100

Certificate of Analysis

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/25/2017 08:15
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627342	Analyst: KKB	Run Date: 08/25/2017 18:29
Collect Date: 08/22/2017 12:35	Dilution: 1	File ID: T4.082517.182932
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	1.25		0.400	0.200
Calcium, Total	7440-70-2	16.8		1.00	0.500
Iron, Total	7439-89-6	0.394		0.200	0.100
Magnesium, Total	7439-95-4	2.70		1.00	0.500
Manganese, Total	7439-96-5	0.0365		0.0200	0.0100
Potassium, Total	7440-09-7	7.99		2.00	1.00
Silica, Calculated as SiO2		16.7		4.28	2.14
Silicon, Total	7440-21-3	7.82		2.00	1.00

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/25/2017 08:15
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/28/2017 11:39
Workgroup #: WG627342	Analyst: KKB	Run Date: 08/28/2017 12:44
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: T4.082817.124407
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sodium, Total	7440-23-5	6490		10.0	5.00
J	The analyte was positively identified, but the quantitation was below the RL.				
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/28/2017 07:51
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/29/2017 14:30
Workgroup #: WG627433	Analyst: JYH	Run Date: 08/29/2017 17:45
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: NI.082917.174514
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	3.71		0.0200	0.0100

Certificate of Analysis

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: IC3
Client ID: MW21-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 03:40
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: I3_082517-32
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	312	E	2.00	1.00
Sulfate	14808-79-8	813		10.0	5.00
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: IC3
Client ID: MW21-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 04:00
Collect Date: 08/22/2017 12:35	Dilution: 50	File ID: I3_082517-33
Sample Tag: DL02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	380		10.0	5.00
Sulfate	14808-79-8	854		50.0	25.0

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW21-082217	Prep Method: 310.2	Prep Date: N/A
Matrix: Water	Analytical Method: 310.2	Cal Date: 08/28/2017 12:24
Workgroup #: WG627619	Analyst: TB	Run Date: 08/28/2017 12:28
Collect Date: 08/22/2017 12:35	Dilution: 100	File ID: S2170828002.015
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Alkalinity, Total (as CaCO3)	11-43-8	14400		2000	1000

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW21-082217	Prep Method: 350.1	Prep Date: N/A
Matrix: Water	Analytical Method: 350.1	Cal Date: 08/24/2017 17:42
Workgroup #: WG627134	Analyst: TB	Run Date: 08/24/2017 18:15
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: S2170824003.030
Sample Tag: DL01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	16.1		1.00	0.500

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW21-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 12:35	Dilution: 100	File ID: S217082916545201
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate-Nitrite (as N)			U	5.00	2.50
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW21-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 12:35	Dilution: 100	File ID: S217082916544501
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate (as N)	14797-55-8		U	5.00	2.50
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW21-082217	Prep Method: 365.4	Prep Date: N/A
Matrix: Water	Analytical Method: 365.4	Cal Date: 08/25/2017 12:10
Workgroup #: WG627266	Analyst: TB	Run Date: 08/25/2017 12:29
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: SC170825002.026
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Phosphorus, Total	7723-14-0	18.3		2.00	1.00

Certificate of Analysis

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: V-1200
Client ID: MW21-082217	Prep Method: SM4500-P-E-1999	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-P-E-1999	Cal Date: 06/07/2017 15:45
Workgroup #: WG626980	Analyst: DLP	Run Date: 08/23/2017 14:15
Collect Date: 08/22/2017 12:35	Dilution: 50	File ID: 00.1708231415-07
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Orthophosphate	14265-44-2	18.7		2.50	1.25

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: BURET
Client ID: MW21-082217	Prep Method: SM4500-S-(-2)-F-2000	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-S-(-2)-F-2000	Cal Date:
Workgroup #: WG626985	Analyst: EPT	Run Date: 08/23/2017 15:10
Collect Date: 08/22/2017 12:35	Dilution: 1	File ID: ET.1708231510-06
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sulfide	18496-25-8	28.4		1.00	0.500

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: OVEN
Client ID: MW21-082217	Prep Method: 160.1/SM2540C	Prep Date: N/A
Matrix: Water	Analytical Method: SM2540-C-1997	Cal Date:
Workgroup #: WG626984	Analyst: ADG	Run Date: 08/23/2017 15:48
Collect Date: 08/22/2017 12:35	Dilution: 1	File ID: EN.1708231548-12
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		1690		20.0	10.0

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW21-082217	Prep Method: 351.2	Prep Date: N/A
Matrix: Water	Analytical Method: 351.2	Cal Date: 08/25/2017 10:53
Workgroup #: WG627196	Analyst: TB	Run Date: 08/25/2017 11:23
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: SC170825001.026
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Total Kjeldahl	7727-37-9	34.1		2.00	1.00

Certificate of Analysis

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: TOC-VWP
Client ID: MW21-082217	Prep Method: SM5310-C-2011	Prep Date: N/A
Matrix: Water	Analytical Method: SM5310-C-2011	Cal Date: 02/10/2017 10:25
Workgroup #: WG627108	Analyst: EPT	Run Date: 08/24/2017 16:48
Collect Date: 08/22/2017 12:35	Dilution: 100	File ID: TC08242017.010
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	653		100	50.0

Sample #: L17081212-09	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/25/2017 08:15
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627342	Analyst: KKB	Run Date: 08/25/2017 18:33
Collect Date: 08/22/2017 12:35	Dilution: 1	File ID: T4.082517.183320
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	1.20		0.400	0.200
Iron, Dissolved	7439-89-6	0.332		0.200	0.100
Manganese, Dissolved	7439-96-5		U	0.0200	0.0100
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-09	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/28/2017 07:51
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/29/2017 14:30
Workgroup #: WG627433	Analyst: JYH	Run Date: 08/29/2017 17:48
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: NI.082917.174820
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	3.56		0.0200	0.0100

Sample #: L17081212-10	PrePrep Method: N/A	Instrument: HPMS9
Client ID: FB-082217	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260C	Cal Date: 08/14/2017 14:15
Workgroup #: WG627475	Analyst: JDS	Run Date: 08/28/2017 17:15
Collect Date: 08/22/2017 12:40	Dilution: 1	File ID: 9M982220
Sample Tag: 01	Units: ug/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	2.00
1,1,2-Trichloroethane	79-00-5		U	1.00	0.500
1,1-Dichloroethane	75-34-3		U	1.00	0.500
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,3-Trichlorobenzene	87-61-6		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.500
1,2-Dichlorobenzene	95-50-1		U	1.00	0.500
1,2-Dichloroethane	107-06-2		U	1.00	0.500
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.500
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.500
1,2-Dichloropropane	78-87-5		U	1.00	0.500
1,3-Dichlorobenzene	541-73-1		U	1.00	0.500
1,4-Dichlorobenzene	106-46-7		U	1.00	0.500
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.500
Bromochloromethane	74-97-5		U	1.00	0.500
Bromodichloromethane	75-27-4		U	1.00	0.500
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.500
Chlorobenzene	108-90-7		U	1.00	0.500
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3	4.82		1.00	0.500
Chloromethane	74-87-3		U	1.00	0.500
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.500
Cyclohexane	110-82-7		U	5.00	1.00
Dibromochloromethane	124-48-1		U	1.00	0.500
Dichlorodifluoromethane	75-71-8		U	2.00	0.500
Ethyl benzene	100-41-4		U	1.00	0.500
Isopropylbenzene	98-82-8		U	1.00	0.500
Methyl acetate	79-20-9		U	5.00	1.00

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Methyl tert-butyl ether	1634-04-4		U	1.00	0.500
Methylcyclohexane	108-87-2		U	5.00	1.00
Methylene chloride	75-09-2		U	5.00	0.500
m,p-Xylene	179601-23-1		U	1.00	0.500
o-Xylene	95-47-6		U	1.00	0.500
Styrene	100-42-5		U	1.00	0.500
Tetrachloroethene	127-18-4		U	1.00	0.500
Toluene	108-88-3		U	1.00	0.500
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6		U	1.00	0.500
Trichlorofluoromethane	75-69-4		U	1.00	0.500
Vinyl chloride	75-01-4		U	1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	101	80	120		
Dibromofluoromethane	101	86	118		
p-Bromofluorobenzene	112	86	115		
Toluene-d8	104	88	110		
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:20
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.202042
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	0.118	J	0.200	0.100
Calcium, Total	7440-70-2	165		0.500	0.250
Iron, Total	7439-89-6	1.44		0.100	0.0500
Magnesium, Total	7439-95-4	83.3		0.500	0.250
Manganese, Total	7439-96-5	0.178		0.0100	0.00500
Potassium, Total	7440-09-7	4.84		1.00	0.500
Silica, Calculated as SiO2		18.7		2.14	1.07
Silicon, Total	7440-21-3	8.75		1.00	0.500
Sodium, Total	7440-23-5	163		0.500	0.250
J	The analyte was positively identified, but the quantitation was below the RL.				

Certificate of Analysis

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:42
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.154256
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.00842		0.00100	0.000500

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: IC3
Client ID: MW35-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 06:02
Collect Date: 08/22/2017 15:28	Dilution: 5	File ID: I3_082517-39
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	386	E	1.00	0.500
Sulfate	14808-79-8	168		5.00	2.50
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: IC3
Client ID: MW35-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 06:23
Collect Date: 08/22/2017 15:28	Dilution: 50	File ID: I3_082517-40
Sample Tag: DL02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	452		10.0	5.00
Sulfate	14808-79-8	168		50.0	25.0

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW35-082217	Prep Method: 310.2	Prep Date: N/A
Matrix: Water	Analytical Method: 310.2	Cal Date: 08/28/2017 12:24
Workgroup #: WG627619	Analyst: TB	Run Date: 08/28/2017 12:29
Collect Date: 08/22/2017 15:28	Dilution: 2	File ID: S2170828002.016
Sample Tag: DL01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Alkalinity, Total (as CaCO3)	11-43-8	343		40.0	20.0

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW35-082217	Prep Method: 350.1	Prep Date: N/A
Matrix: Water	Analytical Method: 350.1	Cal Date: 08/24/2017 17:42
Workgroup #: WG627134	Analyst: TB	Run Date: 08/24/2017 17:50
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: S2170824003.016
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.308		0.100	0.0500

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW35-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 15:28	Dilution: 4	File ID: S217082916550401
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate-Nitrite (as N)		0.260		0.200	0.100

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW35-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 15:28	Dilution: 4	File ID: S217082916545801
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate (as N)	14797-55-8	0.260		0.200	0.100

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW35-082217	Prep Method: 365.4	Prep Date: N/A
Matrix: Water	Analytical Method: 365.4	Cal Date: 08/25/2017 12:10
Workgroup #: WG627266	Analyst: TB	Run Date: 08/25/2017 12:15
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: SC170825002.015
Sample Tag: 01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Phosphorus, Total	7723-14-0		U	0.200	0.100
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-11 **PrePrep Method:** N/A **Instrument:** V-1200
Client ID: MW35-082217 **Prep Method:** SM4500-P-E-1999 **Prep Date:** N/A
Matrix: Water **Analytical Method:** SM4500-P-E-1999 **Cal Date:** 06/07/2017 15:45
Workgroup #: WG626980 **Analyst:** DLP **Run Date:** 08/23/2017 14:15
Collect Date: 08/22/2017 15:28 **Dilution:** 1 **File ID:** 00.1708231415-08
Sample Tag: **Units:** mg/L

Analyte	CAS #	Result	Qual	RL	MDL
Orthophosphate	14265-44-2		U	0.0500	0.0250
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-11 **PrePrep Method:** N/A **Instrument:** BURET
Client ID: MW35-082217 **Prep Method:** SM4500-S-(-2)-F-2000 **Prep Date:** N/A
Matrix: Water **Analytical Method:** SM4500-S-(-2)-F-2000 **Cal Date:**
Workgroup #: WG626985 **Analyst:** EPT **Run Date:** 08/23/2017 15:10
Collect Date: 08/22/2017 15:28 **Dilution:** 1 **File ID:** ET.1708231510-07
Sample Tag: **Units:** mg/L

Analyte	CAS #	Result	Qual	RL	MDL
Sulfide	18496-25-8		U	1.00	0.500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-11 **PrePrep Method:** N/A **Instrument:** OVEN
Client ID: MW35-082217 **Prep Method:** 160.1/SM2540C **Prep Date:** N/A
Matrix: Water **Analytical Method:** SM2540-C-1997 **Cal Date:**
Workgroup #: WG626984 **Analyst:** ADG **Run Date:** 08/23/2017 15:48
Collect Date: 08/22/2017 15:28 **Dilution:** 1 **File ID:** EN.1708231548-13
Sample Tag: **Units:** mg/L

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		1280		20.0	10.0

Certificate of Analysis

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW35-082217	Prep Method: 351.2	Prep Date: N/A
Matrix: Water	Analytical Method: 351.2	Cal Date: 08/25/2017 10:53
Workgroup #: WG627196	Analyst: TB	Run Date: 08/25/2017 11:02
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: SC170825001.017
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Total Kjeldahl	7727-37-9	0.198	J	0.200	0.100
J	The analyte was positively identified, but the quantitation was below the RL.				

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: TOC-VWP
Client ID: MW35-082217	Prep Method: SM5310-C-2011	Prep Date: N/A
Matrix: Water	Analytical Method: SM5310-C-2011	Cal Date: 02/10/2017 10:25
Workgroup #: WG627108	Analyst: EPT	Run Date: 08/24/2017 17:12
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: TC08242017.011
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	4.03		1.00	0.500

Sample #: L17081212-12	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:24
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.202425
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Iron, Dissolved	7439-89-6	0.946		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.174		0.0100	0.00500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-12	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:46
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.154601
Sample Tag: 01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.00674		0.00100	0.000500

Sample #: L17081212-13	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:28
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.202808
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	6.40		0.200	0.100
Calcium, Total	7440-70-2	175		0.500	0.250
Iron, Total	7439-89-6	3.86		0.100	0.0500
Magnesium, Total	7439-95-4	90.1		0.500	0.250
Manganese, Total	7439-96-5	0.486		0.0100	0.00500
Potassium, Total	7440-09-7	37.7		1.00	0.500
Sodium, Total	7440-23-5	203		0.500	0.250

Sample #: L17081212-13	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:49
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.154907
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.135		0.00100	0.000500

Sample #: L17081212-14	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:31
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.203140
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	6.11		0.200	0.100
Iron, Dissolved	7439-89-6	3.36		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.472		0.0100	0.00500

Certificate of Analysis

Sample #: L17081212-14	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:52
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.155212
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.133		0.00100	0.000500

Sample #: L17081212-15	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:35
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.203512
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	6.30		0.200	0.100
Calcium, Total	7440-70-2	170		0.500	0.250
Iron, Total	7439-89-6	3.82		0.100	0.0500
Magnesium, Total	7439-95-4	88.5		0.500	0.250
Manganese, Total	7439-96-5	0.478		0.0100	0.00500
Potassium, Total	7440-09-7	37.6		1.00	0.500
Sodium, Total	7440-23-5	201		0.500	0.250

Sample #: L17081212-15	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:55
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.155518
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.136		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-16	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:38
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.203843
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	6.13		0.200	0.100
Iron, Dissolved	7439-89-6	3.32		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.476		0.0100	0.00500

Sample #: L17081212-16	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:58
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.155823
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.134		0.00100	0.000500

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW36-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:42
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: T4.082517.204215
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2	111		0.500	0.250
Iron, Total	7439-89-6	4.71		0.100	0.0500
Magnesium, Total	7439-95-4	78.8		0.500	0.250
Manganese, Total	7439-96-5	0.0240		0.0100	0.00500
Potassium, Total	7440-09-7	4.88		1.00	0.500
Silica, Calculated as SiO2		23.8		2.14	1.07
Silicon, Total	7440-21-3	11.1		1.00	0.500
Sodium, Total	7440-23-5	118		0.500	0.250
U	Not detected at or above adjusted sample detection limit.				

Certificate of Analysis

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW36-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 16:07
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: NI.082417.160743
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.245		0.00100	0.000500

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: IC3
Client ID: MW36-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 06:43
Collect Date: 08/22/2017 15:50	Dilution: 5	File ID: I3_082517-41
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	230	E	1.00	0.500
Sulfate	14808-79-8	171		5.00	2.50
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: IC3
Client ID: MW36-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 07:03
Collect Date: 08/22/2017 15:50	Dilution: 50	File ID: I3_082517-42
Sample Tag: DL02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	249		10.0	5.00
Sulfate	14808-79-8	172		50.0	25.0

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW36-082217	Prep Method: 310.2	Prep Date: N/A
Matrix: Water	Analytical Method: 310.2	Cal Date: 08/28/2017 12:24
Workgroup #: WG627619	Analyst: TB	Run Date: 08/28/2017 12:29
Collect Date: 08/22/2017 15:50	Dilution: 2	File ID: S2170828002.017
Sample Tag: DL01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Alkalinity, Total (as CaCO3)	11-43-8	376		40.0	20.0

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW36-082217	Prep Method: 350.1	Prep Date: N/A
Matrix: Water	Analytical Method: 350.1	Cal Date: 08/24/2017 17:42
Workgroup #: WG627134	Analyst: TB	Run Date: 08/24/2017 17:51
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: S2170824003.017
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.369		0.100	0.0500

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW36-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 15:50	Dilution: 4	File ID: S217082916551001
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate (as N)	14797-55-8	0.164	J	0.200	0.100
J	The analyte was positively identified, but the quantitation was below the RL.				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW36-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 15:50	Dilution: 4	File ID: S217082916551601
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate-Nitrite (as N)		0.164	J	0.200	0.100
J	The analyte was positively identified, but the quantitation was below the RL.				

Certificate of Analysis

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW36-082217	Prep Method: 365.4	Prep Date: N/A
Matrix: Water	Analytical Method: 365.4	Cal Date: 08/25/2017 12:10
Workgroup #: WG627266	Analyst: TB	Run Date: 08/25/2017 12:16
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: SC170825002.016
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Phosphorus, Total	7723-14-0		U	0.200	0.100
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: V-1200
Client ID: MW36-082217	Prep Method: SM4500-P-E-1999	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-P-E-1999	Cal Date: 06/07/2017 15:45
Workgroup #: WG626980	Analyst: DLP	Run Date: 08/23/2017 14:15
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: 00.1708231415-09
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Orthophosphate	14265-44-2		U	0.0500	0.0250
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: BURET
Client ID: MW36-082217	Prep Method: SM4500-S-(-2)-F-2000	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-S-(-2)-F-2000	Cal Date:
Workgroup #: WG626985	Analyst: EPT	Run Date: 08/23/2017 15:10
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: ET.1708231510-08
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sulfide	18496-25-8		U	1.00	0.500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: OVEN
Client ID: MW36-082217	Prep Method: 160.1/SM2540C	Prep Date: N/A
Matrix: Water	Analytical Method: SM2540-C-1997	Cal Date:
Workgroup #: WG626984	Analyst: ADG	Run Date: 08/23/2017 15:48
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: EN.1708231548-14
Sample Tag:	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		1050		20.0	10.0

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW36-082217	Prep Method: 351.2	Prep Date: N/A
Matrix: Water	Analytical Method: 351.2	Cal Date: 08/25/2017 10:53
Workgroup #: WG627196	Analyst: TB	Run Date: 08/25/2017 11:04
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: SC170825001.018
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Total Kjeldahl	7727-37-9	0.434		0.200	0.100

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: TOC-VWP
Client ID: MW36-082217	Prep Method: SM5310-C-2011	Prep Date: N/A
Matrix: Water	Analytical Method: SM5310-C-2011	Cal Date: 02/10/2017 10:25
Workgroup #: WG627108	Analyst: EPT	Run Date: 08/24/2017 17:36
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: TC08242017.012
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	4.47		1.00	0.500

Sample #: L17081212-18	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW36-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:45
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: T4.082517.204557
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Iron, Dissolved	7439-89-6	4.34		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.0241		0.0100	0.00500
U	Not detected at or above adjusted sample detection limit.				

Certificate of Analysis

Sample #: L17081212-18	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW36-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 16:10
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: NI.082417.161049
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.234		0.00100	0.000500

Sample #: L17081212-19	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: DUP-GW-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:49
Collect Date: 08/22/2017 09:00	Dilution: 1	File ID: T4.082517.204940
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2	107		0.500	0.250
Iron, Total	7439-89-6	4.49		0.100	0.0500
Magnesium, Total	7439-95-4	75.7		0.500	0.250
Manganese, Total	7439-96-5	0.0220		0.0100	0.00500
Potassium, Total	7440-09-7	4.54		1.00	0.500
Sodium, Total	7440-23-5	114		0.500	0.250
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-19	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: DUP-GW-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 16:13
Collect Date: 08/22/2017 09:00	Dilution: 1	File ID: NI.082417.161355
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.244		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-20	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: DUP-GW-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:53
Collect Date: 08/22/2017 09:00	Dilution: 1	File ID: T4.082517.205322
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Iron, Dissolved	7439-89-6	4.53		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.0225		0.0100	0.00500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-20	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: DUP-GW-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 16:17
Collect Date: 08/22/2017 09:00	Dilution: 1	File ID: NI.082417.161700
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.226		0.00100	0.000500

Certificate of Analysis

2.1 Volatiles Data

2.1.1 Volatiles GCMS Data (8260)

2.1.1.1 Summary Data



Login Number: L17081212
Department: Volatiles
Analyst: Jared Smith

METHOD

Preparation SW-846 5030C/5035A

Analysis SW-846 8260C

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: For all compounds that yielded a %RSD greater than 15%, linear or higher order equations were applied. All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration and Tune: Recoveries marginally out of range were observed for the following analytes: 1,2-Dibromo-3-Chloropropane. Please see the applicable QC report for a detailed presentation of the failures.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: Recoveries out of range were observed for the following analytes: Carbon disulfide. Please see the applicable QC report for a detailed presentation of the failures.

SAMPLES

Internal Standards: All acceptance criteria were met.

Surrogates: All acceptance criteria were met.

Other: None.

Manual Integration Reason Codes

Reason #1: Data System Fails to Select Correct Peak. In some cases the chromatography system selects and integrates the 'wrong peak'. In this case the analyst must correct the selection and force the system to integrate the proper peak. Other times the system may miss the peak completely.

Reason #2: Data System Splits the Peak Incorrectly or Integrates a False Peak as a Rider Peak. This phenomena is common at low concentrations where the signal:noise ratio is low. A single compound (peak) is incorrectly split into multiple peaks or integrated as a main peak with one or more rider peaks resulting in low areacounts for the target compound.

Reason #3: Improperly Integrated Isomers and/or coeluting compounds. This system often fails to distinguish coeluting compounds and or isomers. The integration areas and concentrations are wrong, and they must be corrected by manual integration. Prime examples are benzo(k)fluoranthene and benzo(b)fluoranthene which are often unresolved and integrated improperly when both are present at low concentrations in standards or samples.

Reason #4: System Establishes Incorrect Baseline. There are numerous situations in chromatography where the system establishes the baseline incorrectly. Some baseline errors will be obvious to the analyst and should be corrected via manual procedures.

Reason #5: Miscellaneous. Other situations involving integration errors may require in-depth review and technical judgment. These cases should be brought to the attention of the laboratory management. If the form of manual integration is not clearly covered by these four cases, then review and approval by the Managing Director or the QAO will be required.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 129042

Approved By: Anthony Canter



Certificate of Analysis

Sample #: L17081212-01

PrePrep Method: N/A

Instrument: HPMS9

Client ID: TB-082217

Prep Method: 5030B/5030C/5035A

Prep Date: N/A

Matrix: Water

Analytical Method: 8260C

Cal Date: 08/14/2017 14:15

Workgroup #: WG627475

Analyst: JDS

Run Date: 08/28/2017 17:45

Collect Date: 08/22/2017 08:00

Dilution: 1

File ID: 9M982221

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	2.00
1,1,2-Trichloroethane	79-00-5		U	1.00	0.500
1,1-Dichloroethane	75-34-3		U	1.00	0.500
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,3-Trichlorobenzene	87-61-6		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.500
1,2-Dichlorobenzene	95-50-1		U	1.00	0.500
1,2-Dichloroethane	107-06-2		U	1.00	0.500
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.500
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.500
1,2-Dichloropropane	78-87-5		U	1.00	0.500
1,3-Dichlorobenzene	541-73-1		U	1.00	0.500
1,4-Dichlorobenzene	106-46-7		U	1.00	0.500
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1	4.91	J	10.0	2.50
Benzene	71-43-2		U	1.00	0.500
Bromochloromethane	74-97-5		U	1.00	0.500
Bromodichloromethane	75-27-4		U	1.00	0.500
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.500
Chlorobenzene	108-90-7		U	1.00	0.500
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.500
Chloromethane	74-87-3		U	1.00	0.500
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Cyclohexane	110-82-7		U	5.00	1.00
Dibromochloromethane	124-48-1		U	1.00	0.500
Dichlorodifluoromethane	75-71-8		U	2.00	0.500
Ethyl benzene	100-41-4		U	1.00	0.500
Isopropylbenzene	98-82-8		U	1.00	0.500
Methyl acetate	79-20-9		U	5.00	1.00
Methyl tert-butyl ether	1634-04-4		U	1.00	0.500
Methylcyclohexane	108-87-2		U	5.00	1.00
Methylene chloride	75-09-2		U	5.00	0.500
m,p-Xylene	179601-23-1		U	1.00	0.500
o-Xylene	95-47-6		U	1.00	0.500
Styrene	100-42-5		U	1.00	0.500
Tetrachloroethene	127-18-4		U	1.00	0.500
Toluene	108-88-3		U	1.00	0.500
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6		U	1.00	0.500
Trichlorofluoromethane	75-69-4		U	1.00	0.500
Vinyl chloride	75-01-4		U	1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	103	80	120	
Dibromofluoromethane	101	86	118	
p-Bromofluorobenzene	112	86	115	
Toluene-d8	105	88	110	

J	The analyte was positively identified, but the quantitation was below the RL.
U	Not detected at or above adjusted sample detection limit.

Sample #: L17081212-02

PrePrep Method: N/A

Instrument: HPMS9

Client ID: MW02-082217

Prep Method: 5030B/5030C/5035A

Prep Date: N/A

Matrix: Water

Analytical Method: 8260C

Cal Date: 08/14/2017 14:15

Workgroup #: WG627475

Analyst: JDS

Run Date: 08/28/2017 20:15

Collect Date: 08/22/2017 12:23

Dilution: 1

File ID: 9M982226

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	2.00
1,1,2-Trichloroethane	79-00-5		U	1.00	0.500
1,1-Dichloroethane	75-34-3		U	1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,3-Trichlorobenzene	87-61-6		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.500
1,2-Dichlorobenzene	95-50-1		U	1.00	0.500
1,2-Dichloroethane	107-06-2		U	1.00	0.500
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.500
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.500
1,2-Dichloropropane	78-87-5		U	1.00	0.500
1,3-Dichlorobenzene	541-73-1		U	1.00	0.500
1,4-Dichlorobenzene	106-46-7		U	1.00	0.500
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1	3.23	J	10.0	2.50
Benzene	71-43-2		U	1.00	0.500
Bromochloromethane	74-97-5		U	1.00	0.500
Bromodichloromethane	75-27-4		U	1.00	0.500
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0	18.9		1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.500
Chlorobenzene	108-90-7		U	1.00	0.500
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3	1.07		1.00	0.500
Chloromethane	74-87-3		U	1.00	0.500
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.500
Cyclohexane	110-82-7		U	5.00	1.00
Dibromochloromethane	124-48-1		U	1.00	0.500
Dichlorodifluoromethane	75-71-8		U	2.00	0.500
Ethyl benzene	100-41-4		U	1.00	0.500
Isopropylbenzene	98-82-8		U	1.00	0.500
Methyl acetate	79-20-9		U	5.00	1.00
Methyl tert-butyl ether	1634-04-4		U	1.00	0.500
Methylcyclohexane	108-87-2		U	5.00	1.00
Methylene chloride	75-09-2	0.896	J	5.00	0.500
m,p-Xylene	179601-23-1		U	1.00	0.500
o-Xylene	95-47-6		U	1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Styrene	100-42-5		U	1.00	0.500
Tetrachloroethene	127-18-4		U	1.00	0.500
Toluene	108-88-3		U	1.00	0.500
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6		U	1.00	0.500
Trichlorofluoromethane	75-69-4		U	1.00	0.500
Vinyl chloride	75-01-4		U	1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	104	80	120		
Dibromofluoromethane	102	86	118		
p-Bromofluorobenzene	108	86	115		
Toluene-d8	102	88	110		
J	The analyte was positively identified, but the quantitation was below the RL.				
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-04

PrePrep Method: N/A

Instrument: HPMS9

Client ID: MW02-082217-MS

Prep Method: 5030B/5030C/5035A

Prep Date: N/A

Matrix: Water

Analytical Method: 8260C

Cal Date: 08/14/2017 14:15

Workgroup #: WG627475

Analyst: JDS

Run Date: 08/28/2017 16:14

Collect Date: 08/22/2017 12:23

Dilution: 1

File ID: 9M982218

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6	19.0		1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5	22.0		1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	22.2		5.00	2.00
1,1,2-Trichloroethane	79-00-5	20.9		1.00	0.500
1,1-Dichloroethane	75-34-3	18.7		1.00	0.500
1,1-Dichloroethene	75-35-4	17.6		1.00	0.500
1,2,3-Trichlorobenzene	87-61-6	24.6		1.00	0.500
1,2,4-Trichlorobenzene	120-82-1	21.7		1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8	20.3		5.00	1.00
1,2-Dibromoethane	106-93-4	20.8		1.00	0.500
1,2-Dichlorobenzene	95-50-1	22.4		1.00	0.500
1,2-Dichloroethane	107-06-2	19.1		1.00	0.500
cis-1,2-Dichloroethene	156-59-2	19.6		1.00	0.500
trans-1,2-Dichloroethene	156-60-5	18.3		1.00	0.500
1,2-Dichloropropane	78-87-5	20.0		1.00	0.500
1,3-Dichlorobenzene	541-73-1	22.5		1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
1,4-Dichlorobenzene	106-46-7	22.6		1.00	0.500
2-Butanone	78-93-3	18.5		10.0	2.50
2-Hexanone	591-78-6	19.0		10.0	2.50
4-Methyl-2-pentanone	108-10-1	18.5		10.0	2.50
Acetone	67-64-1	20.6		10.0	2.50
Benzene	71-43-2	18.6		1.00	0.500
Bromochloromethane	74-97-5	19.4		1.00	0.500
Bromodichloromethane	75-27-4	19.3		1.00	0.500
Bromoform	75-25-2	16.3		1.00	0.500
Bromomethane	74-83-9	15.7		1.00	0.500
Carbon disulfide	75-15-0	50.8		1.00	0.500
Carbon tetrachloride	56-23-5	18.8		1.00	0.500
Chlorobenzene	108-90-7	21.3		1.00	0.500
Chloroethane	75-00-3	20.7		1.00	0.500
Chloroform	67-66-3	21.2		1.00	0.500
Chloromethane	74-87-3	18.8		1.00	0.500
cis-1,3-Dichloropropene	10061-01-5	21.3		1.00	0.500
Cyclohexane	110-82-7	18.9		5.00	1.00
Dibromochloromethane	124-48-1	20.1		1.00	0.500
Dichlorodifluoromethane	75-71-8	21.7		2.00	0.500
Ethyl benzene	100-41-4	21.4		1.00	0.500
Isopropylbenzene	98-82-8	21.5		1.00	0.500
Methyl acetate	79-20-9	17.6		5.00	1.00
Methyl tert-butyl ether	1634-04-4	19.3		1.00	0.500
Methylcyclohexane	108-87-2	20.4		5.00	1.00
Methylene chloride	75-09-2	19.5		5.00	0.500
m,p-Xylene	179601-23-1	45.0		1.00	0.500
o-Xylene	95-47-6	22.0		1.00	0.500
Styrene	100-42-5	19.1		1.00	0.500
Tetrachloroethene	127-18-4	20.5		1.00	0.500
Toluene	108-88-3	20.5		1.00	0.500
trans-1,3-Dichloropropene	10061-02-6	20.1		1.00	0.500
Trichloroethene	79-01-6	19.1		1.00	0.500
Trichlorofluoromethane	75-69-4	19.3		1.00	0.500
Vinyl chloride	75-01-4	16.5		1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	102	80	120		
Dibromofluoromethane	103	86	118		

Certificate of Analysis

p-Bromofluorobenzene	104	86	115	
Toluene-d8	104	88	110	

Sample #: L17081212-06

PrePrep Method: N/A

Instrument: HPMS9

Client ID: MW02-082217-MSD

Prep Method: 5030B/5030C/5035A

Prep Date: N/A

Matrix: Water

Analytical Method: 8260C

Cal Date: 08/14/2017 14:15

Workgroup #: WG627475

Analyst: JDS

Run Date: 08/28/2017 16:44

Collect Date: 08/22/2017 12:23

Dilution: 1

File ID: 9M982219

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6	18.4		1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5	21.8		1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	20.4		5.00	2.00
1,1,2-Trichloroethane	79-00-5	20.6		1.00	0.500
1,1-Dichloroethane	75-34-3	17.9		1.00	0.500
1,1-Dichloroethene	75-35-4	17.1		1.00	0.500
1,2,3-Trichlorobenzene	87-61-6	23.3		1.00	0.500
1,2,4-Trichlorobenzene	120-82-1	20.0		1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8	20.0		5.00	1.00
1,2-Dibromoethane	106-93-4	20.2		1.00	0.500
1,2-Dichlorobenzene	95-50-1	21.6		1.00	0.500
1,2-Dichloroethane	107-06-2	18.7		1.00	0.500
cis-1,2-Dichloroethene	156-59-2	19.0		1.00	0.500
trans-1,2-Dichloroethene	156-60-5	17.5		1.00	0.500
1,2-Dichloropropane	78-87-5	19.1		1.00	0.500
1,3-Dichlorobenzene	541-73-1	21.3		1.00	0.500
1,4-Dichlorobenzene	106-46-7	21.1		1.00	0.500
2-Butanone	78-93-3	19.3		10.0	2.50
2-Hexanone	591-78-6	19.3		10.0	2.50
4-Methyl-2-pentanone	108-10-1	18.9		10.0	2.50
Acetone	67-64-1	21.1		10.0	2.50
Benzene	71-43-2	18.2		1.00	0.500
Bromochloromethane	74-97-5	18.6		1.00	0.500
Bromodichloromethane	75-27-4	18.7		1.00	0.500
Bromoform	75-25-2	15.8		1.00	0.500
Bromomethane	74-83-9	9.52		1.00	0.500
Carbon disulfide	75-15-0	41.1		1.00	0.500
Carbon tetrachloride	56-23-5	18.0		1.00	0.500
Chlorobenzene	108-90-7	20.4		1.00	0.500
Chloroethane	75-00-3	19.9		1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Chloroform	67-66-3	20.7		1.00	0.500
Chloromethane	74-87-3	17.9		1.00	0.500
cis-1,3-Dichloropropene	10061-01-5	20.1		1.00	0.500
Cyclohexane	110-82-7	17.7		5.00	1.00
Dibromochloromethane	124-48-1	19.6		1.00	0.500
Dichlorodifluoromethane	75-71-8	19.9		2.00	0.500
Ethyl benzene	100-41-4	20.7		1.00	0.500
Isopropylbenzene	98-82-8	20.3		1.00	0.500
Methyl acetate	79-20-9	17.7		5.00	1.00
Methyl tert-butyl ether	1634-04-4	18.8		1.00	0.500
Methylcyclohexane	108-87-2	18.4		5.00	1.00
Methylene chloride	75-09-2	19.5		5.00	0.500
m,p-Xylene	179601-23-1	43.0		1.00	0.500
o-Xylene	95-47-6	21.0		1.00	0.500
Styrene	100-42-5	18.4		1.00	0.500
Tetrachloroethene	127-18-4	19.0		1.00	0.500
Toluene	108-88-3	19.8		1.00	0.500
trans-1,3-Dichloropropene	10061-02-6	19.8		1.00	0.500
Trichloroethene	79-01-6	18.2		1.00	0.500
Trichlorofluoromethane	75-69-4	18.6		1.00	0.500
Vinyl chloride	75-01-4	15.6		1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	101	80	120	
Dibromofluoromethane	101	86	118	
p-Bromofluorobenzene	103	86	115	
Toluene-d8	101	88	110	

Sample #: L17081212-10

PrePrep Method: N/A

Instrument: HPMS9

Client ID: FB-082217

Prep Method: 5030B/5030C/5035A

Prep Date: N/A

Matrix: Water

Analytical Method: 8260C

Cal Date: 08/14/2017 14:15

Workgroup #: WG627475

Analyst: JDS

Run Date: 08/28/2017 17:15

Collect Date: 08/22/2017 12:40

Dilution: 1

File ID: 9M982220

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	RL	MDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.500
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	2.00
1,1,2-Trichloroethane	79-00-5		U	1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
1,1-Dichloroethane	75-34-3		U	1.00	0.500
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,3-Trichlorobenzene	87-61-6		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.500
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.500
1,2-Dichlorobenzene	95-50-1		U	1.00	0.500
1,2-Dichloroethane	107-06-2		U	1.00	0.500
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.500
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.500
1,2-Dichloropropane	78-87-5		U	1.00	0.500
1,3-Dichlorobenzene	541-73-1		U	1.00	0.500
1,4-Dichlorobenzene	106-46-7		U	1.00	0.500
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.500
Bromochloromethane	74-97-5		U	1.00	0.500
Bromodichloromethane	75-27-4		U	1.00	0.500
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.500
Chlorobenzene	108-90-7		U	1.00	0.500
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3	4.82		1.00	0.500
Chloromethane	74-87-3		U	1.00	0.500
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.500
Cyclohexane	110-82-7		U	5.00	1.00
Dibromochloromethane	124-48-1		U	1.00	0.500
Dichlorodifluoromethane	75-71-8		U	2.00	0.500
Ethyl benzene	100-41-4		U	1.00	0.500
Isopropylbenzene	98-82-8		U	1.00	0.500
Methyl acetate	79-20-9		U	5.00	1.00
Methyl tert-butyl ether	1634-04-4		U	1.00	0.500
Methylcyclohexane	108-87-2		U	5.00	1.00
Methylene chloride	75-09-2		U	5.00	0.500
m,p-Xylene	179601-23-1		U	1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
o-Xylene	95-47-6		U	1.00	0.500
Styrene	100-42-5		U	1.00	0.500
Tetrachloroethene	127-18-4		U	1.00	0.500
Toluene	108-88-3		U	1.00	0.500
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6		U	1.00	0.500
Trichlorofluoromethane	75-69-4		U	1.00	0.500
Vinyl chloride	75-01-4		U	1.00	0.500
Epichlorohydrin	106-89-8			0.000	0.000
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	101	80	120		
Dibromofluoromethane	101	86	118		
p-Bromofluorobenzene	112	86	115		
Toluene-d8	104	88	110		
U	Not detected at or above adjusted sample detection limit.				

2.1.1.2 QC Summary Data

Example 8260 Calculations

1.0 Calculating the Response Factor (RF) from the initial calibration (ICAL) data:

$$RF = [(Ax) (Cis)] / [(Ais) (Cx)]$$

Example

where:

Ax = Area of the characteristic ion for the compound being measured:	3399156
Cis = Concentration of the specific internal standard (ug/mL)	25
Ais = Area of the characteristic ion of the specific internal standard	846471
Cx = Concentration of the compound in the standard being measured (ug/mL)	100

RF = Calculated Response Factor **1.0039**

2.0 Calculating the concentration (C) of a compound in water using the average RF: *

$$Cx = [(Ax) (Cis) (Vn)(D)] / [(Ais) (RF) (Vs)]$$

Example

where:

Ax = Area of the characteristic ion for the compound being measured	3122498
Cis = Concentration of the specific internal standard (ug/L)	25
D = Dilution factor for sample as a multiplier (10x = 10)	1
Ais = Area of the characteristic ion of the specific internal standard	611048
RF = Average RF from the ICAL	1.004
Vs = Purge volume of sample (mL)	10
Vn = Nominal purge volume of sample (mL) (10.0 mL)	10
Cx = Concentration of the compound in the sample being measured (ug/L)	127.2428

3.0 Calculating the concentration (C) of a compound in soil using the average RF: *

$$Cx = [(Ax) (Cis) (Wn)(D)] / [(Ais) (RF) (Ws)]$$

Example

where:

Ax = Area of the characteristic ion for the compound being measured	3122498
Cis = Concentration of the specific internal standard (ug/L)	25
D = Dilution factor for sample as a multiplier (10x = 10)	1
Ais = Area of the characteristic ion of the specific internal standard	611048
RF = Average RF from the ICAL	1.004
Ws = Weight of sample purged (g)	5
Wn = Nominal purge weight (g) (5.0 g)	5
Cx = Concentration of the compound in the sample being measured (ug/L)	127.2428

Dry weight correction:

Percent solids (PCT_S)	50
Cd = (Cx) (100)/PCT_S	254.4856

* Concentrations appearing on the instrument quantitation reports are on-column results and do not take into account initial volume, final volume, and the dilution factor.

4.0 Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, $y = mx + b$

y = response ratio = response of analyte / response of IS = Ax/Ais

x = amount ratio = concentration analyte/concentration internal standard = Cx / Cis

m = slope from curve = 0.213

b = intercept from curve = - 0.00642

Step 2: Calculate y from Quantitation Report

$$y = 86550/593147 = 0.1459$$

Step 3: Solve for x

$$x = (y - b)/m = [(0.1459 - (-0.00642))/0.213] = 0.7152$$

Step 4: Solve for analyte concentration Cx

$$Cx = Cis (x) = (25.0)(0.7152) = 17.88$$

Example Spreadsheet Calculation:

Slope from curve, m:	0.213
Intercept from curve, b:	-0.00642
Area of analyte, Ax:	86550
Area of Internal Standard, Ais:	593147
Concentration of IS, Cis	25.00
Response Ratio:	0.145917
Amount Ratio:	0.715195
Concentration:	17.87988
Units of Internal Standard:	ug/L

5.0 Concentration from Quadratic Regression**Step 1 - Retrieve Curve Data from Plot, $y = Ax^2 + Bx + C$**

Where:

$$Ax^2 + Bx + (C - y) = 0$$

A, B, C = constants from the ICAL quadratic regression

y = Response ratio = Area of analyte/Area of internal standard (IS)

x = Amount ratio = Concentration of analyte/concentration of IS

Step 2: Calculate y from Quantitation Report

$$y = Ax/Ais$$

Step 3: Solve for x using the quadratic formula

$$Ax^2 + Bx + C - y = 0$$

$$x = \frac{b \pm \sqrt{(b^2 - 4a(c - y))}}{2a} \quad \text{(Two possible solutions)}$$

Step 4: Solve for analyte concentration Cx

$$Cx = (Cis)(\text{Amount ratio})$$

Example Spreadsheet Calculation:

Value of A from plot:	-0.00629
Value of B from plot:	0.511
Value of C from plot:	-0.0276
Area of unknown from quantitation report:	293821
Area of IS from quantitation report:	784848
Response ratio, y:	0.374367
C - y:	-0.40197
Root 1 - Computed amount ratio, X1:	80.44567
Root 2 - Computed amount ratio, X2:	0.794396 use this solution
Concentration of IS, Cis:	25.00
Concentration of analyte, Cx:	19.86 ug/L

Microbac Laboratories Inc.
Instrument Run Log

Instrument: HPMS9 Dataset: 081417
Analyst1: ADC Analyst2: NA
Method: 8260B/C SOP: MSV01(C), OVAP MSV01 Rev: 25.0
Method: 5035, 5030B/ 5030C SOP: PAT01, OVAP PAT01 Rev: 19.1

Maintenance Log ID: _____

Internal Standard: STD82922 Surrogate Standard: STD82921
CCV: STD83326 LCS: STD83237 MS/MSD: NA
Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG625140 (ICAL), WG625726

Comments: Low first surrogates after L17080372.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
9M981988	WG625140-01 50ng BFB 8260	NA	1	1	STD83010	08/14/17 08:49
9M981989	RINSE	NA	1	1		08/14/17 09:13
9M981990	WG625140-02 0.5ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 09:43
9M981991	WG625140-03 1ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 10:13
9M981992	WG625140-04 2ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 10:43
9M981993	WG625140-05 5ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 11:14
9M981994	WG625140-03 1ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 11:44
9M981995	WG625140-06 20ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 12:14
9M981996	WG625140-07 50ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 12:44
9M981997	WG625140-08 100ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 13:14
9M981998	WG625140-09 200ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 13:45
9M981999	WG625140-10 300ug/L ICAL 8260C	NA	1	1	STD83326	08/14/17 14:15
9M982000	RINSE	NA	1	1		08/14/17 14:46
9M982001	WG625140-11 50ug/L ICV 8260C	NA	1	1	STD83237	08/14/17 15:16
9M982002	RINSE	NA	1	1		08/14/17 15:46
9M982003	WG625726-01 BLANK 8260C	NA	1	1		08/14/17 16:16
9M982004	L17080372-01 B 10X 8260C	<2	1	10		08/14/17 16:47
9M982005	WG625726-02 20ug/L LCS	NA	1	1	STD83233	08/14/17 17:17
9M982006	WG625726-03 20ug/L LCSDUP	NA	1	1	STD83233	08/14/17 17:47
9M982007	RINSE	NA	1	1		08/14/17 18:18
9M982008	L17080491-01 B 8260C	<2	1	1		08/14/17 18:48
9M982009	L17080541-01 A 8260C	<2	1	1		08/14/17 19:18
9M982010	RINSE	NA	1	1		08/14/17 19:48
9M982011	RINSE	NA	1	1		08/14/17 20:18

Comments

Seq.	Rerun	Dil.	Reason	Analytes
3				
File ID: 9M981991				
WG625140-03 RR. No secondary in DCDF				
6				
File ID: 9M981994				
WG625140-03 No secondary in DCDF. RL changed to 2.				

Approved: August 15, 2017

Page: 1

Tiffany Bailey



Microbac Laboratories Inc.
Instrument Run Log

Instrument: HPMS9 Dataset: 082817
 Analyst1: JDS Analyst2: NA
 Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25.0
 Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19.1

Maintenance Log ID: _____

Internal Standard: STD83990 Surrogate Standard: STD83991
 CCV: STD83378 LCS: STD83584 MS/MSD: STD83584
 Column 1 ID: RTX502.2 Column 2 ID: NA
 Workgroups: WG627475

Comments: %RPT limit failed in MS/MSD for bromomethane

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
9M982213	WG627474-01 50ng BFB 8260	NA	1	1	STD83478	08/28/17 13:44
9M982214	WG627474-02 50ug/L CCV	NA	1	1	STD83378	08/28/17 14:08
9M982215	WGXXXXXX-01 100ug/L A9FOO	NA	1	1	STDXXXXXX	08/28/17 14:38
9M982216	WG627475-01 BLANK	NA	1	1		08/28/17 15:08
9M982217	WG627475-02 20ug/L LCS 8260	NA	1	1	STD83584	08/28/17 15:39
9M982218	L17081212-04 A MS 8260C	<2	1	1	STD83584	08/28/17 16:14
9M982219	L17081212-06 A MSD 8260C	<2	1	1	STD83584	08/28/17 16:44
9M982220	L17081212-10 A FB 8260C	<2	1	1		08/28/17 17:15
9M982221	L17081212-01 A TB 8260C	<2	1	1		08/28/17 17:45
9M982222	L17081305-07 A TB 8260C	<2	1	1		08/28/17 18:15
9M982223	L17081305-18 A FB 8260C	<2	1	1		08/28/17 18:45
9M982224	L17081366-16 A FB 8260C	<2	1	1		08/28/17 19:15
9M982225	L17081366-09 A TB 8260C	<2	1	1		08/28/17 19:45
9M982226	L17081212-02 A REF 8260C	<2	1	1		08/28/17 20:15
9M982227	L17081305-01 A 8260C	<2	1	1		08/28/17 20:45
9M982228	L17081305-03 A 8260C	<2	1	1		08/28/17 21:16
9M982229	L17081305-14 A 8260C	<2	1	1		08/28/17 21:46
9M982230	L17081305-16 A 8260C	<2	1	1		08/28/17 22:16
9M982231	L17081366-01 A 8260C	<2	1	1		08/28/17 22:46
9M982232	L17081366-03 A 8260C	<2	1	1		08/28/17 23:16
9M982233	L17081366-05 A 8260C	<2	1	1		08/28/17 23:46
9M982234	L17081366-07 A 8260C	<2	1	1		08/29/17 00:16
9M982235	L17081366-14 A 8260C	<2	1	1		08/29/17 00:47
9M982236	L17081305-19 A 8260C	<2	1	1		08/29/17 01:16
9M982237	L17081305-05 A 8260C	4	1	1		08/29/17 01:46
9M982238	CCV	NA	1	1		08/29/17 02:16
9M982239	RINSE	NA	1	1		08/29/17 02:46
9M982240	RINSE	NA	1	1		08/29/17 03:16
9M982241	SCREEN 100X 1367-01	NA	1	1		08/29/17 03:46
9M982242	SCREEN 100X 1367-02	NA	1	1		08/29/17 04:16
9M982243	SCREEN 100X 1367-03	NA	1	1		08/29/17 04:46
9M982244	SCREEN 100X 1367-04	NA	1	1		08/29/17 05:16
9M982245	SCREEN 100X 1367-05	NA	1	1		08/29/17 05:46
9M982246	SCREEN 100X 1367-06	NA	1	1		08/29/17 06:17

Approved: September 05, 2017

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Cathy Carter



Microbac Laboratories Inc.
Instrument Run Log

Instrument: HPMS9 Dataset: 082817
 Analyst1: JDS Analyst2: NA
 Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25.0
 Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19.1

Maintenance Log ID: _____

Internal Standard: STD83990 Surrogate Standard: STD83991
 CCV: STD83378 LCS: STD83584 MS/MSD: STD83584
 Column 1 ID: RTX502.2 Column 2 ID: NA
 Workgroups: WG627475

Comments: %RPT limit failed in MS/MSD for bromomethane

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
9M982247	SCREEN 100X 1367-07	NA	1	1		08/29/17 06:47
9M982248	SCREEN 100X 1428-01	NA	1	1		08/29/17 07:17

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2			Check Standard Failure	
File ID: 9M982214				
WG627474-02 CCv failed low for 12D3CP				
25				
File ID: 9M982237				
L17081305-05 MT DNR.				

Approved: September 05, 2017

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Cathy Carter



Microbac Laboratories Inc.

Data Checklist

Date: 14-AUG-2017

Analyst: ADC

Analyst: NA

Method: 8260C

Instrument: HPMS9

Curve Workgroup: WG625140

Runlog ID: 83962

Analytical Workgroups: WG625726

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	ADC
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	ADC
Secondary Reviewer	TMB
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
15-AUG-2017



Secondary Reviewer:
15-AUG-2017



CHECKLIST1 - Modified 03/05/2008

Generated: AUG-15-2017 11:54:53



Microbac Laboratories Inc.

Data Checklist

Date: 28-AUG-2017

Analyst: JDS

Analyst: NA

Method: 8260

Instrument: HPMS9

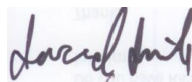
Curve Workgroup: NA

Runlog ID: 84298

Analytical Workgroups: WG627475

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	JDS
Surrogates	X
Internal Standards Criteria	X
Library Searches	X
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	NA
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	JDS
Secondary Reviewer	ADC
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
30-AUG-2017



Secondary Reviewer:
05-SEP-2017




Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260C
Login Number: L17081212

AAB#: WG627475

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
TB-082217	01	08/22/17					08/28/2017	6.4	14		08/28/17	6.4	14	
MW02-082217	02	08/22/17					08/28/2017	6.3	14		08/28/17	6.3	14	
MW02-082217-MS	04	08/22/17					08/28/2017	6.2	14		08/28/17	6.2	14	
MW02-082217-MSD	06	08/22/17					08/28/2017	6.2	14		08/28/17	6.2	14	
FB-082217	10	08/22/17					08/28/2017	6.2	14		08/28/17	6.2	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5455957
Report generated 09/07/2017 07:54



Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17081212
Instrument Id: HPMS9
Workgroup (AAB#): WG627475

Method: 8260C
CAL ID: HPMS9 - 14-AUG-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17081212-01	1.00	01	103	101	112	105
L17081212-02	1.00	01	104	102	108	102
L17081212-04	1.00	01	102	103	104	104
L17081212-06	1.00	01	101	101	103	101
L17081212-10	1.00	01	101	101	112	104
WG627475-01	1.00	01	104	101	113	106
WG627475-02	1.00	01	103	103	107	105

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	86	-	118
3 - p-Bromofluorobenzene	86	-	115
4 - Toluene-d8	88	-	110

Underline = Result out of surrogate limits

DL = surrogate diluted out

ND = surrogate not detected



METHOD BLANK SUMMARY

Login Number: <u>L17081212</u>	Work Group: <u>WG627475</u>
Blank File ID: <u>9M982216</u>	Blank Sample ID: <u>WG627475-01</u>
Prep Date: <u>08/28/17 15:08</u>	Instrument ID: <u>HPMS9</u>
Analyzed Date: <u>08/28/17 15:08</u>	Method: <u>8260C</u>
Analyst: <u>JDS</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627475-02	9M982217	08/28/17 15:39	01
MW02-082217-MS	L17081212-04	9M982218	08/28/17 16:14	01
MW02-082217-MSD	L17081212-06	9M982219	08/28/17 16:44	01
FB-082217	L17081212-10	9M982220	08/28/17 17:15	01
TB-082217	L17081212-01	9M982221	08/28/17 17:45	01
MW02-082217	L17081212-02	9M982226	08/28/17 20:15	01

Report Name: BLANK_SUMMARY
 PDF File ID: 5455958
 Report generated 09/07/2017 07:54



METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/28/17 15:08 Sample ID: WG627475-01
 Instrument ID: HPMS9 Run Date: 08/28/17 15:08 Prep Method: 5030B/5030C/503
 File ID: 9M982216 Analyst: JDS Method: 8260C
 Workgroup (AAB#): WG627475 Matrix: Water Units: ug/L
 Contract #: _____ Cal ID: HPMS9 - 14-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.500	1.00	0.500	1	U
1,1,2,2-Tetrachloroethane	0.500	1.00	0.500	1	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.00	5.00	2.00	1	U
1,1,2-Trichloroethane	0.500	1.00	0.500	1	U
1,1-Dichloroethane	0.500	1.00	0.500	1	U
1,1-Dichloroethene	0.500	1.00	0.500	1	U
1,2,3-Trichlorobenzene	0.500	1.00	0.500	1	U
1,2,4-Trichlorobenzene	0.500	1.00	0.500	1	U
1,2-Dibromo-3-chloropropane	1.00	5.00	1.00	1	U
1,2-Dibromoethane	0.500	1.00	0.500	1	U
1,2-Dichlorobenzene	0.500	1.00	0.500	1	U
1,2-Dichloroethane	0.500	1.00	0.500	1	U
cis-1,2-Dichloroethene	0.500	1.00	0.500	1	U
trans-1,2-Dichloroethene	0.500	1.00	0.500	1	U
1,2-Dichloropropane	0.500	1.00	0.500	1	U
1,3-Dichlorobenzene	0.500	1.00	0.500	1	U
1,4-Dichlorobenzene	0.500	1.00	0.500	1	U
2-Butanone	2.50	10.0	2.50	1	U
2-Hexanone	2.50	10.0	2.50	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.500	1.00	0.500	1	U
Bromochloromethane	0.500	1.00	0.500	1	U
Bromodichloromethane	0.500	1.00	0.500	1	U
Bromoform	0.500	1.00	0.500	1	U
Bromomethane	0.500	1.00	0.500	1	U
Carbon disulfide	0.500	1.00	0.500	1	U
Carbon tetrachloride	0.500	1.00	0.500	1	U
Chlorobenzene	0.500	1.00	0.500	1	U
Chloroethane	0.500	1.00	0.500	1	U
Chloroform	0.500	1.00	0.500	1	U
Chloromethane	0.500	1.00	0.500	1	U
cis-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Cyclohexane	1.00	5.00	1.00	1	U
Dibromochloromethane	0.500	1.00	0.500	1	U
Dichlorodifluoromethane	0.500	2.00	0.500	1	U
Ethyl benzene	0.500	1.00	0.500	1	U
Isopropylbenzene	0.500	1.00	0.500	1	U
Methyl acetate	1.00	5.00	1.00	1	U
Methyl tert-butyl ether	0.500	1.00	0.500	1	U
Methylcyclohexane	1.00	5.00	1.00	1	U
Methylene chloride	0.500	5.00	0.500	1	U

Report Name: BLANK

PDF ID: 5455959

07-SEP-2017 07:54



METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/28/17 15:08 Sample ID: WG627475-01
 Instrument ID: HPMS9 Run Date: 08/28/17 15:08 Prep Method: 5030B/5030C/503
 File ID: 9M982216 Analyst: JDS Method: 8260C
 Workgroup (AAB#): WG627475 Matrix: Water Units: ug/L
 Contract #: _____ Cal ID: HPMS9 - 14-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
m,p-Xylene	0.500	1.00	0.500	1	U
o-Xylene	0.500	1.00	0.500	1	U
Styrene	0.500	1.00	0.500	1	U
Tetrachloroethene	0.500	1.00	0.500	1	U
Toluene	0.500	1.00	0.500	1	U
trans-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Trichloroethene	0.500	1.00	0.500	1	U
Trichlorofluoromethane	0.500	1.00	0.500	1	U
Vinyl chloride	0.500	1.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits		Qualifier
1,2-Dichloroethane-d4	104	80	- 120	PASS
Dibromofluoromethane	101	86	- 118	PASS
p-Bromofluorobenzene	113	86	- 115	PASS
Toluene-d8	106	88	- 110	PASS

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5455959

07-SEP-2017 07:54



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627475-02</u>
Instrument ID: <u>HPMS9</u>	Run Time: <u>15:39</u>	Prep Method: <u>5030B/5030C/503</u>
File ID: <u>9M982217</u>	Analyst: <u>JDS</u>	Method: <u>8260C</u>
Workgroup (AAB#): <u>WG627475</u>	Matrix: <u>Water</u>	Units: <u>ug/L</u>
QC Key: <u>WATERLOO</u>	Lot#: <u>STD83541</u>	Cal ID: <u>HPMS9 - 14-AUG-17</u>

Analytes	Expected	Found	% Rec	LCS Limits			Q
1,1,1-Trichloroethane	20.0	19.4	97.0	80	-	134	
1,1,2,2-Tetrachloroethane	20.0	19.7	98.6	79	-	125	
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	21.2	106	80	-	130	
1,1,2-Trichloroethane	20.0	21.1	105	80	-	125	
1,1-Dichloroethane	20.0	18.8	93.8	80	-	125	
1,1-Dichloroethene	20.0	17.4	87.1	80	-	132	
1,2,3-Trichlorobenzene	20.0	22.9	114	55	-	140	
1,2,4-Trichlorobenzene	20.0	19.5	97.4	65	-	135	
1,2-Dibromo-3-chloropropane	20.0	19.0	95.1	50	-	130	
1,2-Dibromoethane	20.0	20.4	102	80	-	125	
1,2-Dichlorobenzene	20.0	22.3	112	80	-	125	
1,2-Dichloroethane	20.0	19.4	97.1	80	-	129	
cis-1,2-Dichloroethene	20.0	19.6	97.9	70	-	125	
trans-1,2-Dichloroethene	20.0	18.0	90.2	80	-	127	
1,2-Dichloropropane	20.0	19.9	99.5	80	-	120	
1,3-Dichlorobenzene	20.0	21.6	108	80	-	120	
1,4-Dichlorobenzene	20.0	21.8	109	80	-	120	
2-Butanone	20.0	18.7	93.3	30	-	150	
2-Hexanone	20.0	17.4	87.0	55	-	130	
4-Methyl-2-pentanone	20.0	18.0	90.1	64	-	140	
Acetone	20.0	19.9	99.4	40	-	142	
Benzene	20.0	18.8	94.2	80	-	121	
Bromochloromethane	20.0	19.2	96.0	65	-	130	
Bromodichloromethane	20.0	19.5	97.7	80	-	131	
Bromoform	20.0	16.5	82.7	70	-	130	
Bromomethane	20.0	17.7	88.5	30	-	145	
Carbon disulfide	20.0	17.2	85.9	58	-	138	
Carbon tetrachloride	20.0	19.5	97.4	65	-	140	
Chlorobenzene	20.0	21.2	106	80	-	120	
Chloroethane	20.0	21.2	106	60	-	135	
Chloroform	20.0	20.2	101	80	-	125	
Chloromethane	20.0	20.1	101	40	-	125	
cis-1,3-Dichloropropene	20.0	21.6	108	70	-	130	
Cyclohexane	20.0	18.5	92.4	80	-	130	
Dibromochloromethane	20.0	20.6	103	60	-	135	
Dichlorodifluoromethane	20.0	21.0	105	50	-	133	
Ethyl benzene	20.0	21.2	106	80	-	122	
Isopropylbenzene	20.0	21.0	105	80	-	122	
Methyl acetate	20.0	18.9	94.4	80	-	130	
Methyl tert-butyl ether	20.0	19.5	97.4	65	-	125	
Methylcyclohexane	20.0	18.8	94.2	80	-	130	

LCS - Modified 03/06/2008
PDF File ID: 5455960
Report generated: 09/07/2017 07:54



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627475-02</u>
Instrument ID: <u>HPMS9</u>	Run Time: <u>15:39</u>	Prep Method: <u>5030B/5030C/503</u>
File ID: <u>9M982217</u>	Analyst: <u>JDS</u>	Method: <u>8260C</u>
Workgroup (AAB#): <u>WG627475</u>	Matrix: <u>Water</u>	Units: <u>ug/L</u>
QC Key: <u>WATERLOO</u>	Lot#: <u>STD83541</u>	Cal ID: <u>HPMS9 - 14-AUG-17</u>

Analytes	Expected	Found	% Rec	LCS Limits	Q
Methylene chloride	20.0	18.9	94.4	80 - 123	
m,p-Xylene	40.0	44.2	110	80 - 122	
o-Xylene	20.0	21.8	109	80 - 122	
Styrene	20.0	19.1	95.3	80 - 123	
Tetrachloroethene	20.0	20.4	102	80 - 124	
Toluene	20.0	20.7	103	80 - 124	
trans-1,3-Dichloropropene	20.0	21.3	107	80 - 130	
Trichloroethene	20.0	21.2	106	80 - 122	
Trichlorofluoromethane	20.0	19.4	97.2	62 - 151	
Vinyl chloride	20.0	17.3	86.5	65 - 140	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	103	80 - 120	PASS
Dibromofluoromethane	103	86 - 118	PASS
p-Bromofluorobenzene	107	86 - 115	PASS
Toluene-d8	105	88 - 110	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 5455960
Report generated: 09/07/2017 07:54



MS/MSD REPORT

Loginnum: L17081212Cal ID: HPMS9- 14-AUG-17Worknum: WG627475Instrument ID: HPMS9

Contract #:

Prep Method: 5030B/5030C/Parent ID: L17081212-02File ID: 9M982226Dil: 1Method: 5035ASample ID: L17081212-04 MSFile ID: 9M982218Dil: 1Matrix: 8260CSample ID: L17081212-06 MSDFile ID: 9M982219Dil: 1Units: Waterug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
1,1,1-Trichloroethane	U	20.0	19.0	94.9	20.0	18.4	91.8	3.34	80 - 134	30	
1,1,2,2-Tetrachloroethane	U	20.0	22.0	110	20.0	21.8	109	0.854	79 - 125	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	U	20.0	22.2	111	20.0	20.4	102	8.52	80 - 130	30	
1,1,2-Trichloroethane	U	20.0	20.9	105	20.0	20.6	103	1.53	80 - 125	30	
1,1-Dichloroethane	U	20.0	18.7	93.5	20.0	17.9	89.6	4.29	80 - 125	30	
1,1-Dichloroethene	U	20.0	17.6	88.2	20.0	17.1	85.5	3.07	80 - 132	30	
1,2,3-Trichlorobenzene	U	20.0	24.6	123	20.0	23.3	116	5.39	55 - 140	30	
1,2,4-Trichlorobenzene	U	20.0	21.7	108	20.0	20.0	99.9	8.17	65 - 135	30	
1,2-Dibromo-3-chloropropane	U	20.0	20.3	102	20.0	20.0	100	1.51	50 - 130	30	
1,2-Dibromoethane	U	20.0	20.8	104	20.0	20.2	101	2.83	80 - 125	30	
1,2-Dichlorobenzene	U	20.0	22.4	112	20.0	21.6	108	3.71	80 - 125	30	
1,2-Dichloroethane	U	20.0	19.1	95.7	20.0	18.7	93.3	2.51	80 - 129	30	
cis-1,2-Dichloroethene	U	20.0	19.6	98	20.0	19.0	95.1	2.99	70 - 125	30	
trans-1,2-Dichloroethene	U	20.0	18.3	91.5	20.0	17.5	87.7	4.16	80 - 127	30	
1,2-Dichloropropane	U	20.0	20.0	100	20.0	19.1	95.7	4.42	80 - 120	30	
1,3-Dichlorobenzene	U	20.0	22.5	112	20.0	21.3	106	5.52	80 - 120	30	
1,4-Dichlorobenzene	U	20.0	22.6	113	20.0	21.1	106	6.78	80 - 120	30	
2-Butanone	U	20.0	18.5	92.7	20.0	19.3	96.4	3.91	30 - 150	30	
2-Hexanone	U	20.0	19.0	95.1	20.0	19.3	96.3	1.27	55 - 130	30	
4-Methyl-2-pentanone	U	20.0	18.5	92.5	20.0	18.9	94.3	1.84	64 - 140	30	
Acetone	3.23	20.0	20.6	86.6	20.0	21.1	89.2	2.44	40 - 142	30	
Benzene	U	20.0	18.6	93.2	20.0	18.2	91.2	2.08	80 - 121	30	
Bromochloromethane	U	20.0	19.4	97.2	20.0	18.6	92.9	4.45	65 - 130	30	
Bromodichloromethane	U	20.0	19.3	96.3	20.0	18.7	93.6	2.81	80 - 131	30	
Bromoform	U	20.0	16.3	81.6	20.0	15.8	78.8	3.51	70 - 130	30	
Bromomethane	U	20.0	15.7	78.3	20.0	9.52	47.6	48.8	30 - 145	30	#
Carbon disulfide	18.9	20.0	50.8	160	20.0	41.1	111	21.2	58 - 138	30	*
Carbon tetrachloride	U	20.0	18.8	93.8	20.0	18.0	90.2	3.86	65 - 140	30	
Chlorobenzene	U	20.0	21.3	106	20.0	20.4	102	4.08	80 - 120	30	
Chloroethane	U	20.0	20.7	103	20.0	19.9	99.7	3.77	60 - 135	30	
Chloroform	1.07	20.0	21.2	101	20.0	20.7	98	2.67	80 - 125	30	
Chloromethane	U	20.0	18.8	94.1	20.0	17.9	89.5	4.95	40 - 125	30	
cis-1,3-Dichloropropene	U	20.0	21.3	107	20.0	20.1	101	5.82	70 - 130	30	
Cyclohexane	U	20.0	18.9	94.5	20.0	17.7	88.3	6.80	80 - 130	30	
Dibromochloromethane	U	20.0	20.1	100	20.0	19.6	97.9	2.45	60 - 135	30	
Dichlorodifluoromethane	U	20.0	21.7	108	20.0	19.9	99.7	8.33	50 - 133	30	
Ethyl benzene	U	20.0	21.4	107	20.0	20.7	104	3.28	80 - 122	30	
Isopropylbenzene	U	20.0	21.5	107	20.0	20.3	102	5.42	80 - 122	30	
Methyl acetate	U	20.0	17.6	88	20.0	17.7	88.4	0.439	80 - 130	30	
Methyl tert-butyl ether	U	20.0	19.3	96.3	20.0	18.8	93.9	2.50	65 - 125	30	
Methylcyclohexane	U	20.0	20.4	102	20.0	18.4	92.1	10.3	80 - 130	30	

MS_MSD - Modified 03/06/2008

PDF File ID: 5455961

Report generated 09/07/2017 07:54



MS/MSD REPORT

Loginnum: L17081212 Cal ID: HPMS9 14-AUG-17
 Instrument ID: HPMS9 Contract #: _____
 Parent ID: L17081212-02 File ID: 9M982226 Dil: 1
 Sample ID: L17081212-04 MS File ID: 9M982218 Dil: 1
 Sample ID: L17081212-06 MSD File ID: 9M982219 Dil: 1

Worknum: WG627475
 Prep Method: 5030B/5030C/
 Method: 5035A
 Matrix: 8260C
 Units: Water
ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Methylene chloride	0.896	20.0	19.5	92.8	20.0	19.5	93.1	0.319	80 - 123	30	
m,p-Xylene	U	40.0	45.0	112	40.0	43.0	107	4.49	80 - 122	30	
o-Xylene	U	20.0	22.0	110	20.0	21.0	105	4.48	80 - 122	30	
Styrene	U	20.0	19.1	95.7	20.0	18.4	92.2	3.72	80 - 123	30	
Tetrachloroethene	U	20.0	20.5	102	20.0	19.0	94.8	7.52	80 - 124	30	
Toluene	U	20.0	20.5	102	20.0	19.8	99	3.41	80 - 124	30	
trans-1,3-Dichloropropene	U	20.0	20.1	100	20.0	19.8	98.8	1.50	80 - 130	30	
Trichloroethene	U	20.0	19.1	95.7	20.0	18.2	90.8	5.31	80 - 122	30	
Trichlorofluoromethane	U	20.0	19.3	96.4	20.0	18.6	93.2	3.34	62 - 151	30	
Vinyl chloride	U	20.0	16.5	82.3	20.0	15.6	78.2	5.10	65 - 140	30	

* FAILS %REC LIMIT

FAILS RPD LIMIT

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17081212

Instrument: HPMS9

Analyst: ADC

Workgroup: WG625140

Tune ID: WG625140-01

Run Date: 08/14/2017

Run Time: 08:49

File ID: 9M981988

Cal ID: HPMS9 - 14-AUG-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50.0	95.0	15.0	40.0	22.1	5904	PASS
75.0	95.0	30.0	60.0	49.1	13134	PASS
95.0	95.0	100	100	100	26746	PASS
96.0	95.0	5.00	9.00	7.11	1901	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	83.3	22290	PASS
175	174	5.00	9.00	7.18	1601	PASS
176	174	95.0	101	96.5	21505	PASS
177	176	5.00	9.00	7.01	1507	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG625140-02	STD	01	08/14/2017 09:43	
WG625140-04	STD	01	08/14/2017 10:43	
WG625140-05	STD	01	08/14/2017 11:14	
WG625140-03	STD	01	08/14/2017 11:44	
WG625140-06	STD	01	08/14/2017 12:14	
WG625140-07	STD-CCV	01	08/14/2017 12:44	
WG625140-08	STD	01	08/14/2017 13:14	
WG625140-09	STD	01	08/14/2017 13:45	
WG625140-10	STD	01	08/14/2017 14:15	
WG625140-11	SSCV	01	08/14/2017 15:16	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5455963
Report generated 09/07/2017 07:54



Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17081212
Instrument: HPMS9
Analyst: JDS
Workgroup: WG627474

Tune ID: WG627474-01
Run Date: 08/28/2017
Run Time: 13:44
File ID: 9M982213

Cal ID: HPMS9-14-AUG-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50.0	95.0	15.0	40.0	21.5	7933	PASS
75.0	95.0	30.0	60.0	47.6	17593	PASS
95.0	95.0	100	100	100	36952	PASS
96.0	95.0	5.00	9.00	6.67	2465	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	82.6	30517	PASS
175	174	5.00	9.00	7.08	2160	PASS
176	174	95.0	101	97.5	29765	PASS
177	176	5.00	9.00	6.81	2028	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG627474-02	CCV	01	08/28/2017 14:08	
WG627475-01	BLANK	01	08/28/2017 15:08	
WG627475-01	BLANK	01	08/28/2017 15:08	
WG627475-02	LCS	01	08/28/2017 15:39	
L17081212-04	MW02-082217-MS	01	08/28/2017 16:14	
L17081212-06	MW02-082217-MSD	01	08/28/2017 16:44	
L17081212-10	FB-082217	01	08/28/2017 17:15	
L17081212-01	TB-082217	01	08/28/2017 17:45	
L17081212-02	MW02-082217	01	08/28/2017 20:15	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5455963
Report generated 09/07/2017 07:54



Calibration Table Report
Method: 8260C.M
Title: 8260C SOP: OVL MSV01-C WATER 081017 HPMS9
Last Calibration: Mon Aug 14 14:47:27 2017
Curve: WG625140
Calibration Files

Calibration Files											R^2					
Compound	0.5	1	2	5	20	50	100	200	300			Avg	%RSD	Linear	Quadratic	
	9M981990.D	9M981994.D	9M981992.D	9M981993.D	9M981995.D	9M981996.D	9M981997.D	9M981998.D	9M981999.D							
Fluorobenzene	ISTD															
Dichlorodifluoromethane			0.308	0.320	0.393	0.402	0.375	0.397				0.366	11.242			
Chloromethane		0.611	0.533	0.492	0.488	0.515	0.444	0.430				0.502	12.003			
Vinyl Chloride		0.322	0.379	0.335	0.383	0.393	0.341	0.344				0.357	7.794			
1,3-Butadiene		0.110	0.140	0.134	0.143	0.146	0.131	0.137	0.111			0.131	10.402			
Bromomethane		0.241	0.240	0.224	0.207	0.211	0.204	0.209				0.219	7.177			
Chloroethane		0.172	0.184	0.207	0.217	0.231	0.223	0.218				0.207	10.509			
Trichlorofluoromethane		0.392	0.449	0.452	0.469	0.490	0.472	0.493				0.460	7.411			
Diethyl ether		0.280	0.278	0.294	0.271	0.288	0.281		0.301			0.285	3.594			
Isoprene		0.306	0.307	0.357	0.381	0.411	0.399	0.421		0.414		0.374	12.473			
Acrolein			0.041	0.048	0.046	0.050	0.050			0.053		0.048	8.902			
1,1,2-Trichloro-1,2,2-Trifluoroel			0.209	0.229	0.247	0.256	0.247	0.259				0.241	7.956			
Acetone			0.155	0.148	0.156	0.152	0.145	0.160	0.148			0.152	3.567			
1,1-Dichloroethene		0.420	0.405	0.411	0.429	0.456	0.442	0.462				0.432	5.077			
Tert-Butyl Alcohol		0.043	0.049	0.052	0.047	0.052	0.054			0.070		0.052	16.455			
Dimethyl Sulfide		0.264	0.305	0.329	0.350	0.365	0.353	0.374	0.366			0.338	11.045			
Iodomethane				0.257	0.321	0.356	0.348	0.372				0.331	13.668			
Methyl acetate		0.375	0.370	0.383	0.392	0.402	0.391	0.408	0.402			0.390	3.492			
Methylene Chloride		0.258	0.263	0.286	0.288	0.295	0.290	0.300				0.283	5.644			
Carbon Disulfide		0.652	0.659	0.673	0.704	0.756	0.721	0.772				0.705	6.659			
Acrylonitrile		0.165	0.174	0.185	0.176	0.197	0.193		0.195			0.184	6.581			
Methyl Tert Butyl Ether		0.848	0.834	0.875	0.879	0.920	0.906	0.940				0.886	4.306			
trans-1,2-Dichloroethene		0.387	0.376	0.385	0.398	0.421	0.413	0.432				0.402	5.122			
n-Hexane				0.329	0.359	0.397	0.386	0.419	0.383			0.379	8.263			
Diisopropyl ether		1.024	1.068	1.141	1.062	1.118	1.080		1.116			1.087	3.700			
Vinyl Acetate				0.619	0.660	0.694	0.681	0.765	0.659			0.680	7.201			
1,1-Dichloroethane		0.468	0.494	0.527	0.545	0.573	0.552	0.575				0.533	7.506			
Ethyl-Tert-Butyl ether		0.915	0.979	1.039	0.960	1.021	0.995		1.044			0.993	4.645			
2-Butanone				0.190	0.229	0.229	0.225	0.242	0.243			0.226	8.429			
Propionitrile		0.039	0.066	0.069	0.068	0.074	0.075		0.085			0.068	20.740	0.994		
2,2-Dichloropropane		0.393	0.352	0.387	0.386	0.401	0.393	0.408				0.388	4.599			
cis-1,2-Dichloroethene		0.238	0.252	0.276	0.298	0.311	0.308	0.321				0.286	11.165			
Chloroform	0.400	0.441	0.441	0.489	0.499	0.516	0.502	0.522				0.476	9.160			
1-Bromopropane				0.037	0.054	0.058	0.056	0.060	0.059			0.054	15.789			
Bromochloromethane		0.165	0.190	0.207	0.208	0.220	0.218	0.228				0.205	10.522			
Tetrahydrofuran		0.126	0.137	0.144	0.136	0.146	0.146		0.152			0.141	6.199			
Dibromofluoromethane	0.271	0.272	0.275	0.277	0.284	0.285	0.281	0.291	0.286			0.280	2.430			
1,1,1-Trichloroethane		0.400	0.396	0.419	0.442	0.469	0.455	0.478				0.437	7.506			
Cyclohexane				0.507	0.541	0.569	0.544	0.579	0.551			0.549	4.568			
1,1-Dichloropropene		0.302	0.270	0.312	0.331	0.361	0.360	0.375				0.330	11.440			
Tert-Amyl-Methyl ether		0.736	0.801	0.864	0.801	0.849	0.836		0.882			0.824	5.986			
Carbon Tetrachloride		0.33761	0.34851	0.38431	0.4003	0.42763	0.42516	0.44222				0.39511	10.2295			
1,2-Dichloroethane-d4	0.32291	0.32907	0.32444	0.33699	0.32894	0.32662	0.3213	0.3307	0.32813	0.32701	1.05287					
Heptane												0	0			
1,2-Dichloroethane		0.42705	0.41484	0.47359	0.46673	0.47856	0.46972	0.48886				0.45991	6.03806			
Benzene		1.06454	1.06415	1.09109	1.10495	1.13533	1.10146	1.12952				1.09872	2.5627			
Trichloroethene		0.25766	0.26059	0.28251	0.29694	0.31524	0.30913	0.32107				0.29188	8.8006			
Methylcyclohexane				0.39421	0.42656	0.45093	0.433	0.46255	0.44097			0.4347	5.43098			
1,2-Dichloropropane		0.27173	0.265	0.29468	0.30947	0.32893	0.3213	0.33922				0.30433	9.3317			
1,4-Dioxane			0.00296	0.00478	0.00483	0.00527	0.00577		0.00668	0.00505	24.6457		0.993			
Bromodichloromethane		0.29497	0.32406	0.35527	0.36607	0.39761	0.39886	0.42325				0.36573	12.3674			
Dibromomethane		0.15809	0.16593	0.19368	0.20641	0.22027	0.22082	0.23591				0.20016	14.6101			
2-Chloroethyl Vinyl Ether				0.17562	0.23178	0.24578	0.24923	0.27256	0.2697	0.24078	14.7059					
4-Methyl-2-Pentanone				0.11975	0.17176	0.18485	0.18632	0.21227	0.21588	0.18181	19.1652					
cis-1,3-Dichloropropene		0.29924	0.32568	0.37734	0.42344	0.46312	0.4686	0.49803				0.40792	18.6161			
Dimethyl Disulfide				0.15901	0.20597	0.25525	0.26667	0.3041	0.29671	0.24795	22.5327		0.997			
Chlorobenzene-d5	ISTD															
Toluene-d8	1.22603	1.23433	1.22294	1.26156	1.25706	1.23697	1.19606	1.20531	1.23814	1.23093	1.74278					
Toluene		1.36674	1.32922	1.47151	1.48931	1.54244	1.47848	1.46224				1.44856	5.12122			
Ethyl Methacrylate			0.28255	0.40775	0.50145	0.5686	0.57308	0.6161	0.60964	0.50845	24.2		0.999			
trans-1,3-Dichloropropene		0.34549	0.38916	0.43933	0.50246	0.57695	0.56288	0.58497				0.48589	19.8027			
1,1,2-Trichloroethane		0.32099	0.30224	0.35984	0.36784	0.38116	0.37378	0.38428				0.35573	8.90357			
2-Hexanone				0.24677	0.37888	0.43358	0.44958	0.49314	0.51577			0.41962	23.1734	0.997		
1,3-Dichloropropane		0.52259	0.53311	0.57806	0.59603	0.6221	0.61135	0.6196				0.58327	7.00083			
Tetrachloroethene		0.28903	0.24472	0.30345	0.28798	0.31319	0.30429	0.31151				0.29345	8.06098			
Dibromochloromethane		0.32493	0.34704	0.38294	0.42283	0.46217	0.47266	0.49412				0.41524	15.7398			
1,2-Dibromoethane		0.28481	0.31736	0.36914	0.3893	0.42156	0.41938	0.43794				0.37707	15.2209			
1-Chlorohexane		0.30452	0.29036	0.3508	0.4031	0.45518	0.4429	0.47739	0.44863	0.39661	18.2606					
Chlorobenzene		0.96494	0.85828	0.97451	1.01905	1.07761	1.05436	1.08507				1.00483	7.95934			
1,1,1,2-Tetrachloroethane		0.34549	0.31891	0.38356	0.40035	0.42702	0.42148	0.44719				0.392	11.7772			
Ethylbenzene		0.44643	0.4355	0.5161	0.54304	0.57848	0.57532	0.61222				0.52959	12.7699			
m-,p-Xylene	0.4666	0.54702	0.54837	0.65143	0.67167	0.71082	0.70003	0.71558				0.62644	14.9145			
o-Xylene		0.53836	0.53691	0.63994	0.67301	0.70733	0.70446	0.73943				0.64849	12.6093			
Styrene		0.62931	0.71566	0.89457	1.06136	1.18019	1.18818	1.2598				0.98987	25.0122	0.998		
Bromoform			0.20696	0.2706	0.31545	0.35843	0.37704	0.42106				0.32492	23.8541	0.995		
Isopropylbenzene		1.3873	1.37184	1.60388	1.68831	1.79542	1.75966	1.78985				1.62804	11.1958			
1,4-Dichlorobenzene-d4	ISTD															
1,1,2,2-Tetrachloroethane		0.87465	0.87272	1.03791	1.07035	1.13204	1.0509	1.09467				1.01903	10.1943			
p-Bromofluorobenzene	0.90463	0.91396	0.89058	0.95089	0.9348	0.87976	0.81712	0.83822	0.84915			0.88657	5.06991			
1,2,3-Trichloropropane		0.23991	0.34832	0.35374	0.36184	0.38226	0.34984	0.35941				0.34219	13.5916			

trans-1,4-Dichloro-2-Butene	0.3209	0.37667	0.3952	0.37599	0.40844	0.38907	0.37771	8.03946
n-Propylbenzene	3.03535	2.99421	3.52689	3.73324	3.89173	3.45372	3.32297	3.42259
Bromobenzene	0.79142	0.77525	0.9108	0.92161	0.93029	0.85346	0.87142	0.86489
1,3,5-Trimethylbenzene	2.43793	2.26808	2.68607	2.91025	2.95587	2.66641	2.63276	2.65105
2-Chlorotoluene	2.28954	2.27869	2.18882	2.34678	2.44985	2.12323	2.16323	2.26288
4-Chlorotoluene	1.58639	1.67466	1.8971	2.29573	2.33151	2.16186	2.1338	2.01158
a-Methylstyrene	0.91962	1.20508	1.44797	1.61913	1.51006	1.60159	1.53571	1.40559
tert-Butylbenzene	0.45998	0.52263	0.60263	0.6194	0.62492	0.57226	0.59203	0.57055
1,2,4-Trimethylbenzene	2.42342	2.37071	2.79005	3.02279	3.08775	2.78128	2.76524	2.74875
sec-Butylbenzene	2.76019	2.77242	3.22203	3.54512	3.70135	3.3203	3.26719	3.22694
p-Isopropyltoluene	2.06118	2.13167	2.70949	3.01673	3.14876	2.8766	2.88407	2.68979
1,3-Dichlorobenzene	1.28191	1.29743	1.495	1.61386	1.70928	1.62336	1.68262	1.52907
1,4-Dichlorobenzene	1.41193	1.42204	1.54522	1.63198	1.69729	1.65868	1.71778	1.58356
n-Butylbenzene	1.43148	1.61523	1.99998	2.34876	2.64134	2.50828	2.57445	2.15993
1,2-Dichlorobenzene	1.45044	1.41924	1.6392	1.74601	1.82688	1.74475	1.75565	1.6546
1,2-Dibromo-3-Chloropropane	0.14363	0.21413	0.27859	0.32946	0.3086	0.31936	0.26563	0.26563
1,2,4-Trichlorobenzene	0.74729	0.72717	0.92655	1.11571	1.28664	1.21227	1.25193	1.03822
Hexachlorobutadiene	0.27338	0.36381	0.44889	0.47704	0.56012	0.54453	0.55867	0.46092
Naphthalene	2.60143	2.67067	3.48684	4.14419	4.57953	4.00693	3.65977	3.59277
1,2,3-Trichlorobenzene	0.82933	0.86284	1.04721	1.2484	1.39547	1.27179	1.28414	1.13417

Mon Aug 14 15:51:36 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: <u>L17081212</u>	Run Date: <u>08/14/2017</u>	Sample ID: <u>WG625140-11</u>
Instrument ID: <u>HPMS9</u>	Run Time: <u>15:16</u>	Method: <u>8260C</u>
File ID: <u>9M982001</u>	Analyst: <u>ADC</u>	QC Key: <u>WATERLOO</u>
Ical Workgroup: <u>WG625140</u>	Cal ID: <u>HPMS9 - 14-AUG-17</u>	

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	47.3	ug/L	0.409	5.40	25	
1,2-Dichloropropane	CCC	50.0	51.6	ug/L	0.314	3.30	25	
Chloroform	CCC	50.0	51.9	ug/L	0.495	3.80	25	
Ethylbenzene	CCC	50.0	53.8	ug/L	0.570	7.60	25	
Toluene	CCC	50.0	50.1	ug/L	1.45	0.300	25	
Vinyl Chloride	CCC	50.0	45.2	ug/L	0.323	9.50	25	
1,1,2,2-Tetrachloroethane	SPCC	50.0	54.5	ug/L	1.11	9.00	25	
1,1-Dichloroethane	SPCC	50.0	49.5	ug/L	0.528	1.00	25	
Bromoform	SPCC	50.0	47.3	ug/L	0.368	5.40	25	
Chlorobenzene	SPCC	50.0	53.2	ug/L	1.07	6.40	25	
Chloromethane	SPCC	50.0	48.7	ug/L	0.489	2.60	25	
1,1,1-Trichloroethane		50.0	49.9	ug/L	0.436	0.200	25	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	55.3	ug/L	0.267	10.7	25	
1,1,2-Trichloroethane		50.0	52.3	ug/L	0.372	4.70	25	
1,2,3-Trichlorobenzene		50.0	56.9	ug/L	1.29	13.8	25	
1,2,4-Trichlorobenzene		50.0	49.8	ug/L	1.22	0.300	25	
1,2-Dibromo-3-Chloropropane		50.0	49.3	ug/L	0.307	1.30	25	
1,2-Dibromoethane		50.0	54.2	ug/L	0.409	8.30	25	
1,2-Dichlorobenzene		50.0	56.6	ug/L	1.87	13.1	25	
1,2-Dichloroethane		50.0	49.5	ug/L	0.456	0.900	25	
cis-1,2-Dichloroethene		50.0	51.2	ug/L	0.293	2.40	25	
trans-1,2-Dichloroethene		50.0	48.7	ug/L	0.392	2.50	25	
1,3-Dichlorobenzene		50.0	53.9	ug/L	1.65	7.80	25	
1,4-Dichlorobenzene		50.0	55.2	ug/L	1.75	10.4	25	
2-Butanone		50.0	52.0	ug/L	0.236	4.10	25	
2-Hexanone		50.0	54.3	ug/L	0.512	8.70	25	
4-Methyl-2-Pentanone		50.0	56.7	ug/L	0.206	13.5	25	
Acetone		50.0	51.0	ug/L	0.155	2.10	25	
Benzene		50.0	48.9	ug/L	1.08	2.10	25	
Bromochloromethane		50.0	50.0	ug/L	0.205	0.100	25	
Bromodichloromethane		50.0	50.9	ug/L	0.373	1.90	25	
Bromomethane		50.0	42.1	ug/L	0.185	15.7	25	
Carbon Disulfide		50.0	47.3	ug/L	0.667	5.40	25	
Carbon Tetrachloride		50.0	50.5	ug/L	0.399	1.00	25	
Chloroethane		50.0	55.0	ug/L	0.228	10.0	25	
cis-1,3-Dichloropropene		50.0	58.4	ug/L	0.477	16.8	25	
Cyclohexane		50.0	49.0	ug/L	0.538	2.00	25	
Dibromochloromethane		50.0	53.5	ug/L	0.445	7.10	25	
Dichlorodifluoromethane		50.0	54.7	ug/L	0.400	9.40	25	
Isopropylbenzene		50.0	53.0	ug/L	1.73	6.10	25	
Methyl acetate		50.0	48.6	ug/L	0.379	2.80	25	
Methyl Tert Butyl Ether		50.0	51.2	ug/L	0.907	2.30	25	

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5455962
Report generated 09/07/2017 07:54



Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: <u>L17081212</u>	Run Date: <u>08/14/2017</u>	Sample ID: <u>WG625140-11</u>
Instrument ID: <u>HPMS9</u>	Run Time: <u>15:16</u>	Method: <u>8260C</u>
File ID: <u>9M982001</u>	Analyst: <u>ADC</u>	QC Key: <u>WATERL00</u>
ICal Workgroup: <u>WG625140</u>	Cal ID: <u>HPMS9 - 14-AUG-17</u>	

Analyte	Expected	Found	Units	RF	%D	UCL	Q
Methylcyclohexane	50.0	50.0	ug/L	0.435	0	25	
Methylene Chloride	50.0	49.3	ug/L	0.279	1.40	25	
m-,p-Xylene	100	111	ug/L	0.695	10.9	25	
o-Xylene	50.0	54.5	ug/L	0.707	9.00	25	
Styrene	50.0	49.8	ug/L	1.20	0.400	25	
Tetrachloroethene	50.0	50.1	ug/L	0.294	0.200	25	
trans-1,3-Dichloropropene	50.0	56.7	ug/L	0.551	13.4	25	
Trichloroethene	50.0	50.1	ug/L	0.293	0.200	25	
Trichlorofluoromethane	50.0	50.2	ug/L	0.462	0.500	25	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5455962
Report generated 09/07/2017 07:54



CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212	Run Date: 08/28/2017	Sample ID: WG627474-02
Instrument ID: HPMS9	Run Time: 14:08	Method: 8260C
File ID: 9M982214	Analyst: JDS	QC Key: WATERL00
Workgroup (AAB#): WG627475	Cal ID: HPMS9 - 14-AUG-17	
Matrix: WATER		

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	51.3	ug/L	0.443	2.51	20	
1,2-Dichloropropane	CCC	50.0	50.2	ug/L	0.306	0.432	20	
Chloroform	CCC	50.0	50.3	ug/L	0.479	0.533	20	
Ethylbenzene	CCC	50.0	53.2	ug/L	0.564	6.43	20	
Toluene	CCC	50.0	50.8	ug/L	1.47	1.53	20	
Vinyl Chloride	CCC	50.0	46.5	ug/L	0.332	7.09	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	42.9	ug/L	0.874	14.2	20	
1,1-Dichloroethane	SPCC	50.0	50.5	ug/L	0.539	1.01	20	
Bromoform	SPCC	50.0	41.7	ug/L	0.324	16.5	20	
Chlorobenzene	SPCC	50.0	51.3	ug/L	1.03	2.59	20	
Chloromethane	SPCC	50.0	47.1	ug/L	0.473	5.88	20	
Xylenes		150	161	ug/L	0.679	7.51	20	
1,1,1-Trichloroethane		50.0	50.0	ug/L	0.437	0.00380	20	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	54.6	ug/L	0.264	9.20	20	
1,1,2-Trichloroethane		50.0	49.3	ug/L	0.351	1.46	20	
1,2,3-Trichlorobenzene		50.0	55.0	ug/L	1.25	9.90	20	
1,2,4-Trichlorobenzene		50.0	49.9	ug/L	1.23	0.226	20	
1,2-Dibromo-3-Chloropropane		50.0	39.2	ug/L	0.243	21.5	20	*
1,2-Dibromoethane		50.0	50.4	ug/L	0.380	0.854	20	
1,2-Dichlorobenzene		50.0	50.2	ug/L	1.66	0.411	20	
1,2-Dichloroethane		50.0	48.5	ug/L	0.446	3.05	20	
cis-1,2-Dichloroethene		50.0	51.1	ug/L	0.292	2.13	20	
trans-1,2-Dichloroethene		50.0	49.9	ug/L	0.401	0.132	20	
1,3-Dichlorobenzene		50.0	53.0	ug/L	1.62	6.06	20	
1,4-Dichlorobenzene		50.0	51.8	ug/L	1.64	3.55	20	
2-Butanone		50.0	42.9	ug/L	0.194	14.1	20	
2-Hexanone		50.0	40.0	ug/L	0.368	20.0	20	
4-Methyl-2-Pentanone		50.0	43.4	ug/L	0.158	13.1	20	
Acetone		50.0	43.1	ug/L	0.131	13.7	20	
Benzene		50.0	48.1	ug/L	1.06	3.72	20	
Bromochloromethane		50.0	49.0	ug/L	0.201	2.01	20	
Bromodichloromethane		50.0	50.2	ug/L	0.368	0.472	20	
Bromomethane		50.0	42.2	ug/L	0.185	15.6	20	
Carbon Disulfide		50.0	50.2	ug/L	0.709	0.493	20	
Carbon Tetrachloride		50.0	51.8	ug/L	0.410	3.63	20	
Chloroethane		50.0	52.2	ug/L	0.216	4.33	20	
cis-1,3-Dichloropropene		50.0	53.9	ug/L	0.440	7.80	20	
Cyclohexane		50.0	49.8	ug/L	0.546	0.468	20	
Dibromochloromethane		50.0	52.5	ug/L	0.436	4.97	20	
Dichlorodifluoromethane		50.0	48.8	ug/L	0.357	2.44	20	
Isopropylbenzene		50.0	52.9	ug/L	1.72	5.81	20	
Methyl acetate		50.0	49.3	ug/L	0.385	1.32	20	

CCV - Modified 03/05/2008
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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627474-02</u>
Instrument ID: <u>HPMS9</u>	Run Time: <u>14:08</u>	Method: <u>8260C</u>
File ID: <u>9M982214</u>	Analyst: <u>JDS</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627475</u>	Cal ID: <u>HPMS9 - 14-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte	Expected	Found	UNITS	RF	%D	UCL	Q
Methyl Tert Butyl Ether	50.0	48.1	ug/L	0.853	3.76	20	
Methylcyclohexane	50.0	53.0	ug/L	0.461	6.10	20	
Methylene Chloride	50.0	48.6	ug/L	0.275	2.72	20	
m-, p-Xylene	100	109	ug/L	0.685	9.35	20	
o-Xylene	50.0	51.9	ug/L	0.673	3.85	20	
Styrene	50.0	46.8	ug/L	1.13	6.43	20	
Tetrachloroethene	50.0	53.2	ug/L	0.312	6.43	20	
trans-1,3-Dichloropropene	50.0	55.5	ug/L	0.539	11.0	20	
Trichloroethene	50.0	54.8	ug/L	0.320	9.65	20	
Trichlorofluoromethane	50.0	51.5	ug/L	0.474	3.09	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5455964
Report generated 09/07/2017 07:54



Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L17081212
Instrument ID: HPMS9
Workgroup (AAB#): WG627475

CCV Number: WG627474-02
CAL ID: HPMS9 - 14-AUG-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG627474-02	NA	NA	260486	487062	635075
Upper Limit	NA	NA	520972	974124	1270150
Lower Limit	NA	NA	130243	243531	317538
L17081212-01	1.00	01	191492	409485	548381
L17081212-02	1.00	01	190183	400759	525632
L17081212-04	1.00	01	229051	438691	575901
L17081212-06	1.00	01	235481	454202	594682
L17081212-10	1.00	01	201418	430408	574177
WG627475-01	1.00	01	193852	415459	555386
WG627475-02	1.00	01	215958	416822	550237

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits



Microbac Laboratories Inc.
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L17081212
Instrument ID: HPMS9
Workgroup (AAB#): WG627475

CCV Number: WG627474-02
CAL ID: HPMS9 - 14-AUG-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG627474-02	NA	NA	17.58	14.56	10.7
Upper Limit	NA	NA	18.08	15.06	11.2
Lower Limit	NA	NA	17.08	14.06	10.2
L17081212-01	1.00	01	17.58	14.56	10.7
L17081212-02	1.00	01	17.58	14.56	10.7
L17081212-04	1.00	01	17.58	14.56	10.7
L17081212-06	1.00	01	17.58	14.56	10.7
L17081212-10	1.00	01	17.58	14.56	10.7
WG627475-01	1.00	01	17.58	14.56	10.7
WG627475-02	1.00	01	17.58	14.56	10.7

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

2.2 Metals Data

2.2.1 Metals I C P Data

2.2.1.1 Summary Data



Login Number: L17081212
Department: Metals
Analyst: Kerri Buck

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6010

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration Verification: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG627342 - All acceptance criteria were met.

WG627086 - All acceptance criteria were met.

Matrix Spikes: WG627086 - Sample 02 was chosen by the client for MS/MSD analysis. Samples 04(MS) and 06(MSD) yielded noncompliant recoveries for two analytes. Sample 03 was chosen by the client for MS/MSD analysis. Samples 05(MS) and 07(MSD) met all acceptance criteria. Sample 11 was chosen by the client for MS/MSD analysis. Samples 13(MS) and 15(MSD) yielded noncompliant recoveries for three analytes. Sample 12 was chosen by the client for MS/MSD analysis. Samples 14(MS) and 16(MSD) met all acceptance criteria.

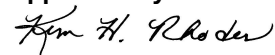
SAMPLES

Samples: WG627342 - Client sample 08 required dilution analysis in order to obtain a result for sodium within the linear range.

WG627086 - Client samples 02, 04(MS), and 06(MSD) required dilution analysis in order to obtain a result for sodium within the linear range.

Narrative ID: 128733

Approved By: Kim Rhodes



Certificate of Analysis

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 19:51
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.195123
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2	198		0.500	0.250
Iron, Total	7439-89-6	0.423		0.100	0.0500
Magnesium, Total	7439-95-4	22.5		0.500	0.250
Manganese, Total	7439-96-5	0.0588		0.0100	0.00500
Potassium, Total	7440-09-7	7.96		1.00	0.500
Silica, Calculated as SiO ₂		31.2		2.14	1.07
Silicon, Total	7440-21-3	14.6		1.00	0.500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/28/2017 11:39
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/28/2017 13:33
Collect Date: 08/22/2017 12:23	Dilution: 5	File ID: T4.082817.133303
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sodium, Total	7440-23-5	422		2.50	1.25
J	The analyte was positively identified, but the quantitation was below the RL.				
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-03	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 19:55
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.195508
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Iron, Dissolved	7439-89-6	0.0700	J	0.100	0.0500
Manganese, Dissolved	7439-96-5	0.0638		0.0100	0.00500

Certificate of Analysis

J	The analyte was positively identified, but the quantitation was below the RL.
U	Not detected at or above adjusted sample detection limit.

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 19:58
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.195852
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	6.09		0.200	0.100
Calcium, Total	7440-70-2	209		0.500	0.250
Iron, Total	7439-89-6	2.88		0.100	0.0500
Magnesium, Total	7439-95-4	29.1		0.500	0.250
Manganese, Total	7439-96-5	0.356		0.0100	0.00500
Potassium, Total	7440-09-7	41.4		1.00	0.500
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/28/2017 11:39
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/28/2017 13:36
Collect Date: 08/22/2017 12:23	Dilution: 5	File ID: T4.082817.133644
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sodium, Total	7440-23-5	498		2.50	1.25

Sample #: L17081212-05	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:02
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.200232
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	6.15		0.200	0.100
Iron, Dissolved	7439-89-6	2.50		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.364		0.0100	0.00500

Certificate of Analysis

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:06
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.200605
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	6.12		0.200	0.100
Calcium, Total	7440-70-2	206		0.500	0.250
Iron, Total	7439-89-6	2.85		0.100	0.0500
Magnesium, Total	7439-95-4	28.1		0.500	0.250
Manganese, Total	7439-96-5	0.356		0.0100	0.00500
Potassium, Total	7440-09-7	41.3		1.00	0.500
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/28/2017 11:39
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/28/2017 13:40
Collect Date: 08/22/2017 12:23	Dilution: 5	File ID: T4.082817.134023
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sodium, Total	7440-23-5	475		2.50	1.25

Sample #: L17081212-07	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:09
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: T4.082517.200942
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	5.82		0.200	0.100
Iron, Dissolved	7439-89-6	2.38		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.342		0.0100	0.00500

Certificate of Analysis

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/25/2017 08:15
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627342	Analyst: KKB	Run Date: 08/25/2017 18:29
Collect Date: 08/22/2017 12:35	Dilution: 1	File ID: T4.082517.182932
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	1.25		0.400	0.200
Calcium, Total	7440-70-2	16.8		1.00	0.500
Iron, Total	7439-89-6	0.394		0.200	0.100
Magnesium, Total	7439-95-4	2.70		1.00	0.500
Manganese, Total	7439-96-5	0.0365		0.0200	0.0100
Potassium, Total	7440-09-7	7.99		2.00	1.00
Silica, Calculated as SiO ₂		16.7		4.28	2.14
Silicon, Total	7440-21-3	7.82		2.00	1.00

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/25/2017 08:15
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/28/2017 11:39
Workgroup #: WG627342	Analyst: KKB	Run Date: 08/28/2017 12:44
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: T4.082817.124407
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sodium, Total	7440-23-5	6490		10.0	5.00
J	The analyte was positively identified, but the quantitation was below the RL.				
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-09	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/25/2017 08:15
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627342	Analyst: KKB	Run Date: 08/25/2017 18:33
Collect Date: 08/22/2017 12:35	Dilution: 1	File ID: T4.082517.183320
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	1.20		0.400	0.200
Iron, Dissolved	7439-89-6	0.332		0.200	0.100
Manganese, Dissolved	7439-96-5		U	0.0200	0.0100
U	Not detected at or above adjusted sample detection limit.				

Certificate of Analysis

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:20
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.202042
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	0.118	J	0.200	0.100
Calcium, Total	7440-70-2	165		0.500	0.250
Iron, Total	7439-89-6	1.44		0.100	0.0500
Magnesium, Total	7439-95-4	83.3		0.500	0.250
Manganese, Total	7439-96-5	0.178		0.0100	0.00500
Potassium, Total	7440-09-7	4.84		1.00	0.500
Silica, Calculated as SiO ₂		18.7		2.14	1.07
Silicon, Total	7440-21-3	8.75		1.00	0.500
Sodium, Total	7440-23-5	163		0.500	0.250
J	The analyte was positively identified, but the quantitation was below the RL.				

Sample #: L17081212-12	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:24
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.202425
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Iron, Dissolved	7439-89-6	0.946		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.174		0.0100	0.00500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-13	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:28
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.202808
Sample Tag: 01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	6.40		0.200	0.100
Calcium, Total	7440-70-2	175		0.500	0.250
Iron, Total	7439-89-6	3.86		0.100	0.0500
Magnesium, Total	7439-95-4	90.1		0.500	0.250
Manganese, Total	7439-96-5	0.486		0.0100	0.00500
Potassium, Total	7440-09-7	37.7		1.00	0.500
Sodium, Total	7440-23-5	203		0.500	0.250

Sample #: L17081212-14

PrePrep Method: N/A

Instrument: ICP-THERMO4

Client ID: MW35-082217-MS

Prep Method: 3015A

Prep Date: 08/24/2017 08:16

Matrix: Water

Analytical Method: 6010C

Cal Date: 08/25/2017 13:19

Workgroup #: WG627086

Analyst: KKB

Run Date: 08/25/2017 20:31

Collect Date: 08/22/2017 15:28

Dilution: 1

File ID: T4.082517.203140

Sample Tag: 01

Units: mg/L

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	6.11		0.200	0.100
Iron, Dissolved	7439-89-6	3.36		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.472		0.0100	0.00500

Sample #: L17081212-15

PrePrep Method: N/A

Instrument: ICP-THERMO4

Client ID: MW35-082217-MSD

Prep Method: 3015A

Prep Date: 08/24/2017 08:16

Matrix: Water

Analytical Method: 6010C

Cal Date: 08/25/2017 13:19

Workgroup #: WG627086

Analyst: KKB

Run Date: 08/25/2017 20:35

Collect Date: 08/22/2017 15:28

Dilution: 1

File ID: T4.082517.203512

Sample Tag: 01

Units: mg/L

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5	6.30		0.200	0.100
Calcium, Total	7440-70-2	170		0.500	0.250
Iron, Total	7439-89-6	3.82		0.100	0.0500
Magnesium, Total	7439-95-4	88.5		0.500	0.250
Manganese, Total	7439-96-5	0.478		0.0100	0.00500
Potassium, Total	7440-09-7	37.6		1.00	0.500
Sodium, Total	7440-23-5	201		0.500	0.250

Certificate of Analysis

Sample #: L17081212-16	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW35-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:38
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: T4.082517.203843
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5	6.13		0.200	0.100
Iron, Dissolved	7439-89-6	3.32		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.476		0.0100	0.00500

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW36-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:42
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: T4.082517.204215
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2	111		0.500	0.250
Iron, Total	7439-89-6	4.71		0.100	0.0500
Magnesium, Total	7439-95-4	78.8		0.500	0.250
Manganese, Total	7439-96-5	0.0240		0.0100	0.00500
Potassium, Total	7440-09-7	4.88		1.00	0.500
Silica, Calculated as SiO ₂		23.8		2.14	1.07
Silicon, Total	7440-21-3	11.1		1.00	0.500
Sodium, Total	7440-23-5	118		0.500	0.250
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-18	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: MW36-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:45
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: T4.082517.204557
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Iron, Dissolved	7439-89-6	4.34		0.100	0.0500

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Manganese, Dissolved	7439-96-5	0.0241		0.0100	0.00500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-19	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: DUP-GW-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:49
Collect Date: 08/22/2017 09:00	Dilution: 1	File ID: T4.082517.204940
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2	107		0.500	0.250
Iron, Total	7439-89-6	4.49		0.100	0.0500
Magnesium, Total	7439-95-4	75.7		0.500	0.250
Manganese, Total	7439-96-5	0.0220		0.0100	0.00500
Potassium, Total	7440-09-7	4.54		1.00	0.500
Sodium, Total	7440-23-5	114		0.500	0.250
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-20	PrePrep Method: N/A	Instrument: ICP-THERMO4
Client ID: DUP-GW-082217	Prep Method: 3015A	Prep Date: 08/24/2017 08:16
Matrix: Water	Analytical Method: 6010C	Cal Date: 08/25/2017 13:19
Workgroup #: WG627086	Analyst: KKB	Run Date: 08/25/2017 20:53
Collect Date: 08/22/2017 09:00	Dilution: 1	File ID: T4.082517.205322
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Iron, Dissolved	7439-89-6	4.53		0.100	0.0500
Manganese, Dissolved	7439-96-5	0.0225		0.0100	0.00500
U	Not detected at or above adjusted sample detection limit.				

2.2.1.2 QC Summary Data

Example 6010 Calculations

Thermo Scientific iCAP

1.0 Initial Calibration (ICAL) Parameters

For a multi-point calibration, the system performs linear regression from data consisting of a blank and four standards.

2.0 Calculating the concentration (C) of an element in water using data from prep log, run log, and quantitation report (note: the data system performs this calculation automatically when correction factors have been entered):

$$Cx = Cs \times \frac{Vf}{Vi} \times D$$

Where:

Cs = Concentration computed by the data system in ug/mL (ppm)

Vf = Final volume (mL)

Vi = Initial volume (mL)

D = Dilution factor as a multiplier (10X = 10)

Example:

0.1

50

50

1

Cx = Concentration of element in ug/mL (mg/L)

0.1

3.0 Calculating the concentration (C) of an element in soil using data from prep log, run log, and quantitation report (note: the data system performs this calculation automatically when correction factors have been entered):

$$Cx = Cs \times \frac{Vf}{Vi} \times D$$

Where:

Cs = Concentration computed by the data system (mg/L) (ppm)

Vf = Final volume (mL)

Vi = Initial weight (g)

D = Dilution factor as a multiplier (10X = 10)

Example:

0.1

50

1

1

Cx = Concentration of element in ug/g (mg/kg)

5

4.0 Adjusting the concentration to dry weight:

$$Cdry = \frac{Cx \times 100}{Px}$$

Where:

Cx = Concentration calculated as received (wet basis)

Px = Percent solids of sample (%wt)

Example:

5

80

$Cdry$ = Concentration calculated as dry weight (mg/kg)

6.25

Example 6010 Calculations

Thermo Scientific iCAP

1.0 Initial Calibration (ICAL) Parameters

For a multi-point calibration, the system performs linear regression from data consisting of a blank and four standards.

2.0 Calculating the concentration (C) of an element in water using data from prep log, run log, and quantitation report (note: the data system performs this calculation automatically when correction factors have been entered):

$$Cx = Cs \times \frac{Vf}{Vi} \times D$$

Where:

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Vf = Final volume (mL)

Vi = Initial volume (mL)

D = Dilution factor as a multiplier (10X = 10)

Example:

0.1

50

50

1

Cx = Concentration of element in ug/mL (mg/L)

0.1

3.0 Calculating the concentration (C) of an element in soil using data from prep log, run log, and quantitation report (note: the data system performs this calculation automatically when correction factors have been entered):

$$Cx = Cs \times \frac{Vf}{Vi} \times D$$

Where:

Cs = Concentration computed by the data system (mg/L) (ppm)

Vf = Final volume (mL)

Vi = Initial weight (g)

D = Dilution factor as a multiplier (10X = 10)

Example:

0.1

50

1

1

Cx = Concentration of element in ug/g (mg/kg)

5

4.0 Adjusting the concentration to dry weight:

$$Cdry = \frac{Cx \times 100}{Px}$$

Where:

Cx = Concentration calculated as received (wet basis)

Px = Percent solids of sample (%wt)

Example:

5

80

$Cdry$ = Concentration calculated as dry weight (mg/kg)

6.25

Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup: WG627186
Analyst: ERP
Spike Analyst: ERP
Run Date: 08/25/2017 08:15
Method: 3015A
Balance: BAL019
Instrument: MW-1
Instrument Start: 08/25/2017 08:52

SOP: ME407 Revision 19
Spike Solution: STD83370
Spike Witness: VC
HNO3 Lot #: COA19940
HCL Lot #: COA19849
40 & 50 ML. DIGESTION TUCOA19932
ICP FILTERS LOT#r7ha2443RGT40684

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG627186-02	BLANK	1	40 mL	50 mL	204.941 g	204.93 g		
2	WG627107-01	FBLK1	17	5 mL	50 mL	206.121 g	206.104 g		
3	WG627107-02	FBLK2	17	5 mL	50 mL	207.034 g	207.019 g		
4	WG627186-04	FLT_BLK	1	40 mL	50 mL	206.094 g	206.079 g		
5	WG627186-03	LCS	1	40 mL	50 mL	209.963 g	209.951 g	5 mL	
6	L17081200-02	SAMP	1	40 mL	50 mL	204.931 g	204.902 g		08/29/17
7	L17081200-04	SAMP	1	40 mL	50 mL	206.694 g	206.643 g		08/29/17
8	L17081200-06	SAMP	1	40 mL	50 mL	204.564 g	204.524 g		08/29/17
9	L17081200-07	SAMP	1	40 mL	50 mL	207.725 g	207.679 g		08/29/17
10	L17081200-08	SAMP	1	40 mL	50 mL	204.165 g	204.117 g		08/29/17
11	L17081212-08	SAMP	1	20 mL	50 mL	206.3 g	206.273 g		09/06/17
12	L17081212-09	SAMP	1	20 mL	50 mL	203.957 g	203.921 g		09/06/17
13	L17081248-01	SAMP	17	5 mL	50 mL	207.896 g	207.868 g		09/01/17
14	L17081257-08	SAMP	1	40 mL	50 mL	204.585 g	204.557 g		08/30/17
15	L17081264-01	SAMP	1	40 mL	50 mL	207.303 g	207.262 g		08/28/17
16	L17081265-01	SAMP	17	5 mL	50 mL	205.374 g	205.332 g		08/29/17
17	L17081307-02	SAMP	1	40 mL	50 mL	205.394 g	205.367 g		09/07/17
18	WG627186-01	REF	1	40 mL	50 mL	203.515 g	203.486 g		
19	L17081307-07	RS02	1	40 mL	50 mL	203.515 g	203.486 g		09/07/17
20	WG627186-05	MS	1	40 mL	50 mL	210.721 g	210.699 g	5 mL	
21	L17081307-08	MS02	1	40 mL	50 mL	210.721 g	210.699 g	5 mL	09/07/17
22	WG627186-06	MSD	1	40 mL	50 mL	209.706 g	209.683 g	5 mL	
23	L17081307-09	SD02	1	40 mL	50 mL	209.706 g	209.683 g	5 mL	09/07/17
24	L17081307-14	SAMP	1	40 mL	50 mL	206.076 g	206.057 g		09/07/17
25	L17081307-17	SAMP	1	40 mL	50 mL	203.822 g	203.806 g		09/07/17
26	L17081307-20	SAMP	1	40 mL	50 mL	203.284 g	203.254 g		09/07/17
27	L17081307-23	SAMP	1	40 mL	50 mL	205.028 g	205.015 g		09/07/17

L17081200-04	filtered digestate
L17081212-08	filtered digestate: reduced volume due to matrix
L17081212-09	filtered digestate: reduced volume due to matrix

Analyst: Eun P. Kim

Reviewer: Vicki Callan



Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup: WG627050
Analyst: ERP
Spike Analyst: ERP
Run Date: 08/24/2017 08:16
Method: 3015A
Balance: BAL019
Instrument: MW-1
Instrument Start: 08/24/2017 08:37

SOP: ME407 Revision 19
Spike Solution: STD83371
Spike Witness: VC
HNO3 Lot #: COA19940
HCL Lot #: COA19849
40 & 50 ML. DIGESTION TUCOA19932
ICP FILTERS LOT#r7ha2443RGT40684

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG627050-05	BLANK	1	40 mL	50 mL	205.388 g	205.372 g		
2	WG627050-06	LCS	1	40 mL	50 mL	209.555 g	209.539 g	5 mL	
3	L17081041-01	SAMP	1	40 mL	50 mL	204.729 g	204.72 g		09/07/17
4	WG627050-01	REF	1	40 mL	50 mL	205.974 g	205.943 g		
5	L17081212-02	RS01	1	40 mL	50 mL	205.974 g	205.943 g		09/06/17
6	WG627050-02	REF	1	40 mL	50 mL	205.459 g	205.438 g		
7	L17081212-03	RS02	1	40 mL	50 mL	205.459 g	205.438 g		09/06/17
8	WG627050-07	MS	1	40 mL	50 mL	210.393 g	210.382 g	5 mL	
9	L17081212-04	MS01	1	40 mL	50 mL	210.393 g	210.382 g	5 mL	09/06/17
10	WG627050-09	MS	1	40 mL	50 mL	210.095 g	210.08 g	5 mL	
11	L17081212-05	MS02	1	40 mL	50 mL	210.095 g	210.08 g	5 mL	09/06/17
12	WG627050-08	MSD	1	40 mL	50 mL	210.775 g	210.747 g	5 mL	
13	L17081212-06	SD01	1	40 mL	50 mL	210.775 g	210.747 g	5 mL	09/06/17
14	WG627050-10	MSD	1	40 mL	50 mL	207.267 g	207.23 g	5 mL	
15	L17081212-07	SD02	1	40 mL	50 mL	207.267 g	207.23 g	5 mL	09/06/17
16	WG627050-03	REF	1	40 mL	50 mL	205.961 g	205.945 g		
17	L17081212-11	RS03	1	40 mL	50 mL	205.961 g	205.945 g		09/06/17
18	WG627050-04	REF	1	40 mL	50 mL	203.957 g	203.94 g		
19	L17081212-12	RS04	1	40 mL	50 mL	203.957 g	203.94 g		09/06/17
20	WG627050-11	MS	1	40 mL	50 mL	212.12 g	212.097 g	5 mL	
21	L17081212-13	MS03	1	40 mL	50 mL	212.12 g	212.097 g	5 mL	09/06/17
22	WG627050-13	MS	1	40 mL	50 mL	210.36 g	210.329 g	5 mL	
23	L17081212-14	MS04	1	40 mL	50 mL	210.36 g	210.329 g	5 mL	09/06/17
24	WG627050-12	MSD	1	40 mL	50 mL	211.892 g	211.866 g	5 mL	
25	L17081212-15	SD03	1	40 mL	50 mL	211.892 g	211.866 g	5 mL	09/06/17
26	WG627050-14	MSD	1	40 mL	50 mL	211.286 g	211.268 g	5 mL	
27	L17081212-16	SD04	1	40 mL	50 mL	211.286 g	211.268 g	5 mL	09/06/17
28	L17081212-17	SAMP	1	40 mL	50 mL	205.793 g	205.776 g		09/06/17
29	L17081212-18	SAMP	1	40 mL	50 mL	205.112 g	205.102 g		09/06/17
30	L17081212-19	SAMP	1	40 mL	50 mL	203.177 g	203.161 g		09/06/17
31	L17081212-20	SAMP	1	40 mL	50 mL	204.549 g	204.539 g		09/06/17
32	L17081215-02	SAMP	1	1 mL	50 mL	204.265 g	204.257 g		09/01/17
33	L17081215-04	SAMP	1	1 mL	50 mL	207.083 g	207.065 g		09/01/17
34	L17081215-06	SAMP	1	1 mL	50 mL	205.95 g	205.942 g		09/01/17
35	L17081220-01	SAMP	1	40 mL	50 mL	206.394 g	206.381 g		08/30/17
36	L17081237-14	SAMP	1	40 mL	50 mL	204.586 g	204.57 g		08/31/17

L17081215-04 filtered digestate

MW_DIG - Modified 09/30/2009
PDF ID: 5446365
Report generated: 08/24/2017 10:09



Microbac Laboratories Inc.
Microwave Digestion Log

L17081041-01	PE	SOP:
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Analyst: Eun P. Kim
Method: _____
Balance: _____

Spike Solution: _____
Spike Witness: _____
Reviewer: Veronica Collins

Instrument: _____
Instrument Start: _____

MW_DIG - Modified 09/30/2009
PDF ID: 5446365
Report generated: 08/24/2017 10:09



Analyst(s): BUB
Date: 8-24-17
Filter Lot #: 9486030
Microbac SOP: JCLP01 Rev #: 12

Balance ID:
BAL020
pH Probe ID:

Temp probe ID:
☒ 1025 ☐ 1023

Analyst / Date		Analyst / Date	
BLUB 8-24-17		BNB 8-25-17	
Time On	Temp On °C	Time Off	Temp Off °C
15:55	22.8	17:55	22.10

Agitator Speed 30 ± 2 rpm ☒

[illegible]

*Matrix Code: (S = solid, sand, soil or sludge) (P = paint) (O = organic) (W = water or aqueous waste)
D = Disposable plastic

D = Disposable plastic jug

TCLP Pretest weight will be 5.0 g (± 0.1) unless otherwise noted.

Temperature shall be maintained at $23^{\circ} \pm 2$ for 18 ± 2 hours unless otherwise noted.

Comments: NA

Peer Review By: Justin H

Microbac Laboratories Inc. Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 082517T4.1R.TXT
 Analyst1: KKB Analyst2: N/A
 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____

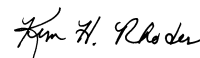
Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83125 ICSAB: STD83467 Int. Std: RG40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol : _____
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627342,627086

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T4.082517.130509	WG627408-01	Calibration Point		1		08/25/17 13:05
2	T4.082517.130856	WG627408-02	Calibration Point		1		08/25/17 13:08
3	T4.082517.131243	WG627408-03	Calibration Point		1		08/25/17 13:12
4	T4.082517.131631	WG627408-04	Calibration Point		1		08/25/17 13:16
5	T4.082517.131959	WG627408-05	Calibration Point		1		08/25/17 13:19
6	T4.082517.132327	WG627408-06	Initial Calibration Verification		1		08/25/17 13:23
7	T4.082517.132656	WG627408-07	Initial Calib Blank		1		08/25/17 13:26
8	T4.082517.133043	WG627408-08	LLICV		1		08/25/17 13:30
9	T4.082517.133427	WG627408-09	Low Level Initial Calibration V		1		08/25/17 13:34
10	T4.082517.133810	WG627408-10	LLICV		1		08/25/17 13:38
11	T4.082517.134153	WG627408-11	Interference Check		1		08/25/17 13:41
12	T4.082517.134539	WG627408-12	Interference Check		1		08/25/17 13:45
13	T4.082517.134913	WG627408-13	CCV		1		08/25/17 13:49
14	T4.082517.135240	WG627408-14	CCB		1		08/25/17 13:52
15	T4.082517.172932	WG627408-15	CCV		1		08/25/17 17:29
16	T4.082517.173301	WG627408-16	CCB		1		08/25/17 17:33
17	T4.082517.173649	WG627186-02	Method/Prep Blank	40/50	1		08/25/17 17:36
18	T4.082517.174037	WG627186-03	Laboratory Control S	40/50	1		08/25/17 17:40
19	T4.082517.174409	WG627186-04	Filter Blank		1		08/25/17 17:44
20	T4.082517.174755	WG627107-01	Fluid Blank 1		1		08/25/17 17:47
21	T4.082517.175143	WG627107-02	Fluid Blank 2		1		08/25/17 17:51
22	T4.082517.175533	L17081200-02	PZ101-GW-082117	40/50	1		08/25/17 17:55
23	T4.082517.175923	L17081200-04	PZ104-GW-082117	40/50	1		08/25/17 17:59
24	T4.082517.180330	L17081200-06	PZ105-GW-082117	40/50	1		08/25/17 18:03
25	T4.082517.180720	WG627342-01	Post Digestion Spike		1	L17081200-06	08/25/17 18:07
26	T4.082517.181059	WG627342-02	Serial Dilution		5	L17081200-06	08/25/17 18:10
27	T4.082517.181445	WG627408-17	CCV		1		08/25/17 18:14
28	T4.082517.181814	WG627408-18	CCB		1		08/25/17 18:18
29	T4.082517.182204	L17081200-07	BSUMP-SW-082117	40/50	1		08/25/17 18:22
30	T4.082517.182547	L17081200-08	BSUMP-SW-082117	40/50	1		08/25/17 18:25
31	T4.082517.182932	L17081212-08	MW21-082217	20/50	1		08/25/17 18:29
32	T4.082517.183320	L17081212-09	MW21-082217	20/50	1		08/25/17 18:33
33	T4.082517.183707	L17081248-01	AWV/SAPA 40 BAGS	5/50	1		08/25/17 18:37
34	T4.082517.184053	L17081257-08	16824-BV01-081717-ER	40/50	1		08/25/17 18:40

Page: 1 Approved: August 28, 2017




Microbac Laboratories Inc.
Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 082517T4.1R.TXT
 Analyst1: KKB Analyst2: N/A
 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____

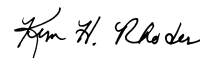
Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83125 ICSAB: STD83467 Int. Std: RG40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol : _____
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627342,627086

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T4.082517.184440	L17081264-01	H7H0602-02	40/50	1		08/25/17 18:44
36	T4.082517.184827	L17081265-01	H7H0602-01	5/50	1		08/25/17 18:48
37	T4.082517.185214	L17081307-02	SW1A-336-14	40/50	1		08/25/17 18:52
38	T4.082517.185600	WG627408-19	CCV		1		08/25/17 18:56
39	T4.082517.185928	WG627408-20	CCB		1		08/25/17 18:59
40	T4.082517.190317	WG627186-01	Reference Sample		1	L17081307-07	08/25/17 19:03
41	T4.082517.190703	WG627186-05	Matrix Spike	40/50	1	L17081307-07	08/25/17 19:07
42	T4.082517.191035	WG627186-06	Matrix Spike Duplica	40/50	1	L17081307-07	08/25/17 19:10
43	T4.082517.191408	L17081307-14	SW3A-336-14	40/50	1		08/25/17 19:14
44	T4.082517.191753	L17081307-17	SW3B-336-14	40/50	1		08/25/17 19:17
45	T4.082517.192137	L17081307-20	SW4A-336-14	40/50	1		08/25/17 19:21
46	T4.082517.192524	L17081307-23	SW5A-336-14	40/50	1		08/25/17 19:25
47	T4.082517.192913	WG627408-21	CCV		1		08/25/17 19:29
48	T4.082517.193241	WG627408-22	CCB		1		08/25/17 19:32
49	T4.082517.193631	WG627050-05	Method/Prep Blank	40/50	1		08/25/17 19:36
50	T4.082517.194017	WG627050-06	Laboratory Control S	40/50	1		08/25/17 19:40
51	T4.082517.194350	L17081041-01	P271-4992 LITHIUM PT	40/50	1		08/25/17 19:43
52	T4.082517.194737	WG627086-03	Serial Dilution		5	L17081041-01	08/25/17 19:47
53	T4.082517.195123	L17081212-02	MW02-082217		1	WG627050-01	08/25/17 19:51
54	T4.082517.195508	L17081212-03	MW02-082217		1	WG627050-02	08/25/17 19:55
55	T4.082517.195852	L17081212-04	MW02-082217-MS	40/50	1	WG627050-07	08/25/17 19:58
56	T4.082517.200232	L17081212-05	MW02-082217-MS	40/50	1	WG627050-09	08/25/17 20:02
57	T4.082517.200605	L17081212-06	MW02-082217-MSD	40/50	1	WG627050-08	08/25/17 20:06
58	T4.082517.200942	L17081212-07	MW02-082217-MSD	40/50	1	WG627050-10	08/25/17 20:09
59	T4.082517.201324	WG627408-23	CCV		1		08/25/17 20:13
60	T4.082517.201653	WG627408-24	CCB		1		08/25/17 20:16
61	T4.082517.202042	L17081212-11	MW35-082217		1	WG627050-03	08/25/17 20:20
62	T4.082517.202425	L17081212-12	MW35-082217		1	WG627050-04	08/25/17 20:24
63	T4.082517.202808	L17081212-13	MW35-082217-MS	40/50	1	WG627050-11	08/25/17 20:28
64	T4.082517.203140	L17081212-14	MW35-082217-MS	40/50	1	WG627050-13	08/25/17 20:31
65	T4.082517.203512	L17081212-15	MW35-082217-MSD	40/50	1	WG627050-12	08/25/17 20:35
66	T4.082517.203843	L17081212-16	MW35-082217-MSD	40/50	1	WG627050-14	08/25/17 20:38
67	T4.082517.204215	L17081212-17	MW36-082217	40/50	1		08/25/17 20:42
68	T4.082517.204557	L17081212-18	MW36-082217	40/50	1		08/25/17 20:45

Page: 2 Approved: August 28, 2017




Microbac Laboratories Inc.
Instrument Run Log

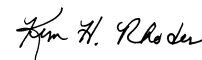
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 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____
 Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83125 ICSAB: STD83467 Int. Std: RG40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol : _____
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627342,627086

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	T4.082517.204940	L17081212-19	DUP-GW-082217	40/50	1		08/25/17 20:49
70	T4.082517.205322	L17081212-20	DUP-GW-082217	40/50	1		08/25/17 20:53
71	T4.082517.205707	WG627408-25	CCV		1		08/25/17 20:57
72	T4.082517.210036	WG627408-26	CCB		1		08/25/17 21:00
73	T4.082517.210426	L17081215-02	PERMEATE	1/50	1		08/25/17 21:04
74	T4.082517.210812	L17081215-04	BLEED	1/50	1		08/25/17 21:08
75	T4.082517.211156	L17081215-06	N. DOCK FLUME	1/50	1		08/25/17 21:11
76	T4.082517.211542	L17081220-01	2017PRE-3442 BROWNING	40/50	1		08/25/17 21:15
77	T4.082517.211926	L17081237-14	45-10-16 S23	40/50	1		08/25/17 21:19
78	T4.082517.212310	WG627086-01	Post Digestion Spike		1	L17081237-14	08/25/17 21:23
79	T4.082517.212642	WG627086-02	Serial Dilution		5	L17081237-14	08/25/17 21:26
80	T4.082517.213029	WG627408-27	CCV		1		08/25/17 21:30
81	T4.082517.213357	WG627408-28	CCB		1		08/25/17 21:33
82	T4.082517.213744	WG627408-29	LLCCV		1		08/25/17 21:37
83	T4.082517.214128	WG627408-30	Low Level Continuing Calibra		1		08/25/17 21:41
84	T4.082517.214513	WG627408-31	LLCCV		1		08/25/17 21:45
85	T4.082517.214857	WG627408-32	Interference Check		1		08/25/17 21:48
86	T4.082517.215241	WG627408-33	Interference Check		1		08/25/17 21:52
87	T4.082517.215618	WG627408-34	CCV		1		08/25/17 21:56
88	T4.082517.215946	WG627408-35	CCB		1		08/25/17 21:59

Page: 3 Approved: August 28, 2017




Microbac Laboratories Inc.
Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 082817T4.1
 Analyst1: KKB Analyst2: N/A
 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____

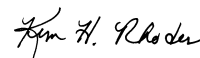
Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83125 ICSAB: STD83467 Int. Std: RG40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol : _____
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627342,627086,627457,627458

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T4.082817.112453	WG627494-01	Calibration Point		1		08/28/17 11:24
2	T4.082817.112840	WG627494-02	Calibration Point		1		08/28/17 11:28
3	T4.082817.113228	WG627494-03	Calibration Point		1		08/28/17 11:32
4	T4.082817.113615	WG627494-04	Calibration Point		1		08/28/17 11:36
5	T4.082817.113945	WG627494-05	Calibration Point		1		08/28/17 11:39
6	T4.082817.114312	WG627494-06	Initial Calibration Verification		1		08/28/17 11:43
7	T4.082817.114909	WG627494-07	Initial Calib Blank		1		08/28/17 11:49
8	T4.082817.115254	WG627494-08	Low Level Initial Calibration V		1		08/28/17 11:52
9	T4.082817.115636	WG627494-09	Low Level Initial Calibration V		1		08/28/17 11:56
10	T4.082817.120017	WG627494-10	LLICV		1		08/28/17 12:00
11	T4.082817.120358	WG627494-11	Interference Check		1		08/28/17 12:03
12	T4.082817.120738	WG627494-12	Interference Check		1		08/28/17 12:07
13	T4.082817.121108	WG627494-13	CCV		1		08/28/17 12:11
14	T4.082817.121434	WG627494-14	CCB		1		08/28/17 12:14
15	T4.082817.121817	L17081200-02	PZ101-GW-082117		10		08/28/17 12:18
16	T4.082817.122200	L17081200-04	PZ104-GW-082117		10		08/28/17 12:22
17	T4.082817.122542	L17081200-06	PZ105-GW-082117		10		08/28/17 12:25
18	T4.082817.122924	WG627342-01	Post Digestion Spike		10	L17081200-06	08/28/17 12:29
19	T4.082817.123251	WG627342-02	Serial Dilution		50	L17081200-06	08/28/17 12:32
20	T4.082817.123633	L17081200-07	BSUMP-SW-082117	40/50	20		08/28/17 12:36
21	T4.082817.124014	L17081200-08	BSUMP-SW-082117	40/50	5		08/28/17 12:40
22	T4.082817.124407	L17081212-08	MW21-082217	20/50	10		08/28/17 12:44
23	T4.082817.125246	L17081264-01	H7H0602-02	40/50	5		08/28/17 12:52
24	T4.082817.125634	WG627494-15	CCV		1		08/28/17 12:56
25	T4.082817.125959	WG627494-16	CCB		1		08/28/17 12:59
26	T4.082817.130352	L17081200-02	PZ101-GW-082117	40/50	20		08/28/17 13:03
27	T4.082817.130735	L17081200-04	PZ104-GW-082117	40/50	20		08/28/17 13:07
28	T4.082817.131118	L17081200-06	PZ105-GW-082117	40/50	20		08/28/17 13:11
29	T4.082817.131501	WG627342-01	Post Digestion Spike		20	L17081200-06	08/28/17 13:15
30	T4.082817.131830	WG627342-02	Serial Dilution		100	L17081200-06	08/28/17 13:18
31	T4.082817.132213	L17081200-07	BSUMP-SW-082117	40/50	50		08/28/17 13:22
32	T4.082817.132554	WG627494-17	CCV		1		08/28/17 13:25
33	T4.082817.132919	WG627494-18	CCB		1		08/28/17 13:29
34	T4.082817.133303	WG627050-01	Reference Sample		5	L17081212-02	08/28/17 13:33

Page: 1 Approved: August 29, 2017




Microbac Laboratories Inc.

Instrument Run Log

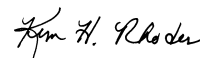
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 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____
 Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83125 ICSAB: STD83467 Int. Std: RG40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol: _____
 Stannous: _____ Hydroxylamine: _____

Workgroups: 627342,627086,627457,627458

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T4.082817.133644	WG627050-07	Matrix Spike	40/50	5	L17081212-02	08/28/17 13:36
36	T4.082817.134023	WG627050-08	Matrix Spike Duplica	40/50	5	L17081212-02	08/28/17 13:40
37	T4.082817.134401	WG627494-19	CCV		1		08/28/17 13:44
38	T4.082817.134726	WG627494-20	CCB		1		08/28/17 13:47
39	T4.082817.135109	WG627494-21	LLCCV		1		08/28/17 13:51
40	T4.082817.135453	WG627494-22	Low Level Continuing Calibra		1		08/28/17 13:54
41	T4.082817.135834	WG627494-23	Low Level Continuing Calibra		1		08/28/17 13:58
42	T4.082817.143921	WG627378-02	Method/Prep Blank	40/50	1		08/28/17 14:39
43	T4.082817.144305	WG627378-03	Laboratory Control S	40/50	1		08/28/17 14:43
44	T4.082817.144635	L17081312-01	45-10-16 P1	40/50	1		08/28/17 14:46
45	T4.082817.145015	L17081312-02	45-10-16 975-S1	40/50	1		08/28/17 14:50
46	T4.082817.145357	L17081312-03	45-10-16 S5/S7	40/50	1		08/28/17 14:53
47	T4.082817.145737	L17081312-04	45-10-16 S7	40/50	1		08/28/17 14:57
48	T4.082817.150119	L17081312-05	45-10-16 S6	40/50	1		08/28/17 15:01
49	T4.082817.150500	L17081312-06	45-10-16 S27	40/50	1		08/28/17 15:05
50	T4.082817.150841	WG627494-24	CCV		1		08/28/17 15:08
51	T4.082817.151206	WG627494-25	CCB		1		08/28/17 15:12
52	T4.082817.151549	L17081312-07	45-10-16 S8	40/50	1		08/28/17 15:15
53	T4.082817.151930	L17081312-08	45-10-16 S17	40/50	1		08/28/17 15:19
54	T4.082817.152312	L17081312-09	45-10-16 S10	40/50	1		08/28/17 15:23
55	T4.082817.152653	L17081312-10	45-10-16 S11/S10	40/50	1		08/28/17 15:26
56	T4.082817.153034	L17081312-11	45-10-16 S24	40/50	1		08/28/17 15:30
57	T4.082817.153415	L17081312-12	45-10-16 S25	40/50	1		08/28/17 15:34
58	T4.082817.153756	L17081312-13	45-10-16 S26	40/50	1		08/28/17 15:37
59	T4.082817.154137	L17081312-14	45-11-15.03 S1	40/50	1		08/28/17 15:41
60	T4.082817.154518	L17081356-01	18108-L01-WQ-W0024	40/50	1		08/28/17 15:45
61	T4.082817.154903	L17081356-02	51103-D01-WQ-W0007	40/50	1		08/28/17 15:49
62	T4.082817.155247	WG627494-26	CCV		1		08/28/17 15:52
63	T4.082817.155612	WG627494-27	CCB		1		08/28/17 15:56
64	T4.082817.155956	L17081356-03	51711-B01-WQ-W0002	40/50	1		08/28/17 15:59
65	T4.082817.160340	WG627378-01	Reference Sample		1	L17081356-04	08/28/17 16:03
66	T4.082817.160726	WG627457-01	Post Digestion Spike		1	L17081356-04	08/28/17 16:07
67	T4.082817.161055	WG627457-02	Serial Dilution		5	L17081356-04	08/28/17 16:10
68	T4.082817.161438	WG627378-04	Matrix Spike	40/50	1	L17081356-04	08/28/17 16:14

Page: 2 Approved: August 29, 2017




Microbac Laboratories Inc.
Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 082817T4.1
 Analyst1: KKB Analyst2: N/A
 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____

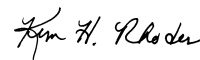
Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83125 ICSAB: STD83467 Int. Std: RG40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol : _____
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627342,627086,627457,627458

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	T4.082817.161807	WG627378-05	Matrix Spike Duplica	40/50	1	L17081356-04	08/28/17 16:18
70	T4.082817.162136	WG627494-28	CCV		1		08/28/17 16:21
71	T4.082817.162501	WG627494-29	CCB		1		08/28/17 16:25
72	T4.082817.162844	WG627494-30	Low Level Continuing Calibra		1		08/28/17 16:28
73	T4.082817.163227	WG627494-31	Low Level Continuing Calibra		1		08/28/17 16:32
74	T4.082817.163608	WG627494-32	LLCCV		1		08/28/17 16:36
75	T4.082817.163949	WG627371-02	Method/Prep Blank	40/50	1		08/28/17 16:39
76	T4.082817.164333	WG627371-03	Laboratory Control S	40/50	1		08/28/17 16:43
77	T4.082817.164702	L17081305-01	PZ06-082317	40/50	1		08/28/17 16:47
78	T4.082817.165042	L17081305-02	PZ06-082317	40/50	1		08/28/17 16:50
79	T4.082817.165423	L17081305-03	PZ04-082317	40/50	1		08/28/17 16:54
80	T4.082817.165810	L17081305-04	PZ04-082317	40/50	1		08/28/17 16:58
81	T4.082817.170159	L17081305-05	DUP-GW-082317-1	40/50	1		08/28/17 17:01
82	T4.082817.170548	L17081305-06	DUP-GW-082317-1	40/50	1		08/28/17 17:05
83	T4.082817.170937	WG627458-01	Post Digestion Spike		1	L17081305-06	08/28/17 17:09
84	T4.082817.171315	WG627458-02	Serial Dilution		5	L17081305-06	08/28/17 17:13
85	T4.082817.171656	WG627494-33	CCV		1		08/28/17 17:16
86	T4.082817.172020	WG627494-34	CCB		1		08/28/17 17:20
87	T4.082817.172404	L17081305-08	MW31-082317	20/50	1		08/28/17 17:24
88	T4.082817.172751	L17081305-09	MW31-082317	20/50	1		08/28/17 17:27
89	T4.082817.173138	L17081305-10	MW30-082317	40/50	1		08/28/17 17:31
90	T4.082817.173527	L17081305-11	MW30-082317	40/50	1		08/28/17 17:35
91	T4.082817.173916	L17081305-12	MW11S-082317	40/50	1		08/28/17 17:39
92	T4.082817.174306	L17081305-13	MW11S-082317	40/50	1		08/28/17 17:43
93	T4.082817.174654	L17081305-14	MW09R-082317	40/50	1		08/28/17 17:46
94	T4.082817.175042	L17081305-15	MW09R-082317	40/50	1		08/28/17 17:50
95	T4.082817.175429	L17081305-16	DUP-GW-082317-2	40/50	1		08/28/17 17:54
96	T4.082817.175818	L17081305-17	DUP-GW-082317-2	40/50	1		08/28/17 17:58
97	T4.082817.180206	WG627494-35	CCV		1		08/28/17 18:02
98	T4.082817.180530	WG627494-36	CCB		1		08/28/17 18:05
99	T4.082817.180914	L17081305-19	MW19-082317	40/50	1		08/28/17 18:09
100	T4.082817.181256	WG627371-01	Reference Sample		1	L17081305-20	08/28/17 18:12
101	T4.082817.181636	WG627371-04	Matrix Spike	40/50	1	L17081305-20	08/28/17 18:16
102	T4.082817.182005	WG627371-05	Matrix Spike Duplica	40/50	1	L17081305-20	08/28/17 18:20

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Microbac Laboratories Inc.

Instrument Run Log

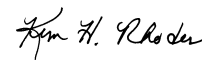
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 Analyst1: KKB Analyst2: N/A
 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____
 Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83125 ICSAB: STD83467 Int. Std: RGT40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol : _____
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627342,627086,627457,627458

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
103	T4.082817.182335	L17081314-01	59-10-1.25 W1	40/50	1		08/28/17 18:23
104	T4.082817.182712	WG627494-37	Interference Check		1		08/28/17 18:27
105	T4.082817.183052	WG627494-38	Interference Check		1		08/28/17 18:30
106	T4.082817.183421	WG627494-39	CCV		1		08/28/17 18:34
107	T4.082817.183746	WG627494-40	CCB		1		08/28/17 18:37
108	T4.082817.184129	WG627494-41	Low Level Continuing Calibra		1		08/28/17 18:41
109	T4.082817.184512	WG627494-42	LLCCV		1		08/28/17 18:45
110	T4.082817.184854	WG627494-43	LLCCV		1		08/28/17 18:48

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Microbac Laboratories Inc.

Instrument Run Log

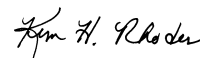
Instrument: ICP-THERMO4 Dataset: 082917T4.2
 Analyst1: KKB Analyst2: N/A
 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____
 Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83620 ICSAB: STD83467 Int. Std: RG40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol: _____
 Stannous: _____ Hydroxylamine: _____

Workgroups: 627458,627342,627650

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T4.082917.141020	WG627770-01	Calibration Point		1		08/29/17 14:10
2	T4.082917.141407	WG627770-02	Calibration Point		1		08/29/17 14:14
3	T4.082917.141755	WG627770-03	Calibration Point		1		08/29/17 14:17
4	T4.082917.142143	WG627770-04	Calibration Point		1		08/29/17 14:21
5	T4.082917.142511	WG627770-05	Calibration Point		1		08/29/17 14:25
6	T4.082917.142839	WG627770-06	Initial Calibration Verification		1		08/29/17 14:28
7	T4.082917.143600	WG627770-07	Initial Calib Blank		1		08/29/17 14:36
8	T4.082917.143948	WG627770-08	Low Level Initial Calibration V		1		08/29/17 14:39
9	T4.082917.144333	WG627770-09	Interference Check		1		08/29/17 14:43
10	T4.082917.144717	WG627770-10	Interference Check		1		08/29/17 14:47
11	T4.082917.145051	WG627770-11	CCV		1		08/29/17 14:50
12	T4.082917.145419	WG627770-12	CCB		1		08/29/17 14:54
13	T4.082917.151827	L17081305-03	PZ04-082317	40/50	1		08/29/17 15:18
14	T4.082917.152212	L17081305-05	DUP-GW-082317-1	40/50	1		08/29/17 15:22
15	T4.082917.152555	L17081305-08	MW31-082317	20/50	1		08/29/17 15:25
16	T4.082917.152940	L17081305-10	MW30-082317	40/50	1		08/29/17 15:29
17	T4.082917.153324	L17081305-12	MW11S-082317	40/50	1		08/29/17 15:33
18	T4.082917.153709	L17081305-14	MW09R-082317	40/50	1		08/29/17 15:37
19	T4.082917.154053	L17081305-16	DUP-GW-082317-2	40/50	1		08/29/17 15:40
20	T4.082917.154436	L17081307-23	SW5A-336-14	40/50	1		08/29/17 15:44
21	T4.082917.154824	WG627342-03	Post Digestion Spike		1	L17081307-23	08/29/17 15:48
22	T4.082917.155156	WG627342-04	Serial Dilution		5	L17081307-23	08/29/17 15:51
23	T4.082917.155544	WG627770-13	CCV		1		08/29/17 15:55
24	T4.082917.155912	WG627770-14	CCB		1		08/29/17 15:59
25	T4.082917.160301	WG627770-15	LLCCV		1		08/29/17 16:03
26	T4.082917.160647	WG627770-16	LLCCV		1		08/29/17 16:06
27	T4.082917.161035	WG627770-17	Low Level Continuing Calibra		1		08/29/17 16:10
28	T4.082917.161421	WG627573-02	Method/Prep Blank	40/50	1		08/29/17 16:14
29	T4.082917.161808	WG627573-03	Laboratory Control S	40/50	1		08/29/17 16:18
30	T4.082917.162140	WG627573-04	Filter Blank		1		08/29/17 16:21
31	T4.082917.162528	WG627396-01	Fluid Blank 1		1		08/29/17 16:25
32	T4.082917.162915	WG627396-02	Fluid Blank 2		1		08/29/17 16:29
33	T4.082917.163303	L17081311-01	RHL\ DINSMORE\ 22-01-01	40/50	1		08/29/17 16:33
34	T4.082917.163647	L17081311-02	RHL\ DINSMORE\ 22-01-01	40/50	1		08/29/17 16:36

Page: 1 Approved: August 31, 2017




Microbac Laboratories Inc.
Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 082917T4.2
 Analyst1: KKB Analyst2: N/A
 Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
 Maintenance Log ID: _____
 Calibration Std: STD83373 ICV Std: STD83372 Post Spike: STD83126
 ICSA: STD83620 ICSAB: STD83467 Int. Std: RG40895
 CCV: STD83374 LLCCV: COA19621 Tuning Sol : _____
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627458,627342,627650

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T4.082917.164032	L17081326-01	FRN SALTCAKE	5/50	1		08/29/17 16:40
36	T4.082917.164427	WG627650-01	Post Digestion Spike		1	L17081326-01	08/29/17 16:44
37	T4.082917.164808	WG627650-02	Serial Dilution		5	L17081326-01	08/29/17 16:48
38	T4.082917.165154	WG627770-18	CCV		1		08/29/17 16:51
39	T4.082917.165523	WG627770-19	CCB		1		08/29/17 16:55
40	T4.082917.165911	L17081326-02	FRN FURNACE BAGHOUSE	5/50	1		08/29/17 16:59
41	T4.082917.170256	L17081326-03	FRN MILL FINES (SCREW 1	5/50	1		08/29/17 17:02
42	T4.082917.170649	L17081326-04	FRN MILL FINES (SCREW 8	5/50	1		08/29/17 17:06
43	T4.082917.171040	L17081364-01	17H1552-11	5/50	1		08/29/17 17:10
44	T4.082917.171423	L17081405-01	CBF-Q1-3	5/50	1		08/29/17 17:14
45	T4.082917.171809	WG627573-01	Reference Sample		1	L17081405-03	08/29/17 17:18
46	T4.082917.172155	WG627573-05	Matrix Spike	5/50	1	L17081405-03	08/29/17 17:21
47	T4.082917.172527	WG627573-06	Matrix Spike Duplica	5/50	1	L17081405-03	08/29/17 17:25
48	T4.082917.172859	L17081406-04	2017-TRENCH-WC	5/50	1		08/29/17 17:28
49	T4.082917.173245	L17081460-01	INS-WL01-082514	40/50	1		08/29/17 17:32
50	T4.082917.173629	WG627770-20	CCV		1		08/29/17 17:36
51	T4.082917.173956	WG627770-21	CCB		1		08/29/17 17:39
52	T4.082917.174346	L17081464-01	INS-WL02-082517	40/50	1		08/29/17 17:43
53	T4.082917.174727	L17081466-01	INS-WL03-082517	40/50	1		08/29/17 17:47
54	T4.082917.175109	L17081469-01	27-1-8 W1	40/50	1		08/29/17 17:51
55	T4.082917.175452	WG627770-22	Interference Check		1		08/29/17 17:54
56	T4.082917.175835	WG627770-23	Interference Check		1		08/29/17 17:58
57	T4.082917.180211	WG627770-24	CCV		1		08/29/17 18:02
58	T4.082917.180540	WG627770-25	CCB		1		08/29/17 18:05

Page: 2 Approved: August 31, 2017

Kim H. Rhodes



Microbac Laboratories Inc.

Data Checklist

Date: 25-AUG-2017

Analyst: KKB

Analyst: NA

Method: 6010B/6010C/200.7

Instrument: ICP-THERMO4

Curve Workgroup: 627408

Runlog ID: 84204

Analytical Workgroups: 627342,627086

STD ID#s on Runlog	X
Calibration/Linearity	X
ICV/CCV	X
ICV RSD < 3% (EPA 200.7 only)	
ICB/CCB	X
ICSA/ICSAB	X
CRI	
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	X
Client Forms	X
Level X	
Level 3	1200,1220
Level 4	1212,1257,1041
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	KKB
Secondary Reviewer	KHR
Comments	

Primary Reviewer:
28-AUG-2017

Secondary Reviewer:
28-AUG-2017

K: K Buck

Lyn H. Rhodes

CHECKLIST1 - Modified 03/05/2008

Generated: AUG-29-2017 16:06:24



Microbac Laboratories Inc.

Data Checklist

Date: 28-AUG-2017

Analyst: KKB

Analyst: NA

Method: 6010B/6010C/200.7

Instrument: ICP-THERMO4

Curve Workgroup: 627494

Runlog ID: 84223

Analytical Workgroups: 627342,627086,627457,627458

STD ID#s on Runlog	X
Calibration/Linearity	X
ICV/CCV	X
ICV RSD < 3% (EPA 200.7 only)	
ICB/CCB	X
ICSA/ICSAB	X
CRI	
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	X
Client Forms	X
Level X	
Level 3	1200
Level 4	1212,1356,1305
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	KKB
Secondary Reviewer	KHR
Comments	

Primary Reviewer:
29-AUG-2017

Secondary Reviewer:
29-AUG-2017

Ki K Buck

Lyn H. Rhodes

CHECKLIST1 - Modified 03/05/2008

Generated: AUG-29-2017 11:51:54



Microbac Laboratories Inc.

Data Checklist

Date: 29-AUG-2017
 Analyst: KKB
 Analyst: NA
 Method: 6010B/6010C/200.7
 Instrument: ICP-THERMO4
 Curve Workgroup: 627770
 Runlog ID: 84259
 Analytical Workgroups: 627458,627342,627650

STD ID#s on Runlog	X
Calibration/Linearity	X
ICV/CCV	X
ICV RSD < 3% (EPA 200.7 only)	
ICB/CCB	X
ICSA/ICSAB	X
CRI	
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	X
Client Forms	X
Level X	
Level 3	1460,1464,1466
Level 4	1305,1406
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	KKB
Secondary Reviewer	KHR
Comments	

Primary Reviewer:
30-AUG-2017

K: K Buck

Secondary Reviewer:
31-AUG-2017

Lyn H. Rhodes

CHECKLIST1 - Modified 03/05/2008

Generated: AUG-31-2017 08:34:04



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C

AAB#: WG627086

Login Number: L17081212

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/24/2017	1.8	180		08/25/17	3.3	180	
MW02-082217	02	08/22/17					08/24/2017	1.8	180		08/28/17	6	180	
MW02-082217	03	08/22/17					08/24/2017	1.8	180		08/25/17	3.3	180	
MW02-082217-MS	04	08/22/17					08/24/2017	1.8	180		08/28/17	6.1	180	
MW02-082217-MS	04	08/22/17					08/24/2017	1.8	180		08/25/17	3.3	180	
MW02-082217-MS	05	08/22/17					08/24/2017	1.8	180		08/25/17	3.3	180	
MW02-082217-MSD	06	08/22/17					08/24/2017	1.8	180		08/28/17	6.1	180	
MW02-082217-MSD	06	08/22/17					08/24/2017	1.8	180		08/25/17	3.3	180	
MW02-082217-MSD	07	08/22/17					08/24/2017	1.8	180		08/25/17	3.3	180	
MW35-082217	11	08/22/17					08/24/2017	1.7	180		08/25/17	3.2	180	
MW35-082217	12	08/22/17					08/24/2017	1.7	180		08/25/17	3.2	180	
MW35-082217-MS	13	08/22/17					08/24/2017	1.7	180		08/25/17	3.2	180	
MW35-082217-MS	14	08/22/17					08/24/2017	1.7	180		08/25/17	3.2	180	
MW35-082217-MSD	15	08/22/17					08/24/2017	1.7	180		08/25/17	3.2	180	
MW35-082217-MSD	16	08/22/17					08/24/2017	1.7	180		08/25/17	3.2	180	
MW36-082217	17	08/22/17					08/24/2017	1.7	180		08/25/17	3.2	180	
MW36-082217	18	08/22/17					08/24/2017	1.7	180		08/25/17	3.2	180	
DUP-GW-082217	19	08/22/17					08/24/2017	2	180		08/25/17	3.5	180	
DUP-GW-082217	20	08/22/17					08/24/2017	2	180		08/25/17	3.5	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5450415
Report generated 08/29/2017 11:05



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C
Login Number: L17081212

AAB#: WG627342

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW21-082217	08	08/22/17					08/25/2017	2.8	180		08/28/17	6	180	
MW21-082217	08	08/22/17					08/25/2017	2.8	180		08/25/17	3.2	180	
MW21-082217	09	08/22/17					08/25/2017	2.8	180		08/25/17	3.2	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5450415
Report generated 08/29/2017 11:05



METHOD BLANK SUMMARY

Login Number: <u>L17081212</u>	Work Group: <u>WG627342</u>
Blank File ID: <u>T4.082517.173649</u>	Blank Sample ID: <u>WG627186-02</u>
Prep Date: <u>08/25/17 08:15</u>	Instrument ID: <u>ICP-THERM04</u>
Analyzed Date: <u>08/25/17 17:36</u>	Method: <u>6010C</u>
Analyst: <u>KKB</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627186-03	T4.082517.174037	08/25/17 17:40	01
FLT_BLK	WG627186-04	T4.082517.174409	08/25/17 17:44	01
MW21-082217	L17081212-08	T4.082517.182932	08/25/17 18:29	01
MW21-082217	L17081212-09	T4.082517.183320	08/25/17 18:33	01
MW21-082217	L17081212-08	T4.082817.124407	08/28/17 12:44	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 5450416
 Report generated 08/29/2017 11:06



METHOD BLANK SUMMARY

Login Number: <u>L17081212</u>	Work Group: <u>WG627086</u>
Blank File ID: <u>T4.082517.193631</u>	Blank Sample ID: <u>WG627050-05</u>
Prep Date: <u>08/24/17 08:16</u>	Instrument ID: <u>ICP-THERM04</u>
Analyzed Date: <u>08/25/17 19:36</u>	Method: <u>6010C</u>
Analyst: <u>KKB</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627050-06	T4.082517.194017	08/25/17 19:40	01
MW02-082217	L17081212-02	T4.082517.195123	08/25/17 19:51	01
MW02-082217	L17081212-03	T4.082517.195508	08/25/17 19:55	01
MW02-082217-MS	L17081212-04	T4.082517.195852	08/25/17 19:58	01
MW02-082217-MS	L17081212-05	T4.082517.200232	08/25/17 20:02	01
MW02-082217-MSD	L17081212-06	T4.082517.200605	08/25/17 20:06	01
MW02-082217-MSD	L17081212-07	T4.082517.200942	08/25/17 20:09	01
MW35-082217	L17081212-11	T4.082517.202042	08/25/17 20:20	01
MW35-082217	L17081212-12	T4.082517.202425	08/25/17 20:24	01
MW35-082217-MS	L17081212-13	T4.082517.202808	08/25/17 20:28	01
MW35-082217-MS	L17081212-14	T4.082517.203140	08/25/17 20:31	01
MW35-082217-MSD	L17081212-15	T4.082517.203512	08/25/17 20:35	01
MW35-082217-MSD	L17081212-16	T4.082517.203843	08/25/17 20:38	01
MW36-082217	L17081212-17	T4.082517.204215	08/25/17 20:42	01
MW36-082217	L17081212-18	T4.082517.204557	08/25/17 20:45	01
DUP-GW-082217	L17081212-19	T4.082517.204940	08/25/17 20:49	01
DUP-GW-082217	L17081212-20	T4.082517.205322	08/25/17 20:53	01
MW02-082217	L17081212-02	T4.082817.133303	08/28/17 13:33	DL01
MW02-082217-MS	L17081212-04	T4.082817.133644	08/28/17 13:36	DL01
MW02-082217-MSD	L17081212-06	T4.082817.134023	08/28/17 13:40	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 5450416
 Report generated 08/29/2017 11:06



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/25/17 08:15 Sample ID: WG627186-02
Instrument ID: ICP-THERM04 Run Date: 08/25/17 17:36 Prep Method: 3015A
File ID: T4.082517.173649 Analyst: KKB Method: 6010C
Workgroup (AAB#): WG627342 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: ICP-TH - 25-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Aluminum, Total	0.100	0.200	0.100	1	U
Calcium, Total	0.250	0.500	0.250	1	U
Iron, Total	0.0500	0.100	0.0500	1	U
Magnesium, Total	0.250	0.500	0.250	1	U
Manganese, Total	0.00500	0.0100	0.00500	1	U
Potassium, Total	0.500	1.00	0.500	1	U
Silica, Calculated as SiO2	1.07	2.14	1.07	1	U
Silicon, Total	0.500	1.00	0.500	1	U
Sodium, Total	0.250	0.500	0.250	1	U

MDL Method Detection Limit
RL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > RL

Report Name: BLANK
PDF ID: 5450417
29-AUG-2017 11:06



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/24/17 08:16 Sample ID: WG627050-05
Instrument ID: ICP-THERM04 Run Date: 08/25/17 19:36 Prep Method: 3015A
File ID: T4.082517.193631 Analyst: KKB Method: 6010C
Workgroup (AAB#): WG627086 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: ICP-TH - 25-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Aluminum, Total	0.100	0.200	0.100	1	U
Calcium, Total	0.250	0.500	0.250	1	U
Iron, Total	0.0500	0.100	0.0500	1	U
Magnesium, Total	0.250	0.500	0.250	1	U
Manganese, Total	0.00500	0.0100	0.00500	1	U
Potassium, Total	0.500	1.00	0.500	1	U
Silica, Calculated as SiO ₂	1.07	2.14	1.07	1	U
Silicon, Total	0.500	1.00	0.500	1	U
Sodium, Total	0.250	0.500	0.250	1	U

MDL Method Detection Limit
RL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > RL

Report Name: BLANK
PDF ID: 5450417
29-AUG-2017 11:06



**Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)**

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627186-03</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>17:40</u>	Prep Method: <u>3015A</u>
File ID: <u>T4.082517.174037</u>	Analyst: <u>KKB</u>	Method: <u>6010C</u>
Workgroup (AAB#): <u>WG627342</u>	Matrix: <u>Water</u>	Units: <u>mg/L</u>
QC Key: <u>WATERLOO</u>	Lot#: <u>STD83370</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>

Analytes	Expected	Found	% Rec	LCS Limits			Q
Aluminum, Total	6.25	6.43	103	85	-	115	
Calcium, Total	6.25	6.28	100	85	-	115	
Iron, Total	2.50	2.50	100	85	-	115	
Magnesium, Total	6.25	6.26	100	85	-	115	
Manganese, Total	0.313	0.318	102	85	-	115	
Potassium, Total	31.3	31.8	102	85	-	115	
Silicon, Total	3.13	3.12	100	85	-	115	
Sodium, Total	31.3	31.8	102	85	-	115	

LCS - Modified 03/06/2008
PDF File ID: 5450418
Report generated: 08/29/2017 11:06



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627050-06</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>19:40</u>	Prep Method: <u>3015A</u>
File ID: <u>T4.082517.194017</u>	Analyst: <u>KKB</u>	Method: <u>6010C</u>
Workgroup (AAB#): <u>WG627086</u>	Matrix: <u>Water</u>	Units: <u>mg/L</u>
QC Key: <u>WATERLOO</u>	Lot#: <u>STD83371</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>

Analytes	Expected	Found	% Rec	LCS Limits			Q
Aluminum, Total	6.25	6.46	103	85	-	115	
Calcium, Total	6.25	6.25	99.9	85	-	115	
Iron, Total	2.50	2.49	99.5	85	-	115	
Magnesium, Total	6.25	6.20	99.2	85	-	115	
Manganese, Total	0.313	0.312	99.9	85	-	115	
Potassium, Total	31.3	32.6	104	85	-	115	
Silicon, Total	3.13	3.12	99.9	85	-	115	
Sodium, Total	31.3	32.4	104	85	-	115	

LCS - Modified 03/06/2008
PDF File ID: 5450418
Report generated: 08/29/2017 11:06



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-THERM04- 25-AUG-17
 Instrument ID: ICP-THERM04 Contract #: _____
 Parent ID: L17081212-02 File ID: T4.082517.195123 Dil: 1
 Sample ID: L17081212-04 MS File ID: T4.082517.195852 Dil: 1
 Sample ID: L17081212-06 MSD File ID: T4.082517.200605 Dil: 1

Worknum: WG627086
 Prep Method: 3015A
 Method: 6010C
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum, Total	U	6.25	6.09	97.4	6.25	6.12	97.9	0.479	85 - 115	20	
Calcium, Total	198	6.25	209	173	6.25	206	123	1.51	85 - 115	20	*
Iron, Total	0.423	2.50	2.88	98.4	2.50	2.85	96.9	1.28	85 - 115	20	
Magnesium, Total	22.5	6.25	29.1	107	6.25	28.1	90.7	3.47	85 - 115	20	
Manganese, Total	0.0588	0.313	0.356	95.1	0.313	0.356	95.1	0.0351	85 - 115	20	
Potassium, Total	7.96	31.3	41.4	107	31.3	41.3	107	0.269	85 - 115	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-THERM04- 25-AUG-17
 Instrument ID: ICP-THERM04 Contract #: _____
 Parent ID: L17081212-03 File ID: T4.082517.195508 Dil: 1
 Sample ID: L17081212-05 MS File ID: T4.082517.200232 Dil: 1
 Sample ID: L17081212-07 MSD File ID: T4.082517.200942 Dil: 1

Worknum: WG627086
 Prep Method: 3015A
 Method: 6010C
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum, Dissolved	U	6.25	6.15	98.3	6.25	5.82	93.2	5.41	85 - 115	20	
Iron, Dissolved	0.0700	2.50	2.50	97.3	2.50	2.38	92.4	5.04	85 - 115	20	
Manganese, Dissolved	0.0638	0.313	0.364	96	0.313	0.342	89.2	6.08	85 - 115	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 5450574
 Report generated 08/29/2017 11:06



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-THERM04- 25-AUG-17
 Instrument ID: ICP-THERM04 Contract #: _____
 Parent ID: L17081212-11 File ID: T4.082517.202042 Dil: 1
 Sample ID: L17081212-13 MS File ID: T4.082517.202808 Dil: 1
 Sample ID: L17081212-15 MSD File ID: T4.082517.203512 Dil: 1

Worknum: WG627086
 Prep Method: 3015A
 Method: 6010C
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum, Total	0.118	6.25	6.40	101	6.25	6.30	98.9	1.62	85 - 115	20	
Calcium, Total	165	6.25	175	151	6.25	170	78.2	2.65	85 - 115	20	*
Iron, Total	1.44	2.50	3.86	97	2.50	3.82	95.3	1.09	85 - 115	20	
Magnesium, Total	83.3	6.25	90.1	109	6.25	88.5	83.8	1.77	85 - 115	20	*
Manganese, Total	0.178	0.313	0.486	98.3	0.313	0.478	95.8	1.64	85 - 115	20	
Potassium, Total	4.84	31.3	37.7	105	31.3	37.6	105	0.332	85 - 115	20	
Sodium, Total	163	31.3	203	128	31.3	201	121	1.12	85 - 115	20	*

* FAILS %REC LIMIT

FAILS RPD LIMIT



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-THERM04- 25-AUG-17
 Instrument ID: ICP-THERM04 Contract #: _____
 Parent ID: L17081212-12 File ID: T4.082517.202425 Dil: 1
 Sample ID: L17081212-14 MS File ID: T4.082517.203140 Dil: 1
 Sample ID: L17081212-16 MSD File ID: T4.082517.203843 Dil: 1

Worknum: WG627086
 Prep Method: 3015A
 Method: 6010C
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum, Dissolved	U	6.25	6.11	97.8	6.25	6.13	98.1	0.265	85 - 115	20	
Iron, Dissolved	0.946	2.50	3.36	96.3	2.50	3.32	94.9	1.10	85 - 115	20	
Manganese, Dissolved	0.174	0.313	0.472	95.4	0.313	0.476	96.7	0.903	85 - 115	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-THERM04- 28-AUG-17
 Instrument ID: ICP-THERM04 Contract #: _____
 Parent ID: L17081212-02 File ID: T4.082817.133303 Dil: 5
 Sample ID: L17081212-04 MS File ID: T4.082817.133644 Dil: 5
 Sample ID: L17081212-06 MSD File ID: T4.082817.134023 Dil: 5

Worknum: WG627086
 Prep Method: 3015A
 Method: 6010C
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Sodium, Total	422	31.3	498	242	31.3	475	168	4.74	85 - 115	20	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 5450574
 Report generated 08/29/2017 11:06



MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum: L17081212Cal ID: ICP-THERM04 -Worknum: WG627342Instrument ID: ICP-THERM04

Contract #: _____

Method: 6010CParent ID: WG627186-01File ID: T4.082517.190317Dil: 1Matrix: WATERSample ID: WG627186-05 MSFile ID: T4.082517.190703Dil: 1Units: mg/LSample ID: WG627186-06 MSDFile ID: T4.082517.191035Dil: 1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum	0.206	6.25	6.68	104	6.25	6.67	103	0.122	85 - 115	20	
Calcium	1.74	6.25	8.04	101	6.25	8.03	101	0.0420	85 - 115	20	
Iron	0.410	2.50	2.89	99.3	2.50	2.89	99.3	0.0130	85 - 115	20	
Magnesium	0.831	6.25	7.07	99.8	6.25	7.07	99.9	0.0566	85 - 115	20	
Manganese	0.0175	0.313	0.332	101	0.313	0.332	101	0.128	85 - 115	20	
Potassium	0.867	31.3	33.2	103	31.3	33.3	104	0.297	85 - 115	20	
Silicon	4.58	3.13	7.73	101	3.13	7.82	104	1.13	85 - 115	20	
Sodium	2.41	31.3	34.4	102	31.3	34.1	101	0.902	85 - 115	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

WG_MS_MSD_DRYWT - Modified 05/26/2011

PDF File ID: 5450419

Report generated 08/29/2017 11:06



Microbac Laboratories Inc.
Serial Dilution Report

Login: L17081212 **Worknum:** WG627086
Instrument: ICP-THERMO4 **Method:** 6010C
Serial Dil: WG627086-02 **File ID:** T4.082517.212642 **Dil:** 5 **Units:** ug/L
Sample: L17081237-14 **File ID:** T4.082517.211926 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Aluminum	279		267		4.45	
Calcium	34800		34400		1.07	
Iron	218		243		11.20	E
Magnesium	3810		3670		3.66	
Manganese	3.23		ND	U		
Potassium	675		1550		129.00	E
Silicon	3850		3920		1.85	
Sodium	6990		7230		3.47	

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 25 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 25 times the MDL.

SERIAL_DIL - Modified 09/22/2008

PDF File ID: 5450413

08/30/2017 09:38



Microbac Laboratories Inc.
Serial Dilution Report

Login: L17081212 Worknum: WG627342
Instrument: ICP-THERMO4 Method: 6010C
Serial Dil: WG627342-02 File ID: T4.082517.181059 Dil: 5 Units: ug/L
Sample: L17081200-06 File ID: T4.082517.180330 Dil: 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Aluminum	308		441		43.10	E
Calcium	2090000		2910000		39.10	E
Iron	4.22		ND	U		
Magnesium	38.5		ND	U		
Manganese	0.220		ND	U		
Potassium	195000		195000		0.28	
Silicon	3010		3320		10.20	E
Sodium	69700		69900		0.26	

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 25 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 25 times the MDL.

SERIAL_DIL - Modified 09/22/2008

PDF File ID: 5450413

08/30/2017 09:38



Microbac Laboratories Inc.
Serial Dilution Report

Login: L17081212 Worknum: WG627342
Instrument: ICP-THERMO4 Method: 6010C
Serial Dil: WG627342-04 File ID: T4.082917.155156 Dil: 5 Units: ug/L
Sample: L17081307-23 File ID: T4.082917.154436 Dil: 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Aluminum	10.1		46.2		357.00	E
Calcium	20.1		ND	U		
Iron	2.64		ND	U		
Magnesium	ND	U	ND	U		
Manganese	ND	U	10.8		2130.00	
Potassium	120		486		305.00	E
Silicon	526		546		3.80	
Sodium	1520		1460		4.13	

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 25 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 25 times the MDL.

SERIAL_DIL - Modified 09/22/2008

PDF File ID: 5450413

08/30/2017 09:38



Microbac Laboratories Inc.
Serial Dilution Report

Login: L17081212 Worknum: WG627342
Instrument: ICP-THERM04 Method: 6010C
Serial Dil: WG627342-02 File ID: T4.082817.131830 Dil: 100 Units: ug/L
Sample: L17081200-06 File ID: T4.082817.131118 Dil: 20

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Aluminum	497		460		7.37	
Calcium	2370000		2960000		24.80	E
Iron	232		752		225.00	E
Magnesium	1530		7150		369.00	E
Manganese	ND	U	ND	U		
Potassium	153000		204000		33.40	E
Silicon	2220		3420		53.70	E
Sodium	54200		68000		25.30	E

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 25 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 25 times the MDL.

SERIAL_DIL - Modified 09/22/2008

PDF File ID: 5450413

08/30/2017 09:38



Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17081212
Instrument ID: ICP-THERM04
Post Spike ID: WG627086-01
Sample ID: L17081237-14

Worknum: WG627086
Method: 6010C
Units: ug/L
Matrix: Water
File ID: T4.082517.212310 Dil: 1
File ID: T4.082517.211926 Dil: 1

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ALUMINUM	5210		279		5000	99.2	75 - 125	
CALCIUM	36300		34800		5000	99.0	75 - 125	
IRON	2110		218		2000	95.5	75 - 125	
MAGNESIUM	8150		3810		5000	94.3	75 - 125	
MANGANESE	241		0	U	250	96.3	75 - 125	
POTASSIUM	26200		675	F	25000	102.3	75 - 125	
SILICON	5970		3850		2500	100.4	75 - 125	
SODIUM	31100		6990		25000	99.4	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 5450414
Report generated: 08/30/2017 09:38



Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17081212
Instrument ID: ICP-THERM04
Post Spike ID: WG627342-01
Sample ID: L17081200-06

Worknum: WG627342
Method: 6010C
Units: ug/L
Matrix: Water
File ID: T4.082517.180720 Dil: 1
File ID: T4.082517.180330 Dil: 1

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ALUMINUM	5030		308		5000	95.1	75 - 125	
CALCIUM	1850000		2090000		5000	-683.6	75 - 125	N
IRON	1950		0	U	2000	97.7	75 - 125	
MAGNESIUM	4620		0	U	5000	92.3	75 - 125	
MANGANESE	247		0	U	250	98.7	75 - 125	
POTASSIUM	197000		195000		25000	88.9	75 - 125	
SILICON	9220		3010		2500	260.2	75 - 125	N
SODIUM	87500		69700		25000	99.1	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 5450414
Report generated: 08/30/2017 09:38



Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17081212
Instrument ID: ICP-THERM04
Post Spike ID: WG627342-01
Sample ID: L17081200-06

Worknum: WG627342
Method: 6010C
Units: ug/L
Matrix: Water
File ID: T4.082817.131501 Dil: 20
File ID: T4.082817.131118 Dil: 20

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ALUMINUM	5110		0	U	5000	102.2	75 - 125	
CALCIUM	128000		119000		5000	195.2	75 - 125	N
IRON	1940		0	U	2000	96.9	75 - 125	
MAGNESIUM	4890		0	U	5000	97.8	75 - 125	
MANGANESE	246		0	U	250	98.4	75 - 125	
POTASSIUM	32700		7650		25000	100.2	75 - 125	
SILICON	2670		111		2500	102.3	75 - 125	
SODIUM	27500		2710		25000	99.3	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 5450414
Report generated: 08/30/2017 09:38



Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17081212
Instrument ID: ICP-THERM04
Post Spike ID: WG627342-03
Sample ID: L17081307-23

Worknum: WG627342
Method: 6010C
Units: ug/L
Matrix: Water
File ID: T4.082917.154824 Dil: 1
File ID: T4.082917.154436 Dil: 1

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ALUMINUM	4970		0	U	5000	99.4	75 - 125	
CALCIUM	4930		0	U	5000	98.6	75 - 125	
IRON	1960		0	U	2000	97.9	75 - 125	
MAGNESIUM	4930		0	U	5000	98.6	75 - 125	
MANGANESE	247		0	U	250	98.8	75 - 125	
POTASSIUM	24800		0	U	25000	99.1	75 - 125	
SILICON	2910		526		2500	97.3	75 - 125	
SODIUM	26100		1520		25000	99.1	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 5450414
Report generated: 08/30/2017 09:38



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	L17081212	Workgroup (AAB#):	WG627086
Analytical Method:	6010C	Instrument ID:	ICP-THERM04
ICAL Worknum:	WG627408	Initial Calibration Date:	25-AUG-2017 13:19

	WG627408-01		WG627408-02		WG627408-03		WG627408-04		WG627408-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	0.00155	.1	0.00225	.2	0.00300	10	0.0892	20	0.173	.999946	
CALCIUM	0	0.000260	.1	0.000930	.2	0.00302	10	0.238	20	0.475	.999242	
IRON	0	0.000110	.04	0.000950	.08	0.00119	4	0.0681	8	0.136	.999624	
MAGNESIUM	0	0.000140	NA	NA	.2	0.000660	10	0.0426	20	0.0851	.999844	
MANGANESE	0	0.00161	.005	0.00223	.01	0.00248	.5	0.0843	1	0.167	.999695	
POTASSIUM	0	0.00902	.5	0.0233	1	0.0343	50	1.51	100	2.99	.999939	
SILICON	0	0.000310	.05	0.00125	.1	0.00228	5	0.118	10	0.237	.999988	
SODIUM	0	-0.0379	.5	-0.00136	1	0.0365	50	4.36	100	8.71	.999985	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 5450422
Report generated: 31-AUG-2017 08:40



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	<u>L17081212</u>	Workgroup (AAB#):	<u>WG627342</u>
Analytical Method:	<u>6010C</u>	Instrument ID:	<u>ICP-THERM04</u>
ICAL Worknum:	<u>WG627408</u>	Initial Calibration Date:	<u>25-AUG-2017 13:19</u>

	WG627408-01		WG627408-02		WG627408-03		WG627408-04		WG627408-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	0.00155	.1	0.00225	.2	0.00300	10	0.0892	20	0.173	.999946	
CALCIUM	0	0.000260	.1	0.000930	.2	0.00302	10	0.238	20	0.475	.999242	
IRON	0	0.000110	.04	0.000950	.08	0.00119	4	0.0681	8	0.136	.999624	
MAGNESIUM	0	0.000140	NA	NA	.2	0.000660	10	0.0426	20	0.0851	.999844	
MANGANESE	0	0.00161	.005	0.00223	.01	0.00248	.5	0.0843	1	0.167	.999695	
POTASSIUM	0	0.00902	.5	0.0233	1	0.0343	50	1.51	100	2.99	.999939	
SILICON	0	0.000310	.05	0.00125	.1	0.00228	5	0.118	10	0.237	.999988	
SODIUM	0	-0.0379	.5	-0.00136	1	0.0365	50	4.36	100	8.71	.999985	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 5450422
Report generated: 31-AUG-2017 08:40



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	L17081212	Workgroup (AAB#):	WG627086
Analytical Method:	6010C	Instrument ID:	ICP-THERM04
ICAL Worknum:	WG627494	Initial Calibration Date:	28-AUG-2017 11:39

	WG627494-01		WG627494-02		WG627494-03		WG627494-04		WG627494-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	0.00157	.1	0.00228	.2	0.00309	10	0.0883	20	0.172	.999942	
CALCIUM	0	-0.000230	.1	0.00166	.2	0.00252	10	0.234	20	0.470	.999808	
IRON	0	0.000110	.04	0.000470	.08	0.00128	4	0.0667	8	0.134	.999839	
MAGNESIUM	0	-0.000320	NA	NA	.2	0.000420	10	0.0416	20	0.0839	.999977	
MANGANESE	0	0.00139	.005	0.00223	.01	0.00294	.5	0.0834	1	0.166	.9998	
POTASSIUM	0	0.00741	.5	0.0217	1	0.0338	50	1.49	100	2.97	.999913	
SILICON	0	0.000300	.05	0.00131	.1	0.00224	5	0.117	10	0.237	.999973	
SODIUM	0	-0.0329	.5	-0.00185	1	0.0379	50	4.25	100	8.55	.999985	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	<u>L17081212</u>	Workgroup (AAB#):	<u>WG627342</u>
Analytical Method:	<u>6010C</u>	Instrument ID:	<u>ICP-THERM04</u>
ICAL Worknum:	<u>WG627494</u>	Initial Calibration Date:	<u>28-AUG-2017 11:39</u>

	WG627494-01		WG627494-02		WG627494-03		WG627494-04		WG627494-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	0.00157	.1	0.00228	.2	0.00309	10	0.0883	20	0.172	.999942	
CALCIUM	0	-0.000230	.1	0.00166	.2	0.00252	10	0.234	20	0.470	.999808	
IRON	0	0.000110	.04	0.000470	.08	0.00128	4	0.0667	8	0.134	.999839	
MAGNESIUM	0	-0.000320	NA	NA	.2	0.000420	10	0.0416	20	0.0839	.999977	
MANGANESE	0	0.00139	.005	0.00223	.01	0.00294	.5	0.0834	1	0.166	.9998	
POTASSIUM	0	0.00741	.5	0.0217	1	0.0338	50	1.49	100	2.97	.999913	
SILICON	0	0.000300	.05	0.00131	.1	0.00224	5	0.117	10	0.237	.999973	
SODIUM	0	-0.0329	.5	-0.00185	1	0.0379	50	4.25	100	8.55	.999985	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	L17081212	Workgroup (AAB#):	WG627342
Analytical Method:	6010C	Instrument ID:	ICP-THERM04
ICAL Worknum:	WG627770	Initial Calibration Date:	29-AUG-2017 14:25

	WG627770-01		WG627770-02		WG627770-03		WG627770-04		WG627770-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	0.00152	.1	0.00226	.2	0.00297	10	0.0904	20	0.176	.999957	
CALCIUM	0	-0.000820	.1	0.00166	.2	0.00313	10	0.247	20	0.495	.99992	
IRON	0	-0.0000300	.04	0.000800	.08	0.00136	4	0.0692	8	0.137	.999473	
MAGNESIUM	0	0.0000300	NA	NA	.2	0.000540	10	0.0441	20	0.0881	.999795	
MANGANESE	0	0.00143	.005	0.00208	.01	0.00280	.5	0.0883	1	0.173	.999982	
POTASSIUM	0	0.00696	.5	0.0199	1	0.0330	50	1.56	100	3.12	.999993	
SILICON	0	0.000350	.05	0.00128	.1	0.00222	5	0.118	10	0.239	.999978	
SODIUM	0	-0.0361	.5	0.00406	1	0.0363	50	4.42	100	8.85	.999976	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-07
Instrument ID: ICP-THERM04 Run Time: 13:26 Method: 6010C
File ID: T4.082517.132656 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-THERI - 25-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ALUMINUM	.08	.16	.08	U
CALCIUM	.2	.4	.2	U
IRON	.04	.08	.04	U
MAGNESIUM	.2	.4	.2	U
MANGANESE	.004	.008	.004	U
POTASSIUM	.4	.8	.4	U
SILICON	.4	.8	.4	U
SODIUM	.2	.4	.2	U

ICB - Modified 07/14/2009
PDF File ID: 5450424
Report generated 08/31/2017 08:40



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-07
Instrument ID: ICP-THERM04 Run Time: 11:49 Method: 6010C
File ID: T4.082817.114909 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-THERI - 28-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ALUMINUM	.08	.16	.08	U
CALCIUM	.2	.4	.2	U
IRON	.04	.08	.04	U
MAGNESIUM	.2	.4	.2	U
MANGANESE	.004	.008	.004	U
POTASSIUM	.4	.8	.4	U
SILICON	.4	.8	.4	U
SODIUM	.2	.4	.2	U

ICB - Modified 07/14/2009
PDF File ID: 5450424
Report generated 08/31/2017 08:40



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-07
Instrument ID: ICP-THERM04 Run Time: 13:26 Method: 6010C
File ID: T4.082517.132656 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-THERI - 25-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ALUMINUM	.08	.16	.08	U
CALCIUM	.2	.4	.2	U
IRON	.04	.08	.04	U
MAGNESIUM	.2	.4	.2	U
MANGANESE	.004	.008	.004	U
POTASSIUM	.4	.8	.4	U
SILICON	.4	.8	.4	U
SODIUM	.2	.4	.2	U

ICB - Modified 07/14/2009
PDF File ID: 5450424
Report generated 08/31/2017 08:40



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-07
Instrument ID: ICP-THERM04 Run Time: 11:49 Method: 6010C
File ID: T4.082817.114909 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-THERM - 28-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ALUMINUM	.08	.16	.08	U
CALCIUM	.2	.4	.2	U
IRON	.04	.08	.04	U
MAGNESIUM	.2	.4	.2	U
MANGANESE	.004	.008	.004	U
POTASSIUM	.4	.8	.4	U
SILICON	.4	.8	.4	U
SODIUM	.2	.4	.2	U

ICB - Modified 07/14/2009
PDF File ID: 5450424
Report generated 08/31/2017 08:40



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627770-07
Instrument ID: ICP-THERM04 Run Time: 14:36 Method: 6010C
File ID: T4.082917.143600 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-THERI - 29-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ALUMINUM	.08	.16	.08	U
CALCIUM	.2	.4	.2	U
IRON	.04	.08	.04	U
MAGNESIUM	.2	.4	.2	U
MANGANESE	.004	.008	.004	U
POTASSIUM	.4	.8	.4	U
SILICON	.4	.8	.4	U
SODIUM	.2	.4	.2	U

ICB - Modified 07/14/2009
PDF File ID: 5450424
Report generated 08/31/2017 08:40



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-14
Instrument ID: ICP-THERM04 Run Time: 13:52 Method: 6010C
File ID: T4.082517.135240 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5450427
Report generated 08/31/2017 08:45



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-22
Instrument ID: ICP-THERM04 Run Time: 19:32 Method: 6010C
File ID: T4.082517.193241 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	-0.00518	F
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5450427
Report generated 08/31/2017 08:45



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-24
Instrument ID: ICP-THERM04 Run Time: 20:16 Method: 6010C
File ID: T4.082517.201653 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5450427
Report generated 08/31/2017 08:45



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-26
Instrument ID: ICP-THERM04 Run Time: 21:00 Method: 6010C
File ID: T4.082517.210036 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.206	F

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5450427
Report generated 08/31/2017 08:45



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-28
Instrument ID: ICP-THERM04 Run Time: 21:33 Method: 6010C
File ID: T4.082517.213357 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-35
Instrument ID: ICP-THERM04 Run Time: 21:59 Method: 6010C
File ID: T4.082517.215946 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-14
Instrument ID: ICP-THERM04 Run Time: 12:14 Method: 6010C
File ID: T4.082817.121434 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-18
Instrument ID: ICP-THERM04 Run Time: 13:29 Method: 6010C
File ID: T4.082817.132919 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-20
Instrument ID: ICP-THERM04 Run Time: 13:47 Method: 6010C
File ID: T4.082817.134726 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-36
Instrument ID: ICP-THERM04 Run Time: 18:05 Method: 6010C
File ID: T4.082817.180530 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-40
Instrument ID: ICP-THERM04 Run Time: 18:37 Method: 6010C
File ID: T4.082817.183746 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-14
Instrument ID: ICP-THERM04 Run Time: 13:52 Method: 6010C
File ID: T4.082517.135240 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-16
Instrument ID: ICP-THERM04 Run Time: 17:33 Method: 6010C
File ID: T4.082517.173301 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-18
Instrument ID: ICP-THERM04 Run Time: 18:18 Method: 6010C
File ID: T4.082517.181814 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-20
Instrument ID: ICP-THERM04 Run Time: 18:59 Method: 6010C
File ID: T4.082517.185928 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.569	*

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-28
Instrument ID: ICP-THERM04 Run Time: 21:33 Method: 6010C
File ID: T4.082517.213357 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-35
Instrument ID: ICP-THERM04 Run Time: 21:59 Method: 6010C
File ID: T4.082517.215946 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-14
Instrument ID: ICP-THERM04 Run Time: 12:14 Method: 6010C
File ID: T4.082817.121434 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-16
Instrument ID: ICP-THERM04 Run Time: 12:59 Method: 6010C
File ID: T4.082817.125959 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-18
Instrument ID: ICP-THERM04 Run Time: 13:29 Method: 6010C
File ID: T4.082817.132919 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-36
Instrument ID: ICP-THERM04 Run Time: 18:05 Method: 6010C
File ID: T4.082817.180530 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-40
Instrument ID: ICP-THERM04 Run Time: 18:37 Method: 6010C
File ID: T4.082817.183746 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627770-12
Instrument ID: ICP-THERM04 Run Time: 14:54 Method: 6010C
File ID: T4.082917.145419 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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PDF File ID: 5450427
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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627770-14
Instrument ID: ICP-THERM04 Run Time: 15:59 Method: 6010C
File ID: T4.082917.155912 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627770-21
Instrument ID: ICP-THERM04 Run Time: 17:39 Method: 6010C
File ID: T4.082917.173956 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627770-25
Instrument ID: ICP-THERM04 Run Time: 18:05 Method: 6010C
File ID: T4.082917.180540 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Manganese	0.00400	0.00800	0.00400	U
Potassium	0.400	0.800	0.400	U
Silicon	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-06
Instrument ID: ICP-THERM04 Run Time: 11:43 Method: 6010C
File ID: T4.082817.114312 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 28-AUG-17
QC Key: WATERL00

Analyte	Expected	Found	%REC	LIMITS	Q
Aluminum	10	10.2	102	90 - 110	
Calcium	10	10.1	101	90 - 110	
Iron	4	4.00	100	90 - 110	
Magnesium	10	10.3	103	90 - 110	
Manganese	.5	0.509	102	90 - 110	
Potassium	50	50.5	101	90 - 110	
Silicon	5	5.00	100	90 - 110	
Sodium	50	50.4	101	90 - 110	

* Exceeds LIMITS Limit



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-06
Instrument ID: ICP-THERM04 Run Time: 13:23 Method: 6010C
File ID: T4.082517.132327 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 25-AUG-17
QC Key: WATERL00

Analyte	Expected	Found	%REC	LIMITS	Q
Aluminum	10	10.1	101	90 - 110	
Calcium	10	9.97	99.7	90 - 110	
Iron	4	3.96	99.0	90 - 110	
Magnesium	10	9.95	99.5	90 - 110	
Manganese	.5	0.502	100	90 - 110	
Potassium	50	49.6	99.3	90 - 110	
Silicon	5	4.97	99.4	90 - 110	
Sodium	50	49.7	99.3	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5450423
Report generated 08/31/2017 08:40



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
 (Alternate Source)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-06</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>13:23</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.132327</u>	Analyst: <u>KKB</u>	Units: <u>mg/L</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
QC Key: <u>WATERL00</u>		

Analyte	Expected	Found	%REC	LIMITS	Q
Aluminum	10	10.1	101	90 - 110	
Calcium	10	9.97	99.7	90 - 110	
Iron	4	3.96	99.0	90 - 110	
Magnesium	10	9.95	99.5	90 - 110	
Manganese	.5	0.502	100	90 - 110	
Potassium	50	49.6	99.3	90 - 110	
Silicon	5	4.97	99.4	90 - 110	
Sodium	50	49.7	99.3	90 - 110	

* Exceeds LIMITS Limit



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
 (Alternate Source)

Login Number: <u>L17081212</u>	Run Date: <u>08/29/2017</u>	Sample ID: <u>WG627770-06</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>14:28</u>	Method: <u>6010C</u>
File ID: <u>T4.082917.142839</u>	Analyst: <u>KKB</u>	Units: <u>mg/L</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 29-AUG-17</u>	
QC Key: <u>WATERL00</u>		

Analyte	Expected	Found	%REC	LIMITS	Q
Aluminum	10	10.1	101	90 - 110	
Calcium	10	10.0	100	90 - 110	
Iron	4	3.96	99.1	90 - 110	
Magnesium	10	10.1	101	90 - 110	
Manganese	.5	0.511	102	90 - 110	
Potassium	50	50.0	100	90 - 110	
Silicon	5	5.00	100	90 - 110	
Sodium	50	49.8	99.6	90 - 110	

* Exceeds LIMITS Limit



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
 (Alternate Source)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-06</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>11:43</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.114312</u>	Analyst: <u>KKB</u>	Units: <u>mg/L</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
QC Key: <u>WATERL00</u>		

Analyte	Expected	Found	%REC	LIMITS	Q
Aluminum	10	10.2	102	90 - 110	
Calcium	10	10.1	101	90 - 110	
Iron	4	4.00	100	90 - 110	
Magnesium	10	10.3	103	90 - 110	
Manganese	.5	0.509	102	90 - 110	
Potassium	50	50.5	101	90 - 110	
Silicon	5	5.00	100	90 - 110	
Sodium	50	50.4	101	90 - 110	

* Exceeds LIMITS Limit



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-13</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>13:49</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.134913</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	9.94	mg/L	99.4	90 - 110		
Iron		4.00	3.99	mg/L	99.7	90 - 110		
Magnesium		10.0	10.0	mg/L	100	90 - 110		
Manganese		0.500	0.498	mg/L	99.6	90 - 110		
Potassium		50.0	50.0	mg/L	99.9	90 - 110		
Silicon		5.00	5.06	mg/L	101	90 - 110		
Sodium		50.0	50.2	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-21
Instrument ID: ICP-THERM04 Run Time: 19:29 Method: 6010C
File ID: T4.082517.192913 Analyst: KKB QC Key: WATERL00
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Calcium		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	4.01	mg/L	100	90 - 110		
Magnesium		10.0	10.1	mg/L	101	90 - 110		
Manganese		0.500	0.498	mg/L	99.7	90 - 110		
Potassium		50.0	52.7	mg/L	105	90 - 110		
Silicon		5.00	5.16	mg/L	103	90 - 110		
Sodium		50.0	51.9	mg/L	104	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-23</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>20:13</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.201324</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	3.92	mg/L	97.9	90 - 110		
Magnesium		10.0	9.80	mg/L	98.0	90 - 110		
Manganese		0.500	0.492	mg/L	98.3	90 - 110		
Potassium		50.0	52.1	mg/L	104	90 - 110		
Silicon		5.00	5.09	mg/L	102	90 - 110		
Sodium		50.0	51.1	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-25</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>20:57</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.205707</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	3.94	mg/L	98.4	90 - 110		
Magnesium		10.0	9.81	mg/L	98.1	90 - 110		
Manganese		0.500	0.491	mg/L	98.1	90 - 110		
Potassium		50.0	52.4	mg/L	105	90 - 110		
Silicon		5.00	5.09	mg/L	102	90 - 110		
Sodium		50.0	51.3	mg/L	103	90 - 110		

* Exceeds LIMITS Criteria

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Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-27</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>21:30</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.213029</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Calcium		10.0	10.0	mg/L	100	90 - 110		
Iron		4.00	3.88	mg/L	97.0	90 - 110		
Magnesium		10.0	9.87	mg/L	98.7	90 - 110		
Manganese		0.500	0.486	mg/L	97.3	90 - 110		
Potassium		50.0	52.3	mg/L	105	90 - 110		
Silicon		5.00	5.07	mg/L	101	90 - 110		
Sodium		50.0	51.3	mg/L	103	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-34</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>21:56</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.215618</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	3.92	mg/L	97.9	90 - 110		
Magnesium		10.0	9.79	mg/L	97.9	90 - 110		
Manganese		0.500	0.490	mg/L	98.1	90 - 110		
Potassium		50.0	52.7	mg/L	105	90 - 110		
Silicon		5.00	5.10	mg/L	102	90 - 110		
Sodium		50.0	51.6	mg/L	103	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-13</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>12:11</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.121108</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	4.08	mg/L	102	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.509	mg/L	102	90 - 110		
Potassium		50.0	50.8	mg/L	102	90 - 110		
Silicon		5.00	5.09	mg/L	102	90 - 110		
Sodium		50.0	50.9	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

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PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-17</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>13:25</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.132554</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	4.00	mg/L	99.9	90 - 110		
Magnesium		10.0	10.3	mg/L	103	90 - 110		
Manganese		0.500	0.506	mg/L	101	90 - 110		
Potassium		50.0	50.7	mg/L	101	90 - 110		
Silicon		5.00	5.08	mg/L	102	90 - 110		
Sodium		50.0	50.4	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-19</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>13:44</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.134401</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Calcium		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	4.00	mg/L	100	90 - 110		
Magnesium		10.0	10.4	mg/L	104	90 - 110		
Manganese		0.500	0.506	mg/L	101	90 - 110		
Potassium		50.0	51.2	mg/L	102	90 - 110		
Silicon		5.00	5.09	mg/L	102	90 - 110		
Sodium		50.0	50.9	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-35</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>18:02</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.180206</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	9.99	mg/L	99.9	90 - 110		
Iron		4.00	3.93	mg/L	98.2	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.493	mg/L	98.7	90 - 110		
Potassium		50.0	51.2	mg/L	102	90 - 110		
Silicon		5.00	5.01	mg/L	100	90 - 110		
Sodium		50.0	50.2	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-39</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>18:34</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.183421</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.0	mg/L	100	90 - 110		
Iron		4.00	3.93	mg/L	98.3	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.491	mg/L	98.1	90 - 110		
Potassium		50.0	51.3	mg/L	103	90 - 110		
Silicon		5.00	5.01	mg/L	100	90 - 110		
Sodium		50.0	50.7	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-13</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>13:49</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.134913</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	9.94	mg/L	99.4	90 - 110		
Iron		4.00	3.99	mg/L	99.7	90 - 110		
Magnesium		10.0	10.0	mg/L	100	90 - 110		
Manganese		0.500	0.498	mg/L	99.6	90 - 110		
Potassium		50.0	50.0	mg/L	99.9	90 - 110		
Silicon		5.00	5.06	mg/L	101	90 - 110		
Sodium		50.0	50.2	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-15</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>17:29</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.172932</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Calcium		10.0	10.3	mg/L	103	90 - 110		
Iron		4.00	4.09	mg/L	102	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.512	mg/L	102	90 - 110		
Potassium		50.0	51.2	mg/L	102	90 - 110		
Silicon		5.00	5.13	mg/L	103	90 - 110		
Sodium		50.0	51.2	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-17</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>18:14</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.181445</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	4.01	mg/L	100	90 - 110		
Magnesium		10.0	9.98	mg/L	99.8	90 - 110		
Manganese		0.500	0.501	mg/L	100	90 - 110		
Potassium		50.0	51.0	mg/L	102	90 - 110		
Silicon		5.00	5.19	mg/L	104	90 - 110		
Sodium		50.0	50.7	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-19</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>18:56</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.185600</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Calcium		10.0	10.0	mg/L	100	90 - 110		
Iron		4.00	3.94	mg/L	98.5	90 - 110		
Magnesium		10.0	9.87	mg/L	98.7	90 - 110		
Manganese		0.500	0.495	mg/L	98.9	90 - 110		
Potassium		50.0	51.6	mg/L	103	90 - 110		
Silicon		5.00	5.09	mg/L	102	90 - 110		
Sodium		50.0	50.0	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-27</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>21:30</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.213029</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Calcium		10.0	10.0	mg/L	100	90 - 110		
Iron		4.00	3.88	mg/L	97.0	90 - 110		
Magnesium		10.0	9.87	mg/L	98.7	90 - 110		
Manganese		0.500	0.486	mg/L	97.3	90 - 110		
Potassium		50.0	52.3	mg/L	105	90 - 110		
Silicon		5.00	5.07	mg/L	101	90 - 110		
Sodium		50.0	51.3	mg/L	103	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-34</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>21:56</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.215618</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	3.92	mg/L	97.9	90 - 110		
Magnesium		10.0	9.79	mg/L	97.9	90 - 110		
Manganese		0.500	0.490	mg/L	98.1	90 - 110		
Potassium		50.0	52.7	mg/L	105	90 - 110		
Silicon		5.00	5.10	mg/L	102	90 - 110		
Sodium		50.0	51.6	mg/L	103	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-13</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>12:11</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.121108</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	4.08	mg/L	102	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.509	mg/L	102	90 - 110		
Potassium		50.0	50.8	mg/L	102	90 - 110		
Silicon		5.00	5.09	mg/L	102	90 - 110		
Sodium		50.0	50.9	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-15</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>12:56</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.125634</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	4.01	mg/L	100	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.499	mg/L	99.8	90 - 110		
Potassium		50.0	50.7	mg/L	101	90 - 110		
Silicon		5.00	5.08	mg/L	102	90 - 110		
Sodium		50.0	50.3	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-17</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>13:25</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.132554</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	4.00	mg/L	99.9	90 - 110		
Magnesium		10.0	10.3	mg/L	103	90 - 110		
Manganese		0.500	0.506	mg/L	101	90 - 110		
Potassium		50.0	50.7	mg/L	101	90 - 110		
Silicon		5.00	5.08	mg/L	102	90 - 110		
Sodium		50.0	50.4	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-35
Instrument ID: ICP-THERM04 Run Time: 18:02 Method: 6010C
File ID: T4.082817.180206 Analyst: KKB QC Key: WATERL00
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	9.99	mg/L	99.9	90 - 110		
Iron		4.00	3.93	mg/L	98.2	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.493	mg/L	98.7	90 - 110		
Potassium		50.0	51.2	mg/L	102	90 - 110		
Silicon		5.00	5.01	mg/L	100	90 - 110		
Sodium		50.0	50.2	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-39</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>18:34</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.183421</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.0	mg/L	100	90 - 110		
Iron		4.00	3.93	mg/L	98.3	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.491	mg/L	98.1	90 - 110		
Potassium		50.0	51.3	mg/L	103	90 - 110		
Silicon		5.00	5.01	mg/L	100	90 - 110		
Sodium		50.0	50.7	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/29/2017</u>	Sample ID: <u>WG627770-11</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>14:50</u>	Method: <u>6010C</u>
File ID: <u>T4.082917.145051</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 29-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	4.04	mg/L	101	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Manganese		0.500	0.505	mg/L	101	90 - 110		
Potassium		50.0	50.6	mg/L	101	90 - 110		
Silicon		5.00	5.10	mg/L	102	90 - 110		
Sodium		50.0	50.8	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/29/2017</u>	Sample ID: <u>WG627770-13</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>15:55</u>	Method: <u>6010C</u>
File ID: <u>T4.082917.155544</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 29-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.1	mg/L	101	90 - 110		
Calcium		10.0	9.98	mg/L	99.8	90 - 110		
Iron		4.00	3.99	mg/L	99.9	90 - 110		
Magnesium		10.0	9.96	mg/L	99.6	90 - 110		
Manganese		0.500	0.503	mg/L	101	90 - 110		
Potassium		50.0	50.4	mg/L	101	90 - 110		
Silicon		5.00	5.08	mg/L	102	90 - 110		
Sodium		50.0	50.2	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627770-20
Instrument ID: ICP-THERM04 Run Time: 17:36 Method: 6010C
File ID: T4.082917.173629 Analyst: KKB QC Key: WATERL00
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	9.90	mg/L	99.0	90 - 110		
Iron		4.00	3.99	mg/L	99.8	90 - 110		
Magnesium		10.0	10.0	mg/L	100	90 - 110		
Manganese		0.500	0.496	mg/L	99.1	90 - 110		
Potassium		50.0	50.6	mg/L	101	90 - 110		
Silicon		5.00	5.05	mg/L	101	90 - 110		
Sodium		50.0	51.0	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L17081212</u>	Run Date: <u>08/29/2017</u>	Sample ID: <u>WG627770-24</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>18:02</u>	Method: <u>6010C</u>
File ID: <u>T4.082917.180211</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 29-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.1	mg/L	101	90 - 110		
Calcium		10.0	9.88	mg/L	98.8	90 - 110		
Iron		4.00	3.97	mg/L	99.3	90 - 110		
Magnesium		10.0	10.0	mg/L	100	90 - 110		
Manganese		0.500	0.494	mg/L	98.8	90 - 110		
Potassium		50.0	50.6	mg/L	101	90 - 110		
Silicon		5.00	5.03	mg/L	101	90 - 110		
Sodium		50.0	51.0	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450426
Report generated 08/31/2017 08:43



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-09</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>13:34</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.133427</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.164	mg/L	103	70 - 130		
Calcium		0.400	0.378	mg/L	94.6	70 - 130		
Iron		0.0800	0.0868	mg/L	109	70 - 130		
Magnesium		0.400	0.356	mg/L	89.1	70 - 130		
Manganese		0.00800	0.00577	mg/L	72.1	70 - 130		
Potassium		0.800	0.896	mg/L	112	70 - 130		
Silicon		0.800	0.740	mg/L	92.5	70 - 130		
Sodium		0.400	0.446	mg/L	112	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450428
Report generated 08/29/2017 11:13



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: <u>L17081212</u>	Run Date: <u>08/25/2017</u>	Sample ID: <u>WG627408-30</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>21:41</u>	Method: <u>6010C</u>
File ID: <u>T4.082517.214128</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 25-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.167	mg/L	104	70 - 130		
Calcium		0.400	0.383	mg/L	95.8	70 - 130		
Iron		0.0800	0.0824	mg/L	103	70 - 130		
Magnesium		0.400	0.289	mg/L	72.2	70 - 130		
Manganese		0.00800	0.00579	mg/L	72.4	70 - 130		
Potassium		0.800	0.966	mg/L	121	70 - 130		
Silicon		0.800	0.733	mg/L	91.6	70 - 130		
Sodium		0.400	0.500	mg/L	125	70 - 130		

* Exceeds LIMITS Criteria



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-08</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>11:52</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.115254</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.166	mg/L	104	70 - 130		
Calcium		0.400	0.377	mg/L	94.2	70 - 130		
Iron		0.0800	0.0953	mg/L	119	70 - 130		
Magnesium		0.400	0.403	mg/L	101	70 - 130		
Manganese		0.00800	0.00684	mg/L	85.5	70 - 130		
Potassium		0.800	1.03	mg/L	128	70 - 130		
Silicon		0.800	0.734	mg/L	91.7	70 - 130		
Sodium		0.400	0.359	mg/L	89.8	70 - 130		

* Exceeds LIMITS Criteria



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-22
Instrument ID: ICP-THERM04 Run Time: 13:54 Method: 6010C
File ID: T4.082817.135453 Analyst: KKB QC Key: WATERL00
Workgroup (AAB#): WG627086 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Sodium		0.400	0.424	mg/L	106	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450428
Report generated 08/29/2017 11:13



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-31</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>16:32</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.163227</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.175	mg/L	110	70 - 130		
Calcium		0.400	0.369	mg/L	92.1	70 - 130		
Iron		0.0800	0.0814	mg/L	102	70 - 130		
Magnesium		0.400	0.443	mg/L	111	70 - 130		
Manganese		0.00800	0.00758	mg/L	94.8	70 - 130		
Potassium		0.800	0.909	mg/L	114	70 - 130		
Silicon		0.800	0.735	mg/L	91.8	70 - 130		
Sodium		0.400	0.383	mg/L	95.8	70 - 130		

* Exceeds LIMITS Criteria



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-41</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>18:41</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.184129</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627086</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.174	mg/L	108	70 - 130		
Calcium		0.400	0.398	mg/L	99.5	70 - 130		
Iron		0.0800	0.0812	mg/L	102	70 - 130		
Magnesium		0.400	0.465	mg/L	116	70 - 130		
Manganese		0.00800	0.00925	mg/L	116	70 - 130		
Potassium		0.800	0.982	mg/L	123	70 - 130		
Silicon		0.800	0.739	mg/L	92.4	70 - 130		
Sodium		0.400	0.424	mg/L	106	70 - 130		

* Exceeds LIMITS Criteria



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-09
 Instrument ID: ICP-THERM04 Run Time: 13:34 Method: 6010C
 File ID: T4.082517.133427 Analyst: KKB QC Key: WATERL00
 Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 25-AUG-17
 Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.164	mg/L	103	70 - 130		
Calcium		0.400	0.378	mg/L	94.6	70 - 130		
Iron		0.0800	0.0868	mg/L	109	70 - 130		
Magnesium		0.400	0.356	mg/L	89.1	70 - 130		
Manganese		0.00800	0.00577	mg/L	72.1	70 - 130		
Potassium		0.800	0.896	mg/L	112	70 - 130		
Silicon		0.800	0.740	mg/L	92.5	70 - 130		
Sodium		0.400	0.446	mg/L	112	70 - 130		

* Exceeds LIMITS Criteria



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627408-30
Instrument ID: ICP-THERM04 Run Time: 21:41 Method: 6010C
File ID: T4.082517.214128 Analyst: KKB QC Key: WATERL00
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 25-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.167	mg/L	104	70 - 130		
Calcium		0.400	0.383	mg/L	95.8	70 - 130		
Iron		0.0800	0.0824	mg/L	103	70 - 130		
Magnesium		0.400	0.289	mg/L	72.2	70 - 130		
Manganese		0.00800	0.00579	mg/L	72.4	70 - 130		
Potassium		0.800	0.966	mg/L	121	70 - 130		
Silicon		0.800	0.733	mg/L	91.6	70 - 130		
Sodium		0.400	0.500	mg/L	125	70 - 130		

* Exceeds LIMITS Criteria



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-08</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>11:52</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.115254</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.166	mg/L	104	70 - 130		
Calcium		0.400	0.377	mg/L	94.2	70 - 130		
Iron		0.0800	0.0953	mg/L	119	70 - 130		
Magnesium		0.400	0.403	mg/L	101	70 - 130		
Manganese		0.00800	0.00684	mg/L	85.5	70 - 130		
Potassium		0.800	1.03	mg/L	128	70 - 130		
Silicon		0.800	0.734	mg/L	91.7	70 - 130		
Sodium		0.400	0.359	mg/L	89.8	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450428
Report generated 08/29/2017 11:13



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-22
Instrument ID: ICP-THERM04 Run Time: 13:54 Method: 6010C
File ID: T4.082817.135453 Analyst: KKB QC Key: WATERL00
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Sodium		0.400	0.424	mg/L	106	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450428
Report generated 08/29/2017 11:13



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/28/2017 Sample ID: WG627494-31
Instrument ID: ICP-THERM04 Run Time: 16:32 Method: 6010C
File ID: T4.082817.163227 Analyst: KKB QC Key: WATERL00
Workgroup (AAB#): WG627342 Cal ID: ICP-TH - 28-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.175	mg/L	110	70 - 130		
Calcium		0.400	0.369	mg/L	92.1	70 - 130		
Iron		0.0800	0.0814	mg/L	102	70 - 130		
Magnesium		0.400	0.443	mg/L	111	70 - 130		
Manganese		0.00800	0.00758	mg/L	94.8	70 - 130		
Potassium		0.800	0.909	mg/L	114	70 - 130		
Silicon		0.800	0.735	mg/L	91.8	70 - 130		
Sodium		0.400	0.383	mg/L	95.8	70 - 130		

* Exceeds LIMITS Criteria



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: <u>L17081212</u>	Run Date: <u>08/28/2017</u>	Sample ID: <u>WG627494-41</u>
Instrument ID: <u>ICP-THERM04</u>	Run Time: <u>18:41</u>	Method: <u>6010C</u>
File ID: <u>T4.082817.184129</u>	Analyst: <u>KKB</u>	QC Key: <u>WATERL00</u>
Workgroup (AAB#): <u>WG627342</u>	Cal ID: <u>ICP-TH - 28-AUG-17</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.174	mg/L	108	70 - 130		
Calcium		0.400	0.398	mg/L	99.5	70 - 130		
Iron		0.0800	0.0812	mg/L	102	70 - 130		
Magnesium		0.400	0.465	mg/L	116	70 - 130		
Manganese		0.00800	0.00925	mg/L	116	70 - 130		
Potassium		0.800	0.982	mg/L	123	70 - 130		
Silicon		0.800	0.739	mg/L	92.4	70 - 130		
Sodium		0.400	0.424	mg/L	106	70 - 130		

* Exceeds LIMITS Criteria



Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-THERMO4
Sol. A : WG627408-11
Sol. AB : WG627408-12

File ID: T4.082517.134153
File ID: T4.082517.134539

Workgroup (AAB#): WG627086
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	250	100	250	245	98.0	
Calcium	250	243	97.2	250	238	95.2	
Iron	100	96.7	96.7	100	95.0	95.0	
Magnesium	250	248	99.2	250	242	96.8	
Manganese	NS	-0.00314	NS	0.250	0.237	94.8	
Potassium	NS	0.123	NS	5.00	5.17	103	
Silicon	NS	0.0113	NS	NS	0.0121	NS	
Sodium	NS	0.0896	NS	5.00	5.10	102	

NS = Not spiked

* = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5450425
Report generated 08/31/2017 08:42



Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-THERM04
Sol. A : WG627408-32
Sol. AB : WG627408-33

File ID: T4.082517.214857
File ID: T4.082517.215241

Workgroup (AAB#): WG627086
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	254	102	250	249	99.6	
Calcium	250	243	97.2	250	243	97.2	
Iron	100	93.7	93.7	100	93.9	93.9	
Magnesium	250	240	96.0	250	241	96.4	
Manganese	NS	-0.00393	NS	0.250	0.235	94.0	
Potassium	NS	0.0882	NS	5.00	5.43	109	
Silicon	NS	0.0125	NS	NS	0.0115	NS	
Sodium	NS	0.0865	NS	5.00	5.29	106	

NS = Not spiked

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**Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES**

Login number: L17081212
Instrument ID: ICP-THERMO4
Sol. A : WG627494-11
Sol. AB : WG627494-12

File ID: T4.082817.120358
File ID: T4.082817.120738

Workgroup (AAB#): WG627086
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	255	102	250	249	99.6	
Calcium	250	246	98.4	250	243	97.2	
Iron	100	98.8	98.8	100	97.4	97.4	
Magnesium	250	253	101	250	249	99.6	
Manganese	NS	-0.00408	NS	0.250	0.241	96.4	
Potassium	NS	0.206	NS	5.00	5.45	109	
Silicon	NS	0.0106	NS	NS	0.00936	NS	
Sodium	NS	-0.00831	NS	5.00	5.07	101	

NS = Not spiked

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**Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES**

Login number: L17081212
Instrument ID: ICP-THERM04
Sol. A : WG627494-37
Sol. AB : WG627494-38

File ID: T4.082817.182712
File ID: T4.082817.183052

Workgroup (AAB#): WG627086
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	252	101	250	246	98.4	
Calcium	250	243	97.2	250	238	95.2	
Iron	100	94.6	94.6	100	92.8	92.8	
Magnesium	250	248	99.2	250	242	96.8	
Manganese	NS	-0.00338	NS	0.250	0.232	92.8	
Potassium	NS	0.0911	NS	5.00	5.25	105	
Silicon	NS	0.0143	NS	NS	0.0126	NS	
Sodium	NS	0.111	NS	5.00	5.12	102	

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Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-THERMO4
Sol. A : WG627408-11
Sol. AB : WG627408-12

File ID: T4.082517.134153
File ID: T4.082517.134539

Workgroup (AAB#): WG627342
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	250	100	250	245	98.0	
Calcium	250	243	97.2	250	238	95.2	
Iron	100	96.7	96.7	100	95.0	95.0	
Magnesium	250	248	99.2	250	242	96.8	
Manganese	NS	-0.00314	NS	0.250	0.237	94.8	
Potassium	NS	0.123	NS	5.00	5.17	103	
Silicon	NS	0.0113	NS	NS	0.0121	NS	
Sodium	NS	0.0896	NS	5.00	5.10	102	

NS = Not spiked

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Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-THERM04
Sol. A : WG627408-32
Sol. AB : WG627408-33

File ID: T4.082517.214857
File ID: T4.082517.215241

Workgroup (AAB#): WG627342
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	254	102	250	249	99.6	
Calcium	250	243	97.2	250	243	97.2	
Iron	100	93.7	93.7	100	93.9	93.9	
Magnesium	250	240	96.0	250	241	96.4	
Manganese	NS	-0.00393	NS	0.250	0.235	94.0	
Potassium	NS	0.0882	NS	5.00	5.43	109	
Silicon	NS	0.0125	NS	NS	0.0115	NS	
Sodium	NS	0.0865	NS	5.00	5.29	106	

NS = Not spiked

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**Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES**

Login number: L17081212
Instrument ID: ICP-THERMO4
Sol. A : WG627494-11
Sol. AB : WG627494-12

File ID: T4.082817.120358
File ID: T4.082817.120738

Workgroup (AAB#): WG627342
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	255	102	250	249	99.6	
Calcium	250	246	98.4	250	243	97.2	
Iron	100	98.8	98.8	100	97.4	97.4	
Magnesium	250	253	101	250	249	99.6	
Manganese	NS	-0.00408	NS	0.250	0.241	96.4	
Potassium	NS	0.206	NS	5.00	5.45	109	
Silicon	NS	0.0106	NS	NS	0.00936	NS	
Sodium	NS	-0.00831	NS	5.00	5.07	101	

NS = Not spiked

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**Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES**

Login number: L17081212
Instrument ID: ICP-THERM04
Sol. A : WG627494-37
Sol. AB : WG627494-38

File ID: T4.082817.182712
File ID: T4.082817.183052

Workgroup (AAB#): WG627342
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	252	101	250	246	98.4	
Calcium	250	243	97.2	250	238	95.2	
Iron	100	94.6	94.6	100	92.8	92.8	
Magnesium	250	248	99.2	250	242	96.8	
Manganese	NS	-0.00338	NS	0.250	0.232	92.8	
Potassium	NS	0.0911	NS	5.00	5.25	105	
Silicon	NS	0.0143	NS	NS	0.0126	NS	
Sodium	NS	0.111	NS	5.00	5.12	102	

NS = Not spiked

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Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-THERMO4
Sol. A : WG627770-09
Sol. AB : WG627770-10

File ID: T4.082917.144333
File ID: T4.082917.144717

Workgroup (AAB#): WG627342
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	250	100	250	244	97.6	
Calcium	250	242	96.8	250	236	94.4	
Iron	100	96.2	96.2	100	95.0	95.0	
Magnesium	250	246	98.4	250	243	97.2	
Manganese	NS	-0.00146	NS	0.250	0.238	95.2	
Potassium	NS	0.177	NS	5.00	5.24	105	
Silicon	NS	0.00611	NS	NS	0.00904	NS	
Sodium	NS	0.0174	NS	5.00	5.10	102	

NS = Not spiked

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Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-THERM04
Sol. A : WG627770-22
Sol. AB : WG627770-23

File ID: T4.082917.175452
File ID: T4.082917.175835

Workgroup (AAB#): WG627342
Method: 6010C
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	248	99.2	250	244	97.6	
Calcium	250	237	94.8	250	232	92.8	
Iron	100	95.6	95.6	100	93.9	93.9	
Magnesium	250	245	98.0	250	241	96.4	
Manganese	NS	-0.00140	NS	0.250	0.231	92.4	
Potassium	NS	0.127	NS	5.00	5.14	103	
Silicon	NS	0.00745	NS	NS	0.0100	NS	
Sodium	NS	0.177	NS	5.00	5.14	103	

NS = Not spiked

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+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5450425
Report generated 08/31/2017 08:42



Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17081212
Instrument ID: ICP-THERM04

Date: 01/04/2017
Method: 6010C

Analyte	Wave Length	AG	AL	AS	B	BA
ALUMINUM	308.20	0	0	0	0	0
ANTIMONY	206.80	0	0.0000410	0	0	0
ARSENIC	189.00	0	0	0	0	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.10	0	0	0	0	0
BORON	249.60	0	0	0	0	0
CADMIUM	228.80	0	0	0.0145	0	-0.0000800
CALCIUM	422.60	0	0	0	0	0
CHROMIUM	267.70	0	0	0	0	0
COBALT	228.60	0	0	0	0	0
COPPER	224.70	0	0	0	0	0
IRON	261.10	0	0	0	0	0
LEAD	220.30	0	0.000378	0	0	0
LITHIUM	670.70	0	0	0	0	0
MAGNESIUM	279.10	0	0	0	0	0
MANGANESE	257.60	0	0	0	0	0
MOLYBDENUM	202.00	0	0	0	0	0
NICKEL	231.60	0	0	0	0	0
PHOSPHORUS	214.90	0	-0.000289	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.10	0	0.0000140	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.10	0	0	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.70	0	0	0	0	0
THALLIUM	190.80	0	-0.0000120	0	0	0
TIN	189.90	0	0	0	0	0
TITANIUM	337.20	0	0	0	0	0
VANADIUM	292.40	0	0	0	0	0
ZINC	206.20	0	0.0000320	0	0	0
ZIRCONIUM	339.10	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 5450421
Report generated: 08/31/2017 08:40



Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17081212
Instrument ID: ICP-THERM04

Date: 01/04/2017
Method: 6010C

Analyte	Wave Length	BE	CA	CD	CO	CR
ALUMINUM	308.20	0	0	0	-0.000820	0
ANTIMONY	206.80	0	0	0	0	0.0260
ARSENIC	189.00	0	0	0	0	-0.00730
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.10	0	0	0	0	0
BORON	249.60	0	0	0	0.00343	0
CADMIUM	228.80	0	0	0	-0.00390	0
CALCIUM	422.60	0	0	0	0	0
CHROMIUM	267.70	0	0	0	0	0
COBALT	228.60	0	0	0	0	-0.000200
COPPER	224.70	0	0	0	0.0000770	-0.00100
IRON	261.10	0	0	0	0	-0.00100
LEAD	220.30	0	0	0	-0.0000130	-0.000132
LITHIUM	670.70	0	0	0	0	0
MAGNESIUM	279.10	0	0	0	0	0
MANGANESE	257.60	0	0	0	0	0.0000500
MOLYBDENUM	202.00	0	0	0	0	0
NICKEL	231.60	0	0	0	-0.000860	0
PHOSPHORUS	214.90	0	0	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.10	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.10	0	0	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.70	0	0.00000500	0	0	0
THALLIUM	190.80	0	0	0	0.00240	0.000276
TIN	189.90	0	0	0	0	0
TITANIUM	337.20	0	0	0	0	0
VANADIUM	292.40	0	0	0	0	-0.00350
ZINC	206.20	0	0	0	0	-0.00180
ZIRCONIUM	339.10	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 5450421
Report generated: 08/31/2017 08:40



Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17081212
Instrument ID: ICP-THERM04

Date: 01/04/2017
Method: 6010C

Analyte	Wave Length	CU	FE	K	LI	MG
ALUMINUM	308.20	0	0	0	0	0
ANTIMONY	206.80	0	0.0000560	0	0	0
ARSENIC	189.00	0	-0.0000490	0	0	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.10	0	0	0	0	0
BORON	249.60	0	0.000648	0	0	0
CADMIUM	228.80	0	-0.00000500	0	0	0
CALCIUM	422.60	0	0	0	0	0
CHROMIUM	267.70	0	0.0000400	0	0	0
COBALT	228.60	0	0	0	0	0
COPPER	224.70	0	0.00139	0	0	0
IRON	261.10	0	0	0	0	0
LEAD	220.30	0.000609	0	0	0	0
LITHIUM	670.70	0	0	0	0	0
MAGNESIUM	279.10	0	0	0	0	0
MANGANESE	257.60	0	0	0	0	0.0000220
MOLYBDENUM	202.00	0	0	0	0	0
NICKEL	231.60	0	0.0000420	0	0	0
PHOSPHORUS	214.90	0.0390	0.000900	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.10	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.10	0	-0.000118	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.70	0	0	0	0	0
THALLIUM	190.80	0	0	0	0	0
TIN	189.90	0	0	0	0	0
TITANIUM	337.20	0	-0.000200	0	0	0
VANADIUM	292.40	0	0.0000700	0	0	0
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.10	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 5450421
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Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17081212
Instrument ID: ICP-THERM04

Date: 01/04/2017
Method: 6010C

Analyte	Wave Length	MN	MO	NA	NI	P
ALUMINUM	308.20	0	0.0163	0	0	0
ANTIMONY	206.80	0	0.000910	0	-0.00190	0
ARSENIC	189.00	0	0.000139	0	0	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.10	0	0	0	0	0
BORON	249.60	0	-0.00190	0	0	0
CADMIUM	228.80	0	0.0000320	0	-0.000770	0
CALCIUM	422.60	0	0	0	0	0
CHROMIUM	267.70	0.000360	0	0	0	0
COBALT	228.60	0	-0.00200	0	0.000100	0
COPPER	224.70	0	0.00160	0	-0.0123	0
IRON	261.10	0	0	0	0	0
LEAD	220.30	0	-0.000610	0	0.000110	0
LITHIUM	670.70	0	0	0	0	0
MAGNESIUM	279.10	-0.00290	-0.0230	0	0	0
MANGANESE	257.60	0	0	0	0	0
MOLYBDENUM	202.00	0	0.0000300	0	0	0
NICKEL	231.60	0	0	0	0	0
PHOSPHORUS	214.90	0	0.00710	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.10	0.000600	0.000580	0	0	0
SILICON	212.40	0	-0.354	0	0	0
SILVER	328.10	0	-0.0000100	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.70	0	0	0	0	0
THALLIUM	190.80	0.00100	0	0	0	0
TIN	189.90	0	0	0	0	0
TITANIUM	337.20	0	-0.000153	0	0	0
VANADIUM	292.40	-0.000200	-0.00160	0	0	0
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.10	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
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Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17081212
Instrument ID: ICP-THERM04

Date: 01/04/2017
Method: 6010C

Analyte	Wave Length	PB	SB	SE	SI	SN
ALUMINUM	308.20	0	0	0	0	0
ANTIMONY	206.80	0	0	0	0	-0.0320
ARSENIC	189.00	0	0	0	0	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.10	0	0	0	0	0
BORON	249.60	0	0	0	0	0
CADMIUM	228.80	0	0	0	0	0
CALCIUM	422.60	0	0	0	0	0
CHROMIUM	267.70	0	0	0	0	0
COBALT	228.60	0	0	0	0	0
COPPER	224.70	0.00440	0	0	0	0
IRON	261.10	0	0	0	0	0
LEAD	220.30	0	0	0	0	0
LITHIUM	670.70	0	0	0	0	0
MAGNESIUM	279.10	0	0	0	0	0
MANGANESE	257.60	0	0	0	0	0
MOLYBDENUM	202.00	0	0	0	0	0
NICKEL	231.60	0	0	0	0	0
PHOSPHORUS	214.90	0	0	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.10	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.10	0	0	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.70	0	0	0	0	0
THALLIUM	190.80	0	0	0	0	0
TIN	189.90	0	0	0	0	0
TITANIUM	337.20	0	0	0	0	0
VANADIUM	292.40	0	0	0	0	0
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.10	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
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Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17081212
Instrument ID: ICP-THERM04

Date: 01/04/2017
Method: 6010C

Analyte	Wave Length	SR	TI	TL	V	ZN
ALUMINUM	308.20	0	0	0	0.0720	0
ANTIMONY	206.80	0	0.000500	0	-0.00360	0
ARSENIC	189.00	0	0	0	0.000107	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.10	0	-0.00000700	0	0.000990	0
BORON	249.60	0	0	0	0	0
CADMIUM	228.80	0	0	0	0.000102	0
CALCIUM	422.60	0	0	0	0	0
CHROMIUM	267.70	0	0.0000550	0	0	0
COBALT	228.60	0	0.00170	0	0.0000200	0
COPPER	224.70	0	0.000269	0	0	0
IRON	261.10	0	0	0	0	0
LEAD	220.30	0	0	0	-0.000126	0
LITHIUM	670.70	0	0	0	0	0
MAGNESIUM	279.10	0	-0.00290	0	0	0
MANGANESE	257.60	0	0	0	0	0
MOLYBDENUM	202.00	0	0	0	-0.000110	0
NICKEL	231.60	0	0	0	0	0
PHOSPHORUS	214.90	0	0	0	-0.00100	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.10	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.10	0	-0.000720	0	-0.000260	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.70	0	0	0	0	0
THALLIUM	190.80	0	-0.00100	0	-0.0420	0
TIN	189.90	0	-0.00190	0	0	0
TITANIUM	337.20	0	0	0	0	0
VANADIUM	292.40	0	0.000820	0	0	0
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.10	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
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Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17081212

Date: 01/04/2017

Instrument ID: ICP-THERM04

Method: 6010C

Analyte	Wave Length	ZR
ALUMINUM	308.20	0
ANTIMONY	206.80	0
ARSENIC	189.00	0
BARIUM	455.40	0
BERYLLIUM	313.10	0
BORON	249.60	0
CADMIUM	228.80	0
CALCIUM	422.60	0
CHROMIUM	267.70	0
COBALT	228.60	0
COPPER	224.70	0
IRON	261.10	0
LEAD	220.30	0
LITHIUM	670.70	0
MAGNESIUM	279.10	0
MANGANESE	257.60	0
MOLYBDENUM	202.00	0
NICKEL	231.60	0
PHOSPHORUS	214.90	0
POTASSIUM	766.40	0
SELENIUM	196.10	0
SILICON	212.40	0
SILVER	328.10	0
SODIUM	589.50	0
STRONTIUM	407.70	0
THALLIUM	190.80	0
TIN	189.90	0
TITANIUM	337.20	0
VANADIUM	292.40	0
ZINC	206.20	0
ZIRCONIUM	339.10	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 5450421
Report generated: 08/31/2017 08:40



Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17081212
Instrument ID: ICP-THERM04

Date: 07/17/2017
Method: 6010C

Analyte	Integration Time (Sec.)	Concentration (ug/L)
Aluminum	10.00	900.0
Antimony	20.00	45.0
Arsenic	10.00	45.0
Barium	10.00	45.0
Beryllium	10.00	1.8
Boron	20.00	45.0
Cadmium	20.00	4.5
Calcium	8.00	270.0
Chromium	20.00	36.0
Cobalt	20.00	45.0
Copper	20.00	180.0
Iron	8.00	720.0
Lead	20.00	225.0
Lithium	8.00	36.0
Magnesium	8.00	900.0
Manganese	10.00	36.0
Molybdenum	20.00	18.0
Nickel	20.00	90.0
Phosphorus	20.00	180.0
Potassium	8.00	360.0
Selenium	20.00	90.0
Silicon	20.00	36.0
Silver	10.00	3.6
Sodium	8.00	270.0
Strontium	8.00	9.0
Thallium	20.00	18.0
Tin	20.00	45.0
Titanium	8.00	45.0
Vanadium	20.00	27.0
Zinc	20.00	45.0
Zirconium	10.00	45.0

Comments:

All analytes passed acceptance criteria at the specified concentration.

LINEAR_RANGE - Modified 03/06/2008
PDF File ID: 5450420
Report generated: 08/31/2017 08:40



2.2 Metals Data

2.2.2 Metals ICP-MS Data

2.2.2.1 Summary Data



Login Number: L17081212
Department: Metals
Analyst: Ji Hu

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6020

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

Low Level Check: WG627096 - Due to the low level initial calibration verification failure for chromium on 24-Aug-2017 at 13:54, client samples 02 through 07 and QA/QC were reanalyzed on a later calibration which was compliant for chromium.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG627096 - All acceptance criteria were met.

WG627433 - All acceptance criteria were met.

Matrix Spikes: WG627096 - Sample 02 was chosen by the client for MS/MSD analysis. Samples 04 (MS) and 06 (MSD) met all acceptance criteria. Sample 03 was chosen by the client for MS/MSD analysis. Samples 05 (MS) and 07 (MSD) met all acceptance criteria. Sample 11 was chosen by the client for MS/MSD analysis. Samples 13 (MS) and 15 (MSD) met all acceptance criteria. Sample 12 was chosen by the client for MS/MSD analysis. Samples 14 (MS) and 16 (MSD) met all acceptance criteria.

SAMPLES

Samples: WG627433 - Due to the dark color of the digestate and high levels of nontarget analytes which can contribute to undercorrected interferences and instrument malfunctions, client samples 08 and 09 were analyzed at dilutions for all analytes.

Narrative ID: 128738

Approved By: Kerri Buck

K: K Buck

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:18
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.151808
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.00117		0.00100	0.000500

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:10
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.131019
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Total	7440-47-3	0.00432		0.00200	0.00100

Sample #: L17081212-03	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:21
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.152114
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.00109		0.00100	0.000500

Sample #: L17081212-03	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:13
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.131325
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Dissolved	7440-47-3	0.00385		0.00200	0.00100

Certificate of Analysis

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:16
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.131630
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Total	7440-47-3	0.130		0.00200	0.00100

Sample #: L17081212-04	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:30
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.153034
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.129		0.00100	0.000500

Sample #: L17081212-05	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:19
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.131935
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Dissolved	7440-47-3	0.126		0.00200	0.00100

Sample #: L17081212-05	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:33
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.153339
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.130		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:36
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.153645
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.130		0.00100	0.000500

Sample #: L17081212-06	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:22
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.132241
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Total	7440-47-3	0.129		0.00200	0.00100

Sample #: L17081212-07	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:39
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.082417.153950
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.130		0.00100	0.000500

Sample #: L17081212-07	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW02-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:48
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/30/2017 12:39
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/30/2017 13:25
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: NI.083017.132546
Sample Tag: 02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chromium, Dissolved	7440-47-3	0.128		0.00200	0.00100

Certificate of Analysis

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/28/2017 07:51
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/29/2017 14:30
Workgroup #: WG627433	Analyst: JYH	Run Date: 08/29/2017 17:45
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: NI.082917.174514
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	3.71		0.0200	0.0100

Sample #: L17081212-09	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW21-082217	Prep Method: 3015A	Prep Date: 08/28/2017 07:51
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/29/2017 14:30
Workgroup #: WG627433	Analyst: JYH	Run Date: 08/29/2017 17:48
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: NI.082917.174820
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	3.56		0.0200	0.0100

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:42
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.154256
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.00842		0.00100	0.000500

Sample #: L17081212-12	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:46
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.154601
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.00674		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-13	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:49
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.154907
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.135		0.00100	0.000500

Sample #: L17081212-14	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217-MS	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:52
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.155212
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.133		0.00100	0.000500

Sample #: L17081212-15	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:55
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.155518
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.136		0.00100	0.000500

Sample #: L17081212-16	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW35-082217-MSD	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 15:58
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: NI.082417.155823
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.134		0.00100	0.000500

Certificate of Analysis

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW36-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 16:07
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: NI.082417.160743
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.245		0.00100	0.000500

Sample #: L17081212-18	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: MW36-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 16:10
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: NI.082417.161049
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.234		0.00100	0.000500

Sample #: L17081212-19	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: DUP-GW-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 16:13
Collect Date: 08/22/2017 09:00	Dilution: 1	File ID: NI.082417.161355
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Total	7440-38-2	0.244		0.00100	0.000500

Sample #: L17081212-20	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: DUP-GW-082217	Prep Method: 3015A	Prep Date: 08/24/2017 07:49
Matrix: Water	Analytical Method: 6020A	Cal Date: 08/24/2017 13:44
Workgroup #: WG627096	Analyst: JYH	Run Date: 08/24/2017 16:17
Collect Date: 08/22/2017 09:00	Dilution: 1	File ID: NI.082417.161700
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Arsenic, Dissolved	7440-38-2	0.226		0.00100	0.000500

2.2.2.2 QC Summary Data

Example 6020 Calculations
Perkin Elmer ELAN 6100

1.0 Initial Calibration (ICAL) Parameters

The system performs linear regression from data consisting of a blank and three standards.

2.0 Calculating the concentration (C) of an element in water using data from prep log, run log, and quantitation report (note: the data system performs this calculation automatically when correction factors have been entered):

$$Cx = Cs \times \frac{Vf}{Vi} \times D$$

Where:

Cs = Concentration computed by the data system (ug/L)

Vf = Final volume

Vi = Initial volume

D = Dilution factor as a multiplier (10X = 10)

Cx = Concentration of element in (ug/L)

Example:

0.1

100

40

1

0.25

3.0 Calculating the concentration (C) of an element in soil using data from prep log, run log, and quantitation report (note: the data system performs this calculation automatically when correction factors have been entered):

$$Cx = Cs \times \frac{Vf}{Vi} \times D$$

Where:

Cs = Concentration computed by the data system (ug/L)

Vf = Final volume

Vi = Initial volume

D = Dilution factor as a multiplier (10X = 10)

Cx = Concentration of element in (ug/kg)

Example:

0.1

200

0.5

1

40

4.0 Adjusting the concentration to dry weight:

$$Cdry = \frac{Cx \times 100}{Px}$$

Where:

Cx = Concentration calculated as received (wet basis)

Px = Percent solids of sample (%wt)

$Cdry$ = Concentration calculated as dry weight (ug/kg)

Example:

40

80

50

50 ug/kg = 0.050 mg/kg

Perkin Elmer ELAN ICP/MS

STANDARDS KEY

QC Std 1 - ICV

QC Std 2 - ICB

QC Std 3 - LLICV

QC Std 4 - ICSA

QC Std 5 - ICSAB

QC Std 6 - CCV

QC Std 7 - CCB

QC Std 8 - LLCCV

Calibration Solutions

Analyte	Stock Conc. (mg/L)	S1 (mg/L)	S2 (mg/L)	S3 (mg/L)	S4 (mg/L)
Al	10	0	0.0004	0.05	0.1
Sb	10	0	0.0004	0.05	0.1
As	10	0	0.0004	0.05	0.1
Ba	10	0	0.0004	0.05	0.1
Be	10	0	0.0004	0.05	0.1
Ca	1000	0	0.04	5	10
Cd	10	0	0.0004	0.05	0.1
Cr	10	0	0.0004	0.05	0.1
Co	10	0	0.0004	0.05	0.1
Cu	10	0	0.0004	0.05	0.1
Fe	1000	0	0.04	5	10
Pb	10	0	0.0004	0.05	0.1
Mg	1000	0	0.04	5	10
Mn	10	0	0.0004	0.05	0.1
Ni	10	0	0.0004	0.05	0.1
K	1000	0	0.04	5	10
Se	10	0	0.0004	0.05	0.1
Ag	10	0	0.0004	0.05	0.1
Na	1000	0	0.04	5	10
Tl	10	0	0.0004	0.05	0.1
V	10	0	0.0004	0.05	0.1
U	1000	0	0.0004	0.05	0.1
Zn	10	0	0.0004	0.05	0.1

Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup: WG627041
Analyst: VC
Spike Analyst: VC
Run Date: 08/24/2017 07:49
Method: 3015A
Balance: BAL016
Instrument: MW-3
Instrument Start: 08/24/2017 09:38

SOP: ME407 Revision 19
Spike Solution: STD80296
Spike Witness: ERP
HNO3 Lot #: COA19940
40 & 50 ML. DIGESTION TUCOA19932
MS Filters- fisher-Lot#rRGT40686

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG627041-05	BLANK	1	20 mL	50 mL	182.275 g	182.27 g		
2	WG627041-07	FLT_BLK	1	20 mL	50 mL	181.821 g	181.801 g		
3	WG627041-06	LCS	1	20 mL	50 mL	184.031 g	184.021 g	.25 mL	
4	L17081200-02	SAMP	1	20 mL	50 mL	184.272 g	184.249 g		08/29/17
5	L17081200-04	SAMP	1	20 mL	50 mL	183.396 g	183.365 g		08/29/17
6	L17081200-06	SAMP	1	20 mL	50 mL	183.963 g	183.95 g		08/29/17
7	L17081200-07	SAMP	1	20 mL	50 mL	184.998 g	184.97 g		08/29/17
8	L17081200-08	SAMP	1	20 mL	50 mL	183.456 g	183.43 g		08/29/17
9	WG627041-01	REF	1	20 mL	50 mL	183.163 g	183.145 g		
10	L17081212-02	RS01	1	20 mL	50 mL	183.163 g	183.145 g		09/06/17
11	WG627041-02	REF	1	20 mL	50 mL	184.269 g	184.245 g		
12	L17081212-03	RS02	1	20 mL	50 mL	184.269 g	184.245 g		09/06/17
13	WG627041-08	MS	1	20 mL	50 mL	182.64 g	182.628 g	.25 mL	
14	L17081212-04	MS01	1	20 mL	50 mL	182.64 g	182.628 g	.25 mL	09/06/17
15	WG627041-10	MS	1	20 mL	50 mL	184.883 g	184.875 g	.25 mL	
16	L17081212-05	MS02	1	20 mL	50 mL	184.883 g	184.875 g	.25 mL	09/06/17
17	WG627041-09	MSD	1	20 mL	50 mL	182.121 g	182.109 g	.25 mL	
18	L17081212-06	SD01	1	20 mL	50 mL	182.121 g	182.109 g	.25 mL	09/06/17
19	WG627041-11	MSD	1	20 mL	50 mL	185.68 g	185.675 g	.25 mL	
20	L17081212-07	SD02	1	20 mL	50 mL	185.68 g	185.675 g	.25 mL	09/06/17
21	WG627041-03	REF	1	20 mL	50 mL	182.294 g	182.284 g		
22	L17081212-11	RS03	1	20 mL	50 mL	182.294 g	182.284 g		09/06/17
23	WG627041-04	REF	1	20 mL	50 mL	183.766 g	183.751 g		
24	L17081212-12	RS04	1	20 mL	50 mL	183.766 g	183.751 g		09/06/17
25	WG627041-12	MS	1	20 mL	50 mL	182.961 g	182.933 g	.25 mL	
26	L17081212-13	MS03	1	20 mL	50 mL	182.961 g	182.933 g	.25 mL	09/06/17
27	WG627041-14	MS	1	20 mL	50 mL	181.358 g	181.352 g	.25 mL	
28	L17081212-14	MS04	1	20 mL	50 mL	181.358 g	181.352 g	.25 mL	09/06/17
29	WG627041-13	MSD	1	20 mL	50 mL	182.652 g	182.639 g	.25 mL	
30	L17081212-15	SD03	1	20 mL	50 mL	182.652 g	182.639 g	.25 mL	09/06/17
31	WG627041-15	MSD	1	20 mL	50 mL	181.729 g	181.734 g	.25 mL	
32	L17081212-16	SD04	1	20 mL	50 mL	181.729 g	181.734 g	.25 mL	09/06/17
33	L17081212-17	SAMP	1	20 mL	50 mL	185.185 g	185.177 g		09/06/17
34	L17081212-18	SAMP	1	20 mL	50 mL	184.356 g	184.35 g		09/06/17
35	L17081212-19	SAMP	1	20 mL	50 mL	181.374 g	181.366 g		09/06/17
36	L17081212-20	SAMP	1	20 mL	50 mL	181.236 g	181.224 g		09/06/17

L17081200-02 FILTERED DIGESTATE

L17081200-04 FILTERED DIGESTATE

MW_DIG - Modified 09/30/2009
PDF ID: 5446544
Report generated: 08/24/2017 10:26



Microbac Laboratories Inc.
Microwave Digestion Log

L17081200-06	FILTERED DIGESTATE	SOP:
L17081200-07	FILTERED DIGESTATE	Spike Solution:
		Spike Witness:

Analyst: *Vicki Collins*
Balance: _____
Instrument: _____

Reviewer: *Em Pottin*

Instrument Start:

MW_DIG - Modified 09/30/2009
PDF ID: 5446544
Report generated: 08/24/2017 10:26



Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup: WG627377
Analyst: VC
Spike Analyst: VC
Run Date: 08/28/2017 07:51
Method: 3015A
Balance: BAL016
Instrument: MW-3
Instrument Start: 08/28/2017 07:55

SOP: ME407 Revision 19
Spike Solution: STD80296
Spike Witness: ERP
40 & 50 ML. DIGESTION TUCOA19932
HNO3 Lot #: COA19940
MS Filters- fisher-Lot#rRGT40686

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG627377-02	BLANK	1	20 mL	50 mL	185.051 g	185.059 g		
2	WG627377-03	LCS	1	20 mL	50 mL	184.467 g	184.484 g	.25 mL	
3	L17081212-08	SAMP	1	10 mL	50 mL	181.981 g	181.985 g		09/06/17
4	L17081212-09	SAMP	1	10 mL	50 mL	181.148 g	181.125 g		09/06/17
5	L17081305-08	SAMP	1	10 mL	50 mL	181.475 g	181.472 g		09/07/17
6	L17081305-09	SAMP	1	10 mL	50 mL	181.268 g	181.28 g		09/07/17
7	L17081305-11	SAMP	1	20 mL	50 mL	181.81 g	181.804 g		09/07/17
8	L17081305-12	SAMP	1	20 mL	50 mL	182.432 g	182.407 g		09/07/17
9	L17081305-13	SAMP	1	20 mL	50 mL	182.386 g	182.356 g		09/07/17
10	L17081305-14	SAMP	1	20 mL	50 mL	182.914 g	182.898 g		09/07/17
11	L17081305-15	SAMP	1	20 mL	50 mL	183.21 g	183.203 g		09/07/17
12	L17081305-16	SAMP	1	20 mL	50 mL	185.13 g	185.115 g		09/07/17
13	L17081305-17	SAMP	1	20 mL	50 mL	181.082 g	181.05 g		09/07/17
14	L17081305-19	SAMP	1	20 mL	50 mL	182.153 g	182.14 g		09/07/17
15	L17081305-20	SAMP	1	20 mL	50 mL	184.518 g	184.488 g		09/07/17
16	L17081354-01	SAMP	1	20 mL	50 mL	181.884 g	181.864 g		09/01/17
17	L17081354-02	SAMP	1	20 mL	50 mL	181.773 g	181.746 g		09/01/17
18	L17081354-03	SAMP	1	20 mL	50 mL	182.229 g	182.198 g		09/01/17
19	L17081354-04	SAMP	1	20 mL	50 mL	183.353 g	183.343 g		09/01/17
20	WG627377-01	REF	1	20 mL	50 mL	184.388 g	184.372 g		
21	L17081354-05	SAMP	1	20 mL	50 mL	184.388 g	184.372 g		09/01/17
22	L17081354-06	SAMP	1	20 mL	50 mL	183.438 g	183.43 g		09/01/17
23	WG627377-04	MS	1	20 mL	50 mL	183.454 g	183.416 g	.25 mL	
24	WG627377-05	MSD	1	20 mL	50 mL	183.632 g	183.629 g	.25 mL	

L17081212-08 volumeadj due to matrix,ph adj FILTERED DIGESTATE

L17081212-09 volumeadj due to matrix,ph adj FILTERED DIGESTATE

L17081305-08 volumeadj due to matrix,ph adj FILTERED DIGESTATE

L17081305-09 volumeadj due to matrix,ph adj FILTERED DIGESTATE

L17081354-05 ph adj

WG627377-01 ph adj

Analyst: Vicki Collier

Reviewer: Erin Pottin

Microbac Laboratories Inc.
Instrument Run Log

Instrument: ICP-MS2 Dataset: 082417C.REP
 Analyst1: JYH Analyst2: N/A
 Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
 Maintenance Log ID: _____

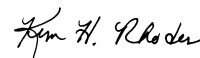
Calibration Std: STD83445 ICV Std: STD83299 Post Spike: STD83027
 ICSA: STD83552 ICSAB: STD83553 Int. Std: RG739300
 CCV: STD83443 LLCCV: STD83301 Tuning Sol : STD83302
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627097,627096

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.082417.133208	Blank	Blank		1		08/24/17 13:32
2	NI.082417.133514	WG627130-01	Calibration Point		1		08/24/17 13:35
3	NI.082417.133820	WG627130-02	Calibration Point		1		08/24/17 13:38
4	NI.082417.134125	WG627130-03	Calibration Point		1		08/24/17 13:41
5	NI.082417.134431	WG627130-04	Calibration Point		1		08/24/17 13:44
6	NI.082417.134738	WG627130-05	Initial Calibration Verification		1		08/24/17 13:47
7	NI.082417.135053	WG627130-06	Initial Calib Blank		1		08/24/17 13:50
8	NI.082417.135400	WG627130-07	Low Level Initial Calibration V		1		08/24/17 13:54
9	NI.082417.135705	WG627130-08	Interference Check		1		08/24/17 13:57
10	NI.082417.140011	WG627130-09	Interference Check		1		08/24/17 14:00
11	NI.082417.140318	WG627130-10	CCV		1		08/24/17 14:03
12	NI.082417.140623	WG627130-11	CCB		1		08/24/17 14:06
13	NI.082417.140930	WG626050-01	Method/Prep Blank	10/100	1		08/24/17 14:09
14	NI.082417.141235	WG626050-02	Laboratory Control S	10/100	1		08/24/17 14:12
15	NI.082417.141541	WG626050-03	Laboratory Control S	10/100	1		08/24/17 14:15
16	NI.082417.141846	L17080844-41	CO-REC15-01-SOIL	0.318/100	1		08/24/17 14:18
17	NI.082417.142152	L17080844-43	CO-REC14-02-SOIL	0.081/100	1		08/24/17 14:21
18	NI.082417.142457	L17080844-45	CO-REC15-03-SOIL	0.137/100	1		08/24/17 14:24
19	NI.082417.142803	WG627097-01	Post Digestion Spike		1	L17080844-45	08/24/17 14:28
20	NI.082417.143108	WG627097-02	Serial Dilution		5	L17080844-45	08/24/17 14:31
21	NI.082417.143415	WG627130-12	CCV		1		08/24/17 14:34
22	NI.082417.143721	WG627130-13	CCB		1		08/24/17 14:37
23	NI.082417.145324	WG627041-05	Method/Prep Blank	20/50	1		08/24/17 14:53
24	NI.082417.145630	WG627041-06	Laboratory Control S	20/50	1		08/24/17 14:56
25	NI.082417.145935	WG627041-07	Filter Blank		1		08/24/17 14:59
26	NI.082417.150241	L17081200-02	PZ101-GW-082117	20/50	1		08/24/17 15:02
27	NI.082417.150546	L17081200-04	PZ104-GW-082117	20/50	1		08/24/17 15:05
28	NI.082417.150852	L17081200-06	PZ105-GW-082117	20/50	1		08/24/17 15:08
29	NI.082417.151157	L17081200-07	BSUMP-SW-082117	20/50	1		08/24/17 15:11
30	NI.082417.151503	L17081200-08	BSUMP-SW-082117	20/50	1		08/24/17 15:15
31	NI.082417.151808	L17081212-02	MW02-082217		1	WG627041-01	08/24/17 15:18
32	NI.082417.152114	L17081212-03	MW02-082217		1	WG627041-02	08/24/17 15:21
33	NI.082417.152421	WG627130-14	CCV		1		08/24/17 15:24
34	NI.082417.152727	WG627130-15	CCB		1		08/24/17 15:27

Page: 1 Approved: August 28, 2017




Microbac Laboratories Inc.
Instrument Run Log

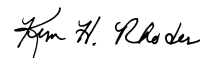
Instrument: ICP-MS2 Dataset: 082417C.REP
 Analyst1: JYH Analyst2: N/A
 Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
 Maintenance Log ID: _____
 Calibration Std: STD83445 ICV Std: STD83299 Post Spike: STD83027
 ICSA: STD83552 ICSAB: STD83553 Int. Std: RG739300
 CCV: STD83443 LLCCV: STD83301 Tuning Sol : STD83302
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627097,627096

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	NI.082417.153034	L17081212-04	MW02-082217-MS	20/50	1	WG627041-08	08/24/17 15:30
36	NI.082417.153339	L17081212-05	MW02-082217-MS	20/50	1	WG627041-10	08/24/17 15:33
37	NI.082417.153645	L17081212-06	MW02-082217-MSD	20/50	1	WG627041-09	08/24/17 15:36
38	NI.082417.153950	L17081212-07	MW02-082217-MSD	20/50	1	WG627041-11	08/24/17 15:39
39	NI.082417.154256	L17081212-11	MW35-082217		1	WG627041-03	08/24/17 15:42
40	NI.082417.154601	L17081212-12	MW35-082217		1	WG627041-04	08/24/17 15:46
41	NI.082417.154907	L17081212-13	MW35-082217-MS	20/50	1	WG627041-12	08/24/17 15:49
42	NI.082417.155212	L17081212-14	MW35-082217-MS	20/50	1	WG627041-14	08/24/17 15:52
43	NI.082417.155518	L17081212-15	MW35-082217-MSD	20/50	1	WG627041-13	08/24/17 15:55
44	NI.082417.155823	L17081212-16	MW35-082217-MSD	20/50	1	WG627041-15	08/24/17 15:58
45	NI.082417.160130	WG627130-16	CCV		1		08/24/17 16:01
46	NI.082417.160436	WG627130-17	CCB		1		08/24/17 16:04
47	NI.082417.160743	L17081212-17	MW36-082217	20/50	1		08/24/17 16:07
48	NI.082417.161049	L17081212-18	MW36-082217	20/50	1		08/24/17 16:10
49	NI.082417.161355	L17081212-19	DUP-GW-082217	20/50	1		08/24/17 16:13
50	NI.082417.161700	L17081212-20	DUP-GW-082217	20/50	1		08/24/17 16:17
51	NI.082417.162006	WG627096-01	Post Digestion Spike		1	L17081212-20	08/24/17 16:20
52	NI.082417.162311	WG627096-02	Serial Dilution		5	L17081212-20	08/24/17 16:23
53	NI.082417.162617	WG627096-02	Serial Dilution		25	L17081212-20	08/24/17 16:26
54	NI.082417.162923	WG627096-02	Serial Dilution		125	L17081212-20	08/24/17 16:29
55	NI.082417.163229	WG627130-18	CCV		1		08/24/17 16:32
56	NI.082417.163534	WG627130-19	CCB		1		08/24/17 16:35
57	NI.082417.163841	WG627096-02	Serial Dilution		625	L17081212-20	08/24/17 16:38
58	NI.082417.164147	WG627130-20	Interference Check		1		08/24/17 16:41
59	NI.082417.164453	WG627130-21	Interference Check		1		08/24/17 16:44
60	NI.082417.164800	WG627130-22	CCV		1		08/24/17 16:48
61	NI.082417.165106	WG627130-23	CCB		1		08/24/17 16:51
62	NI.082417.165413	WG627130-24	Low Level Continuing Calibra		1		08/24/17 16:54

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Microbac Laboratories Inc. **Instrument Run Log**

Instrument: ICP-MS2 Dataset: 082917B.REP
 Analyst1: JYH Analyst2: N/A
 Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
 Maintenance Log ID: _____

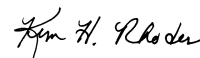
Calibration Std: STD83445 ICV Std: STD83299 Post Spike: STD83027
 ICSA: STD83552 ICSAB: STD83553 Int. Std: RGT39300
 CCV: STD83443 LLCCV: STD83301 Tuning Sol : STD83302
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627431,627433

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.082917.141816	Blank	Blank		1		08/29/17 14:18
2	NI.082917.142122	WG627739-01	Calibration Point		1		08/29/17 14:21
3	NI.082917.142427	WG627739-02	Calibration Point		1		08/29/17 14:24
4	NI.082917.142733	WG627739-03	Calibration Point		1		08/29/17 14:27
5	NI.082917.143038	WG627739-04	Calibration Point		1		08/29/17 14:30
6	NI.082917.143346	WG627739-05	Initial Calibration Verification		1		08/29/17 14:33
7	NI.082917.143653	WG627739-06	Initial Calib Blank		1		08/29/17 14:36
8	NI.082917.144000	WG627739-07	Low Level Initial Calibration V		1		08/29/17 14:40
9	NI.082917.145321	WG627739-08	Low Level Initial Calibration V		1		08/29/17 14:53
10	NI.082917.145626	WG627739-09	Interference Check		1		08/29/17 14:56
11	NI.082917.145932	WG627739-10	Interference Check		1		08/29/17 14:59
12	NI.082917.150239	WG627739-11	CCV		1		08/29/17 15:02
13	NI.082917.150544	WG627739-12	CCB		1		08/29/17 15:05
14	NI.082917.150953	WG627191-03	Method/Prep Blank	20/50	1		08/29/17 15:09
15	NI.082917.151259	WG627191-04	Laboratory Control S	20/50	1		08/29/17 15:12
16	NI.082917.151604	WG627191-01	Reference Sample		1	L17081285-05	08/29/17 15:16
17	NI.082917.151910	WG627191-05	Matrix Spike	20/50	1	L17081285-05	08/29/17 15:19
18	NI.082917.152215	WG627191-06	Matrix Spike Duplica	20/50	1	L17081285-05	08/29/17 15:22
19	NI.082917.152845	L17081285-01	BETHP-S4-MW-04	20/50	1		08/29/17 15:28
20	NI.082917.153151	L17081285-02	BETHP-S4-MW-07	20/50	1		08/29/17 15:31
21	NI.082917.153508	WG627431-01	Post Digestion Spike		1	L17081285-02	08/29/17 15:35
22	NI.082917.153813	WG627431-02	Serial Dilution		5	L17081285-02	08/29/17 15:38
23	NI.082917.154118	WG627431-02	Serial Dilution		25	L17081285-02	08/29/17 15:41
24	NI.082917.154425	WG627739-13	CCV		1		08/29/17 15:44
25	NI.082917.154730	WG627739-14	CCB		1		08/29/17 15:47
26	NI.082917.155037	L17081285-03	BETHP-S4-MW-09	20/50	1		08/29/17 15:50
27	NI.082917.155343	L17081285-04	BETHP-S4-MW-10	20/50	1		08/29/17 15:53
28	NI.082917.155648	L17081305-01	PZ06-082317	20/50	1		08/29/17 15:56
29	NI.082917.155953	L17081305-02	PZ06-082317	20/50	1		08/29/17 15:59
30	NI.082917.160259	L17081305-03	PZ04-082317	20/50	1		08/29/17 16:02
31	NI.082917.160605	L17081305-04	PZ04-082317	20/50	1		08/29/17 16:06
32	NI.082917.160910	L17081305-05	DUP-GW-082317-1	20/50	1		08/29/17 16:09
33	NI.082917.161215	L17081305-06	DUP-GW-082317-1	20/50	1		08/29/17 16:12
34	NI.082917.161520	L17081305-10	MW30-082317	20/50	1		08/29/17 16:15

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Microbac Laboratories Inc. **Instrument Run Log**

Instrument: ICP-MS2 Dataset: 082917B.REP
 Analyst1: JYH Analyst2: N/A
 Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
 Maintenance Log ID: _____

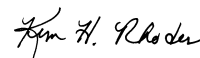
Calibration Std: STD83445 ICV Std: STD83299 Post Spike: STD83027
 ICSA: STD83552 ICSAB: STD83553 Int. Std: RG739300
 CCV: STD83443 LLCCV: STD83301 Tuning Sol : STD83302
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627431,627433

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	NI.082917.161826	L17081307-02	SW1A-336-14	20/50	1		08/29/17 16:18
36	NI.082917.162134	WG627739-15	CCV		1		08/29/17 16:21
37	NI.082917.162439	WG627739-16	CCB		1		08/29/17 16:24
38	NI.082917.162746	WG627191-02	Reference Sample		1	L17081307-07	08/29/17 16:27
39	NI.082917.163052	WG627191-07	Matrix Spike	20/50	1	L17081307-07	08/29/17 16:30
40	NI.082917.163358	WG627191-08	Matrix Spike Duplica	20/50	1	L17081307-07	08/29/17 16:33
41	NI.082917.163703	L17081307-14	SW3A-336-14	20/50	1		08/29/17 16:37
42	NI.082917.164009	L17081307-17	SW3B-336-14	20/50	1		08/29/17 16:40
43	NI.082917.164314	L17081307-20	SW4A-336-14	20/50	1		08/29/17 16:43
44	NI.082917.164619	L17081307-23	SW5A-336-14	20/50	1		08/29/17 16:46
45	NI.082917.164925	L17081307-23	SW5A-336-14		50		08/29/17 16:49
46	NI.082917.165231	WG627739-17	Interference Check		1		08/29/17 16:52
47	NI.082917.165537	WG627739-18	Interference Check		1		08/29/17 16:55
48	NI.082917.165844	WG627739-19	CCV		1		08/29/17 16:58
49	NI.082917.170150	WG627739-20	CCB		1		08/29/17 17:01
50	NI.082917.170457	WG627739-21	Low Level Continuing Calibra		1		08/29/17 17:04
51	NI.082917.170804	WG627377-02	Method/Prep Blank	20/50	1		08/29/17 17:08
52	NI.082917.171109	WG627377-03	Laboratory Control S	20/50	1		08/29/17 17:11
53	NI.082917.171415	WG627377-01	Reference Sample		1	L17081354-05	08/29/17 17:14
54	NI.082917.171721	WG627377-04	Matrix Spike	20/50	1	L17081354-05	08/29/17 17:17
55	NI.082917.172026	WG627377-05	Matrix Spike Duplica	20/50	1	L17081354-05	08/29/17 17:20
56	NI.082917.172332	L17081354-01	BETHP-S4-MW-03	20/50	1		08/29/17 17:23
57	NI.082917.172637	L17081354-02	BETHP-S4-MW-06	20/50	1		08/29/17 17:26
58	NI.082917.172943	WG627433-01	Post Digestion Spike		1	L17081354-02	08/29/17 17:29
59	NI.082917.173248	L17081354-02	BETHP-S4-MW-06		5		08/29/17 17:32
60	NI.082917.173554	WG627433-02	Serial Dilution		25	L17081354-02	08/29/17 17:35
61	NI.082917.173901	WG627739-22	CCV		1		08/29/17 17:39
62	NI.082917.174207	WG627739-23	CCB		1		08/29/17 17:42
63	NI.082917.174514	L17081212-08	MW21-082217	10/50	10		08/29/17 17:45
64	NI.082917.174820	L17081212-09	MW21-082217	10/50	10		08/29/17 17:48
65	NI.082917.175125	L17081305-08	MW31-082317	10/50	10		08/29/17 17:51
66	NI.082917.175431	L17081305-09	MW31-082317	10/50	10		08/29/17 17:54
67	NI.082917.175736	L17081305-11	MW30-082317	20/50	1		08/29/17 17:57
68	NI.082917.180042	L17081305-12	MW11S-082317		1		08/29/17 18:00

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Microbac Laboratories Inc.
Instrument Run Log

Instrument: ICP-MS2 Dataset: 082917B.REP
 Analyst1: JYH Analyst2: N/A
 Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
 Maintenance Log ID: _____

Calibration Std: STD83445 ICV Std: STD83299 Post Spike: STD83027
 ICSA: STD83552 ICSAB: STD83553 Int. Std: RG739300
 CCV: STD83443 LLCCV: STD83301 Tuning Sol : STD83302
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627431,627433

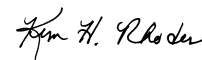
Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	NI.082917.180347	L17081305-13	MW11S-082317		1		08/29/17 18:03
70	NI.082917.180653	L17081305-14	MW09R-082317	20/50	1		08/29/17 18:06
71	NI.082917.180959	L17081305-15	MW09R-082317	20/50	1		08/29/17 18:09
72	NI.082917.181304	L17081305-16	DUP-GW-082317-2	20/50	1		08/29/17 18:13
73	NI.082917.181611	WG627739-24	CCV		1		08/29/17 18:16
74	NI.082917.181917	WG627739-25	CCB		1		08/29/17 18:19
75	NI.082917.182224	L17081305-17	DUP-GW-082317-2	20/50	1		08/29/17 18:22
76	NI.082917.182529	L17081305-19	MW19-082317	20/50	1		08/29/17 18:25
77	NI.082917.182835	L17081305-20	MW19-082317	20/50	1		08/29/17 18:28
78	NI.082917.183140	L17081354-03	BETHP-S4-MW-08	20/50	1		08/29/17 18:31
79	NI.082917.183446	L17081354-04	BETHP-S4-MW-12	20/50	1		08/29/17 18:34
80	NI.082917.183752	L17081354-06	BETHP-S4-EB-002	20/50	1		08/29/17 18:37
81	NI.082917.184057	L17081354-06	BETHP-S4-EB-002		50		08/29/17 18:40
82	NI.082917.184404	WG627739-26	Interference Check		1		08/29/17 18:44
83	NI.082917.184709	WG627739-27	Interference Check		1		08/29/17 18:47
84	NI.082917.185016	WG627739-28	CCV		1		08/29/17 18:50
85	NI.082917.185322	WG627739-29	CCB		1		08/29/17 18:53
86	NI.082917.185629	WG627739-30	Low Level Continuing Calibra		1		08/29/17 18:56

Comments

Seq.	Rerun	Dil.	Reason	Analytes
8			Rerun to verify. JYH	

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Microbac Laboratories Inc. Instrument Run Log

Instrument: ICP-MS2 Dataset: 083017B.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID: _____

Calibration Std: STD83445 ICV Std: STD83299 Post Spike: STD83027
ICSA: STD83552 ICSAB: STD83553 Int. Std: RGT39300
CCV: STD83443 LLCCV: STD83301 Tuning Sol : STD83302
Stannous : _____ Hydroxylamine : _____

Workgroups: 627096,627433,627431,627822,627859

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.083017.122654	Blank	Blank		1		08/30/17 12:26
2	NI.083017.123000	WG627861-01	Calibration Point		1		08/30/17 12:30
3	NI.083017.123306	WG627861-02	Calibration Point		1		08/30/17 12:33
4	NI.083017.123611	WG627861-03	Calibration Point		1		08/30/17 12:36
5	NI.083017.123917	WG627861-04	Calibration Point		1		08/30/17 12:39
6	NI.083017.124224	WG627861-05	Initial Calibration Verification		1		08/30/17 12:42
7	NI.083017.124531	WG627861-06	Initial Calib Blank		1		08/30/17 12:45
8	NI.083017.124838	WG627861-07	Low Level Initial Calibration V		1		08/30/17 12:48
9	NI.083017.125143	WG627861-08	Interference Check		1		08/30/17 12:51
10	NI.083017.125449	WG627861-09	Interference Check		1		08/30/17 12:54
11	NI.083017.125756	WG627861-10	CCV		1		08/30/17 12:57
12	NI.083017.130102	WG627861-11	CCB		1		08/30/17 13:01
13	NI.083017.130408	WG627041-05	Method/Prep Blank	20/50	1		08/30/17 13:04
14	NI.083017.130714	WG627041-06	Laboratory Control S	20/50	1		08/30/17 13:07
15	NI.083017.131019	WG627041-01	Reference Sample		1	L17081212-02	08/30/17 13:10
16	NI.083017.131325	WG627041-02	Reference Sample		1	L17081212-03	08/30/17 13:13
17	NI.083017.131630	WG627041-08	Matrix Spike	20/50	1	L17081212-02	08/30/17 13:16
18	NI.083017.131935	WG627041-10	Matrix Spike	20/50	1	L17081212-03	08/30/17 13:19
19	NI.083017.132241	WG627041-09	Matrix Spike Duplica	20/50	1	L17081212-02	08/30/17 13:22
20	NI.083017.132546	WG627041-11	Matrix Spike Duplica	20/50	1	L17081212-03	08/30/17 13:25
21	NI.083017.132852	WG627096-03	Post Digestion Spike		1	L17081212-02	08/30/17 13:28
22	NI.083017.133157	WG627096-04	Serial Dilution		5	L17081212-02	08/30/17 13:31
23	NI.083017.133504	WG627861-12	CCV		1		08/30/17 13:35
24	NI.083017.133810	WG627861-13	CCB		1		08/30/17 13:38
25	NI.083017.134117	L17081305-12	MW11S-082317	20/50	50		08/30/17 13:41
26	NI.083017.134422	L17081305-13	MW11S-082317	20/50	50		08/30/17 13:44
27	NI.083017.134727	L17081354-04	BETHP-S4-MW-12	20/50	50		08/30/17 13:47
28	NI.083017.135032	L17081285-01	BETHP-S4-MW-04	20/50	100		08/30/17 13:50
29	NI.083017.135339	WG627861-14	Interference Check		1		08/30/17 13:53
30	NI.083017.135644	WG627861-15	Interference Check		1		08/30/17 13:56
31	NI.083017.135951	WG627861-16	CCV		1		08/30/17 13:59
32	NI.083017.140257	WG627861-17	CCB		1		08/30/17 14:02
33	NI.083017.140604	WG627861-18	Low Level Continuing Calibra		1		08/30/17 14:06
34	NI.083017.141339	WG627718-02	Method/Prep Blank	.25/100	1		08/30/17 14:13

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Kim H. Rhodes



Microbac Laboratories Inc.
Instrument Run Log

Instrument: ICP-MS2 Dataset: 083017B.REP
 Analyst1: JYH Analyst2: N/A
 Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
 Maintenance Log ID: _____

Calibration Std: STD83445 ICV Std: STD83299 Post Spike: STD83027
 ICSA: STD83552 ICSAB: STD83553 Int. Std: RG739300
 CCV: STD83443 LLCCV: STD83301 Tuning Sol : STD83302
 Stannous : _____ Hydroxylamine : _____

Workgroups: 627096,627433,627431,627822,627859

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	NI.083017.141644	WG627718-03	Laboratory Control S	.25/100	1		08/30/17 14:16
36	NI.083017.141950	L17081428-01	T7H1424-01	.252/100	1		08/30/17 14:19
37	NI.083017.142256	WG627718-01	Reference Sample		100	L17081540-04	08/30/17 14:22
38	NI.083017.142601	WG627718-04	Matrix Spike		100	L17081540-04	08/30/17 14:26
39	NI.083017.142906	WG627718-05	Matrix Spike Duplica		100	L17081540-04	08/30/17 14:29
40	NI.083017.143212	L17081540-01	A1-EW03-00	.251/100	100		08/30/17 14:32
41	NI.083017.143518	WG627822-01	Post Digestion Spike		100	L17081540-01	08/30/17 14:35
42	NI.083017.143823	WG627822-02	Serial Dilution		500	L17081540-01	08/30/17 14:38
43	NI.083017.144128	WG627822-02	Serial Dilution		2500	L17081540-01	08/30/17 14:41
44	NI.083017.144435	WG627861-19	CCV		1		08/30/17 14:44
45	NI.083017.144741	WG627861-20	CCB		1		08/30/17 14:47
46	NI.083017.145048	L17081540-02	A1-EW05-00	.257/100	100		08/30/17 14:50
47	NI.083017.145354	L17081540-03	A1-EW06-00	.256/100	100		08/30/17 14:53
48	NI.083017.150051	WG627718-01	Reference Sample		1	L17081540-04	08/30/17 15:00
49	NI.083017.150357	WG627718-04	Matrix Spike	.256/100	1	L17081540-04	08/30/17 15:03
50	NI.083017.151130	WG627718-05	Matrix Spike Duplica	.254/100	1	L17081540-04	08/30/17 15:11
51	NI.083017.151436	L17081428-01	T7H1424-01	.252/100	5		08/30/17 15:14
52	NI.083017.151741	L17081428-01	T7H1424-01	.252/100	100		08/30/17 15:17
53	NI.083017.152048	WG627861-21	CCV		1		08/30/17 15:20
54	NI.083017.152353	WG627861-22	CCB		1		08/30/17 15:23
55	NI.083017.153138	WG627720-01	Method/Prep Blank	.25/100	1		08/30/17 15:31
56	NI.083017.153444	WG627720-02	Laboratory Control S	.25/100	1		08/30/17 15:34
57	NI.083017.153749	WG627720-03	Laboratory Control S	.25/100	1		08/30/17 15:37
58	NI.083017.154055	L17081428-01	T7H1424-01	.252/100	1		08/30/17 15:40
59	NI.083017.154401	WG627859-01	Post Digestion Spike		1	L17081428-01	08/30/17 15:44
60	NI.083017.154706	WG627859-02	Serial Dilution		5	L17081428-01	08/30/17 15:47
61	NI.083017.155012	WG627859-02	Serial Dilution		25	L17081428-01	08/30/17 15:50
62	NI.083017.155722	L17081540-01	A1-EW03-00	.251/100	1		08/30/17 15:57
63	NI.083017.160028	WG627822-01	Post Digestion Spike		1	L17081540-01	08/30/17 16:00
64	NI.083017.160333	WG627822-02	Serial Dilution		5	L17081540-01	08/30/17 16:03
65	NI.083017.160640	WG627861-23	CCV		1		08/30/17 16:06
66	NI.083017.160946	WG627861-24	CCB		1		08/30/17 16:09

Page: 2 Approved: August 31, 2017

Jim H. Rhodes



Microbac Laboratories Inc.

Data Checklist

Date: 24-AUG-2017

Analyst: JYH

Analyst: NA

Method: 6020/6020A/200.8

Instrument: ICP-MS

Curve Workgroup: 627130

Runlog ID: 84163

Analytical Workgroups: 627097,627096

STD ID#s on Runlog	X
Calibration/Linearity	X
ICV/CCV	X
ICV RSD < 3% (EPA 200.7 only)	
ICB/CCB	X
ICSA/ICSAB	X
CRI	
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	844,1200,1212
Client Forms	X
Level X	
Level 3	844,1200
Level 4	1212
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	JYH
Secondary Reviewer	KHR
Comments	

Primary Reviewer:

Secondary Reviewer:
28-AUG-2017

CHECKLIST1 - Modified 03/05/2008

Generated: AUG-28-2017 12:25:37



Microbac Laboratories Inc.

Data Checklist

Date: 29-AUG-2017

Analyst: JYH

Analyst: NA

Method: 6010B/6010C/200.7

Instrument: ICP-MS2

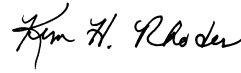
Curve Workgroup: 627739

Runlog ID: 84268

Analytical Workgroups: 627431,627433

STD ID#s on Runlog	X
Calibration/Linearity	X
ICV/CCV	X
ICV RSD < 3% (EPA 200.7 only)	
ICB/CCB	X
ICSA/ICSAB	X
CRI	
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	1285,1305,1212,1354
Client Forms	X
Level X	
Level 3	
Level 4	1285,1305,1212,1354
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	JYH
Secondary Reviewer	KHR
Comments	

Primary Reviewer:


Secondary Reviewer:
31-AUG-2017


CHECKLIST1 - Modified 03/05/2008

Generated: AUG-31-2017 09:36:46



Microbac Laboratories Inc.

Data Checklist

Date: 30-AUG-2017
Analyst: JYH
Analyst: NA
Method: 6020/6020A/200.8
Instrument: ICP-MS
Curve Workgroup: 627861
Runlog ID: 84291
Analytical Workgroups: 627096,627433,627431,627822,627859

STD ID#s on Runlog	X
Calibration/Linearity	X
ICV/CCV	X
ICV RSD < 3% (EPA 200.7 only)	
ICB/CCB	X
ICSA/ICSAB	X
CRI	
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	1428,1540
Client Forms	X
Level X	
Level 3	
Level 4	1212,1305,1354,1285
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	JYH
Secondary Reviewer	KHR
Comments	

Primary Reviewer:

Secondary Reviewer:
31-AUG-2017

CHECKLIST1 - Modified 03/05/2008

Generated: AUG-31-2017 12:38:47



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6020A

AAB#: WG627096

Login Number: L17081212

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/24/2017	1.8	180		08/30/17	8	180	
MW02-082217	02	08/22/17					08/24/2017	1.8	180		08/24/17	2.1	180	
MW02-082217	03	08/22/17					08/24/2017	1.8	180		08/30/17	8	180	
MW02-082217	03	08/22/17					08/24/2017	1.8	180		08/24/17	2.1	180	
MW02-082217-MS	04	08/22/17					08/24/2017	1.8	180		08/30/17	8	180	
MW02-082217-MS	04	08/22/17					08/24/2017	1.8	180		08/24/17	2.1	180	
MW02-082217-MS	05	08/22/17					08/24/2017	1.8	180		08/30/17	8	180	
MW02-082217-MS	05	08/22/17					08/24/2017	1.8	180		08/24/17	2.1	180	
MW02-082217-MSD	06	08/22/17					08/24/2017	1.8	180		08/24/17	2.1	180	
MW02-082217-MSD	06	08/22/17					08/24/2017	1.8	180		08/30/17	8	180	
MW02-082217-MSD	07	08/22/17					08/24/2017	1.8	180		08/24/17	2.1	180	
MW02-082217-MSD	07	08/22/17					08/24/2017	1.8	180		08/30/17	8	180	
MW35-082217	11	08/22/17					08/24/2017	1.7	180		08/24/17	2	180	
MW35-082217	12	08/22/17					08/24/2017	1.7	180		08/24/17	2	180	
MW35-082217-MS	13	08/22/17					08/24/2017	1.7	180		08/24/17	2	180	
MW35-082217-MS	14	08/22/17					08/24/2017	1.7	180		08/24/17	2	180	
MW35-082217-MSD	15	08/22/17					08/24/2017	1.7	180		08/24/17	2	180	
MW35-082217-MSD	16	08/22/17					08/24/2017	1.7	180		08/24/17	2	180	
MW36-082217	17	08/22/17					08/24/2017	1.7	180		08/24/17	2	180	
MW36-082217	18	08/22/17					08/24/2017	1.7	180		08/24/17	2	180	
DUP-GW-082217	19	08/22/17					08/24/2017	2	180		08/24/17	2.3	180	
DUP-GW-082217	20	08/22/17					08/24/2017	2	180		08/24/17	2.3	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5450635
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6020A
Login Number: L17081212

AAB#: WG627433

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW21-082217	08	08/22/17					08/28/2017	5.8	180		08/29/17	7.2	180	
MW21-082217	09	08/22/17					08/28/2017	5.8	180		08/29/17	7.2	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5450635
Report generated 08/30/2017 14:52



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: NI.082417.145324
 Prep Date: 08/24/17 07:49
 Analyzed Date: 08/24/17 14:53
 Analyst: JYH

Work Group: WG627096
 Blank Sample ID: WG627041-05
 Instrument ID: ICP-MS2
 Method: 6020A

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627041-06	NI.082417.145630	08/24/17 14:56	01
FLT_BLK	WG627041-07	NI.082417.145935	08/24/17 14:59	01
MW02-082217	L17081212-02	NI.082417.151808	08/24/17 15:18	01
MW02-082217	L17081212-03	NI.082417.152114	08/24/17 15:21	01
MW02-082217-MS	L17081212-04	NI.082417.153034	08/24/17 15:30	01
MW02-082217-MS	L17081212-05	NI.082417.153339	08/24/17 15:33	01
MW02-082217-MSD	L17081212-06	NI.082417.153645	08/24/17 15:36	01
MW02-082217-MSD	L17081212-07	NI.082417.153950	08/24/17 15:39	01
MW35-082217	L17081212-11	NI.082417.154256	08/24/17 15:42	01
MW35-082217	L17081212-12	NI.082417.154601	08/24/17 15:46	01
MW35-082217-MS	L17081212-13	NI.082417.154907	08/24/17 15:49	01
MW35-082217-MS	L17081212-14	NI.082417.155212	08/24/17 15:52	01
MW35-082217-MSD	L17081212-15	NI.082417.155518	08/24/17 15:55	01
MW35-082217-MSD	L17081212-16	NI.082417.155823	08/24/17 15:58	01
MW36-082217	L17081212-17	NI.082417.160743	08/24/17 16:07	01
MW36-082217	L17081212-18	NI.082417.161049	08/24/17 16:10	01
DUP-GW-082217	L17081212-19	NI.082417.161355	08/24/17 16:13	01
DUP-GW-082217	L17081212-20	NI.082417.161700	08/24/17 16:17	01
LCS	WG627041-06	NI.083017.130714	08/30/17 13:07	02
MW02-082217	L17081212-02	NI.083017.131019	08/30/17 13:10	02
MW02-082217	L17081212-03	NI.083017.131325	08/30/17 13:13	02
MW02-082217-MS	L17081212-04	NI.083017.131630	08/30/17 13:16	02
MW02-082217-MS	L17081212-05	NI.083017.131935	08/30/17 13:19	02
MW02-082217-MSD	L17081212-06	NI.083017.132241	08/30/17 13:22	02
MW02-082217-MSD	L17081212-07	NI.083017.132546	08/30/17 13:25	02

Report Name: BLANK_SUMMARY
 PDF File ID: 5450636
 Report generated 08/30/2017 14:52



METHOD BLANK SUMMARY

Login Number: L17081212
Blank File ID: NI.082917.170804
Prep Date: 08/28/17 07:51
Analyzed Date: 08/29/17 17:08
Analyst: JYH

Work Group: WG627433
Blank Sample ID: WG627377-02
Instrument ID: ICP-MS2
Method: 6020A

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627377-03	NI.082917.171109	08/29/17 17:11	01
MW21-082217	L17081212-08	NI.082917.174514	08/29/17 17:45	DL01
MW21-082217	L17081212-09	NI.082917.174820	08/29/17 17:48	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5450636
Report generated 08/30/2017 14:52



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: NI.083017.130408
 Prep Date: 08/24/17 07:49
 Analyzed Date: 08/30/17 13:04
 Analyst: JYH

Work Group: WG627096
 Blank Sample ID: WG627041-05
 Instrument ID: ICP-MS2
 Method: 6020A

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627041-06	NI.082417.145630	08/24/17 14:56	01
FLT_BLK	WG627041-07	NI.082417.145935	08/24/17 14:59	01
MW02-082217	L17081212-02	NI.082417.151808	08/24/17 15:18	01
MW02-082217	L17081212-03	NI.082417.152114	08/24/17 15:21	01
MW02-082217-MS	L17081212-04	NI.082417.153034	08/24/17 15:30	01
MW02-082217-MS	L17081212-05	NI.082417.153339	08/24/17 15:33	01
MW02-082217-MSD	L17081212-06	NI.082417.153645	08/24/17 15:36	01
MW02-082217-MSD	L17081212-07	NI.082417.153950	08/24/17 15:39	01
MW35-082217	L17081212-11	NI.082417.154256	08/24/17 15:42	01
MW35-082217	L17081212-12	NI.082417.154601	08/24/17 15:46	01
MW35-082217-MS	L17081212-13	NI.082417.154907	08/24/17 15:49	01
MW35-082217-MS	L17081212-14	NI.082417.155212	08/24/17 15:52	01
MW35-082217-MSD	L17081212-15	NI.082417.155518	08/24/17 15:55	01
MW35-082217-MSD	L17081212-16	NI.082417.155823	08/24/17 15:58	01
MW36-082217	L17081212-17	NI.082417.160743	08/24/17 16:07	01
MW36-082217	L17081212-18	NI.082417.161049	08/24/17 16:10	01
DUP-GW-082217	L17081212-19	NI.082417.161355	08/24/17 16:13	01
DUP-GW-082217	L17081212-20	NI.082417.161700	08/24/17 16:17	01
LCS	WG627041-06	NI.083017.130714	08/30/17 13:07	02
MW02-082217	L17081212-02	NI.083017.131019	08/30/17 13:10	02
MW02-082217	L17081212-03	NI.083017.131325	08/30/17 13:13	02
MW02-082217-MS	L17081212-04	NI.083017.131630	08/30/17 13:16	02
MW02-082217-MS	L17081212-05	NI.083017.131935	08/30/17 13:19	02
MW02-082217-MSD	L17081212-06	NI.083017.132241	08/30/17 13:22	02
MW02-082217-MSD	L17081212-07	NI.083017.132546	08/30/17 13:25	02

Report Name: BLANK_SUMMARY
 PDF File ID: 5450636
 Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/24/17 07:49 Sample ID: WG627041-05
Instrument ID: ICP-MS2 Run Date: 08/24/17 14:53 Prep Method: 3015A
File ID: NI.082417.145324 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG627096 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: ICP-MS - 24-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Arsenic, Total	0.000500	0.00100	0.000500	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5450637

30-AUG-2017 14:52



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/28/17 07:51 Sample ID: WG627377-02
Instrument ID: ICP-MS2 Run Date: 08/29/17 17:08 Prep Method: 3015A
File ID: NI.082917.170804 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG627433 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: ICP-MS - 29-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Arsenic, Total	0.000500	0.00100	0.000500	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5450637

30-AUG-2017 14:52



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/24/17 07:49 Sample ID: WG627041-05
Instrument ID: ICP-MS2 Run Date: 08/30/17 13:04 Prep Method: 3015A
File ID: NI.083017.130408 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG627096 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: ICP-MS - 30-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chromium, Total	0.00100	0.00200	0.00100	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5450637

30-AUG-2017 14:52



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627041-06
Instrument ID: ICP-MS2 Run Time: 14:56 Prep Method: 3015A
File ID: NI.082417.145630 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG627096 Matrix: Water Units: mg/L
QC Key: WATERL00 Lot#: STD80296 Cal ID: ICP-MS - 24-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Arsenic, Total	0.125	0.123	98.1	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5450638
Report generated: 08/30/2017 14:52



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627377-03
Instrument ID: ICP-MS2 Run Time: 17:11 Prep Method: 3015A
File ID: NI.082917.171109 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG627433 Matrix: Water Units: mg/L
QC Key: WATERLOO Lot#: STD80296 Cal ID: ICP-MS - 29-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Arsenic, Total	0.125	0.123	98.7	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5450638
Report generated: 08/30/2017 14:52



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627041-06
Instrument ID: ICP-MS2 Run Time: 13:07 Prep Method: 3015A
File ID: NI.083017.130714 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG627096 Matrix: Water Units: mg/L
QC Key: WATERL00 Lot#: STD80296 Cal ID: ICP-MS - 30-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Chromium, Total	0.125	0.125	99.8	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5450638
Report generated: 08/30/2017 14:52



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-MS2- 24-AUG-17
 Instrument ID: ICP-MS2 Contract #: _____
 Parent ID: L17081212-02 File ID: NI.082417.151808 Dil: 1
 Sample ID: L17081212-04 MS File ID: NI.082417.153034 Dil: 1
 Sample ID: L17081212-06 MSD File ID: NI.082417.153645 Dil: 1

Worknum: WG627096
 Prep Method: 3015A
 Method: 6020A
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Arsenic, Total	0.00117	0.125	0.129	102	0.125	0.130	103	1.10	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 5450639
 Report generated 08/30/2017 14:52



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-MS2- 24-AUG-17
 Instrument ID: ICP-MS2 Contract #: _____
 Parent ID: L17081212-03 File ID: NI.082417.152114 Dil: 1
 Sample ID: L17081212-05 MS File ID: NI.082417.153339 Dil: 1
 Sample ID: L17081212-07 MSD File ID: NI.082417.153950 Dil: 1

Worknum: WG627096
 Prep Method: 3015A
 Method: 6020A
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Arsenic, Dissolved	0.00109	0.125	0.130	103	0.125	0.130	103	0.305	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT



MS/MSD REPORT

Loginnum: <u>L17081212</u>	Cal ID: <u>ICP-MS2- 24-AUG-17</u>	Worknum: <u>WG627096</u>
Instrument ID: <u>ICP-MS2</u>	Contract #: _____	Prep Method: <u>3015A</u>
Parent ID: <u>L17081212-11</u>	File ID: <u>NI.082417.154256</u> Dil: <u>1</u>	Method: <u>6020A</u>
Sample ID: <u>L17081212-13 MS</u>	File ID: <u>NI.082417.154907</u> Dil: <u>1</u>	Matrix: <u>Water</u>
Sample ID: <u>L17081212-15 MSD</u>	File ID: <u>NI.082417.155518</u> Dil: <u>1</u>	Units: <u>mg/L</u>

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Arsenic, Total	0.00842	0.125	0.135	101	0.125	0.136	102	1.14	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 5450639
 Report generated 08/30/2017 14:52



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-MS2- 24-AUG-17
 Instrument ID: ICP-MS2 Contract #: _____
 Parent ID: L17081212-12 File ID: NI.082417.154601 Dil: 1
 Sample ID: L17081212-14 MS File ID: NI.082417.155212 Dil: 1
 Sample ID: L17081212-16 MSD File ID: NI.082417.155823 Dil: 1

Worknum: WG627096
 Prep Method: 3015A
 Method: 6020A
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Arsenic, Dissolved	0.00674	0.125	0.133	101	0.125	0.134	102	1.22	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT



MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-MS2- 30-AUG-17
 Instrument ID: ICP-MS2 Contract #: _____
 Parent ID: L17081212-02 File ID: NI.083017.131019 Dil: 1
 Sample ID: L17081212-04 MS File ID: NI.083017.131630 Dil: 1
 Sample ID: L17081212-06 MSD File ID: NI.083017.132241 Dil: 1

Worknum: WG627096
 Prep Method: 3015A
 Method: 6020A
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chromium, Total	0.00432	0.125	0.130	101	0.125	0.129	99.8	1.02	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
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MS/MSD REPORT

Loginnum: L17081212 Cal ID: ICP-MS2- 30-AUG-17
 Instrument ID: ICP-MS2 Contract #: _____
 Parent ID: L17081212-03 File ID: NI.083017.131325 Dil: 1
 Sample ID: L17081212-05 MS File ID: NI.083017.131935 Dil: 1
 Sample ID: L17081212-07 MSD File ID: NI.083017.132546 Dil: 1

Worknum: WG627096
 Prep Method: 3015A
 Method: 6020A
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chromium, Dissolved	0.00385	0.125	0.126	97.8	0.125	0.128	99.5	1.68	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 5450639
 Report generated 08/30/2017 14:52



MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum: L17081212 Cal ID: ICP-MS2 - Worknum: WG627433
 Instrument ID: ICP-MS2 Contract #: _____ Method: 6020A
 Parent ID: WG627377-01 File ID: NI.082917.171415 Dil: 1 Matrix: WATER
 Sample ID: WG627377-04 MS File ID: NI.082917.171721 Dil: 1 Units: mg/L
 Sample ID: WG627377-05 MSD File ID: NI.082917.172026 Dil: 1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Arsenic	ND	0.125	0.120	96.2	0.125	0.121	96.5	0.290	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17081212 Worknum: WG627096
Instrument: ICP-MS2 Method: 6020A
Serial Dil: WG627096-02 File ID: NI.082417.162311 Dil: 5 Units: ug/L
Sample: L17081212-20 File ID: NI.082417.161700 Dil: 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Arsenic	90.5		93.8		3.62	
Chromium	0.404	F	ND	U		

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 100 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 100 times the MDL.

SERIAL_DIL - Modified 09/22/2008

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Microbac Laboratories Inc.
Serial Dilution Report

Login: L17081212 Worknum: WG627096
Instrument: ICP-MS2 Method: 6020A
Serial Dil: WG627096-04 File ID: NI.083017.133157 Dil: 5 Units: ug/L
Sample: L17081212-02 File ID: NI.083017.131019 Dil: 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Arsenic	0.514	X	ND	U		
Chromium	1.73	X	2.26	F	30.50	

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 100 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 100 times the MDL.

SERIAL_DIL - Modified 09/22/2008

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Microbac Laboratories Inc.
Serial Dilution Report

Login: L17081212 Worknum: WG627433
Instrument: ICP-MS2 Method: 6020A
Serial Dil: WG627433-02 File ID: NI.082917.173248 Dil: 5 Units: ug/L
Sample: L17081354-02 File ID: NI.082917.172637 Dil: 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Arsenic	0.206	F	ND	U		
Chromium	0.114		ND			

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 100 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 100 times the MDL.

SERIAL_DIL - Modified 09/22/2008

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Microbac Laboratories Inc.
Serial Dilution Report

Login: L17081212 Worknum: WG627433
Instrument: ICP-MS2 Method: 6020A
Serial Dil: WG627433-02 File ID: NI.082917.173554 Dil: 25 Units: ug/L
Sample: L17081354-02 File ID: NI.082917.173248 Dil: 5

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Arsenic	ND	U	ND	U		
Chromium	-0.957		ND			

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 100 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 100 times the MDL.

SERIAL_DIL - Modified 09/22/2008

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Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17081212
Instrument ID: ICP-MS2
Post Spike ID: WG627096-01
Sample ID: L17081212-20

Worknum: WG627096
Method: 6020A
File ID: NI.082417.162006 Dil: 1 Units: ug/L
File ID: NI.082417.161700 Dil: 1 Matrix: Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ARSENIC	143		90.5		50	105.2	75 - 125	
CHROMIUM	51.0		0.404		50	101.2	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation



Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17081212
Instrument ID: ICP-MS2
Post Spike ID: WG627096-03
Sample ID: L17081212-02

Worknum: WG627096
Method: 6020A
Units: ug/L
Matrix: Water
File ID: NI.083017.132852 Dil: 1
File ID: NI.083017.131019 Dil: 1

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ARSENIC	53.3		0.514		50	105.6	75 - 125	
CHROMIUM	53.0		1.73		50	102.5	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation



Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17081212

Worknum: WG627433

Instrument ID: ICP-MS2

Method: 6020A

Post Spike ID: WG627433-01

File ID: NI.082917.172943

Dil: 1

Units: ug/L

Sample ID: L17081354-02

File ID: NI.082917.172637

Dil: 1

Matrix: Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ARSENIC	51.5		0.206	F	50	102.6	75 - 125	
CHROMIUM	49.7		0.114		50	99.2	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 5450634
Report generated: 08/30/2017 14:52



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	<u>L17081212</u>	Workgroup (AAB#):	<u>WG627096</u>
Analytical Method:	<u>6020A</u>	Instrument ID:	<u>ICP-MS2</u>
ICAL Worknum:	<u>WG627130</u>	Initial Calibration Date:	<u>24-AUG-2017 13:44</u>

	WG627130-01		WG627130-02		WG627130-03		WG627130-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ARSENIC	0	-51.5	.4	-4.80	50	41900	100	84400	.999989	
CHROMIUM	0	8770	.4	9070	50	349000	100	686000	.999999	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 5450642
Report generated: 30-AUG-2017 14:52



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	<u>L17081212</u>	Workgroup (AAB#):	<u>WG627433</u>
Analytical Method:	<u>6020A</u>	Instrument ID:	<u>ICP-MS2</u>
ICAL Worknum:	<u>WG627739</u>	Initial Calibration Date:	<u>29-AUG-2017 14:30</u>

	WG627739-01		WG627739-02		WG627739-03		WG627739-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ARSENIC	0	-79.8	.4	-24.3	50	43200	100	87900	.999918	
CHROMIUM	0	7760	.4	7950	50	323000	100	639000	.999991	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 5450642
Report generated: 30-AUG-2017 14:52



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	<u>L17081212</u>	Workgroup (AAB#):	<u>WG627096</u>
Analytical Method:	<u>6020A</u>	Instrument ID:	<u>ICP-MS2</u>
ICAL Worknum:	<u>WG627861</u>	Initial Calibration Date:	<u>30-AUG-2017 12:39</u>

	WG627861-01		WG627861-02		WG627861-03		WG627861-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ARSENIC	0	-69.6	.4	-28.7	50	36800	100	74800	.999978	
CHROMIUM	0	7510	.4	7920	50	298000	100	580000	.999963	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 5450642
Report generated: 30-AUG-2017 14:52



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-06
Instrument ID: ICP-MS2 Run Time: 13:50 Method: 6020A
File ID: NI.082417.135053 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS2 - 24-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ARSENIC	.2	.4	.2	U
CHROMIUM	.4	.8	.4	U

ICB - Modified 07/14/2009
PDF File ID: 5450644
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-06
Instrument ID: ICP-MS2 Run Time: 12:45 Method: 6020A
File ID: NI.083017.124531 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS2 - 30-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ARSENIC	.2	.4	.2	U
CHROMIUM	.4	.8	.4	U

ICB - Modified 07/14/2009
PDF File ID: 5450644
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-06
Instrument ID: ICP-MS2 Run Time: 14:36 Method: 6020A
File ID: NI.082917.143653 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627433 Cal ID: ICP-MS2 - 29-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ARSENIC	.2	.4	.2	U

ICB - Modified 07/14/2009
PDF File ID: 5450644
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-11
Instrument ID: ICP-MS2 Run Time: 14:06 Method: 6020A
File ID: NI.082417.140623 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5450662
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-13
Instrument ID: ICP-MS2 Run Time: 14:37 Method: 6020A
File ID: NI.082417.143721 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-15
Instrument ID: ICP-MS2 Run Time: 15:27 Method: 6020A
File ID: NI.082417.152727 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-17
Instrument ID: ICP-MS2 Run Time: 16:04 Method: 6020A
File ID: NI.082417.160436 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-19
Instrument ID: ICP-MS2 Run Time: 16:35 Method: 6020A
File ID: NI.082417.163534 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-23
Instrument ID: ICP-MS2 Run Time: 16:51 Method: 6020A
File ID: NI.082417.165106 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-11
Instrument ID: ICP-MS2 Run Time: 13:01 Method: 6020A
File ID: NI.083017.130102 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-13
Instrument ID: ICP-MS2 Run Time: 13:38 Method: 6020A
File ID: NI.083017.133810 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-17
Instrument ID: ICP-MS2 Run Time: 14:02 Method: 6020A
File ID: NI.083017.140257 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Chromium	0.400	0.800	0.400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-12
Instrument ID: ICP-MS2 Run Time: 15:05 Method: 6020A
File ID: NI.082917.150544 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5450662
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-16
Instrument ID: ICP-MS2 Run Time: 16:24 Method: 6020A
File ID: NI.082917.162439 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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PDF File ID: 5450662
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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-20
Instrument ID: ICP-MS2 Run Time: 17:01 Method: 6020A
File ID: NI.082917.170150 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-23
Instrument ID: ICP-MS2 Run Time: 17:42 Method: 6020A
File ID: NI.082917.174207 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-25
Instrument ID: ICP-MS2 Run Time: 18:19 Method: 6020A
File ID: NI.082917.181917 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

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Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-29
Instrument ID: ICP-MS2 Run Time: 18:53 Method: 6020A
File ID: NI.082917.185322 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5450662
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-05
Instrument ID: ICP-MS2 Run Time: 12:42 Method: 6020A
File ID: NI.083017.124224 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
QC Key: WATERL00

Analyte	Expected	Found	%REC	LIMITS	Q
Arsenic	50	49.0	97.9	90 - 110	
Chromium	50	49.5	99.1	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5450643
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-05
Instrument ID: ICP-MS2 Run Time: 13:47 Method: 6020A
File ID: NI.082417.134738 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
QC Key: WATERL00

Analyte	Expected	Found	%REC	LIMITS	Q
Arsenic	50	49.2	98.4	90 - 110	
Chromium	50	51.0	102	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5450643
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-05
Instrument ID: ICP-MS2 Run Time: 14:33 Method: 6020A
File ID: NI.082917.143346 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
QC Key: WATERL00

Analyte	Expected	Found	%REC	LIMITS	Q
Arsenic	50	49.2	98.4	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5450643
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-10
Instrument ID: ICP-MS2 Run Time: 14:03 Method: 6020A
File ID: NI.082417.140318 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0492	mg/L	98.4	90 - 110		
Chromium		0.0500	0.0494	mg/L	98.9	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450661
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-12
Instrument ID: ICP-MS2 Run Time: 14:34 Method: 6020A
File ID: NI.082417.143415 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0501	mg/L	100	90 - 110		
Chromium		0.0500	0.0508	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450661
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-14
Instrument ID: ICP-MS2 Run Time: 15:24 Method: 6020A
File ID: NI.082417.152421 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0491	mg/L	98.1	90 - 110		
Chromium		0.0500	0.0508	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
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Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-16
Instrument ID: ICP-MS2 Run Time: 16:01 Method: 6020A
File ID: NI.082417.160130 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0491	mg/L	98.3	90 - 110		
Chromium		0.0500	0.0505	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450661
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-18
Instrument ID: ICP-MS2 Run Time: 16:32 Method: 6020A
File ID: NI.082417.163229 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0478	mg/L	95.6	90 - 110		
Chromium		0.0500	0.0486	mg/L	97.2	90 - 110		

* Exceeds LIMITS Criteria

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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-22
Instrument ID: ICP-MS2 Run Time: 16:48 Method: 6020A
File ID: NI.082417.164800 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0475	mg/L	94.9	90 - 110		
Chromium		0.0500	0.0477	mg/L	95.3	90 - 110		

* Exceeds LIMITS Criteria

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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-10
Instrument ID: ICP-MS2 Run Time: 12:57 Method: 6020A
File ID: NI.083017.125756 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0496	mg/L	99.2	90 - 110		
Chromium		0.0500	0.0501	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-12
Instrument ID: ICP-MS2 Run Time: 13:35 Method: 6020A
File ID: NI.083017.133504 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0493	mg/L	98.5	90 - 110		
Chromium		0.0500	0.0507	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450661
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-16
Instrument ID: ICP-MS2 Run Time: 13:59 Method: 6020A
File ID: NI.083017.135951 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0494	mg/L	98.7	90 - 110		
Chromium		0.0500	0.0503	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-11
Instrument ID: ICP-MS2 Run Time: 15:02 Method: 6020A
File ID: NI.082917.150239 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0494	mg/L	98.8	90 - 110		

* Exceeds LIMITS Criteria

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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-15
Instrument ID: ICP-MS2 Run Time: 16:21 Method: 6020A
File ID: NI.082917.162134 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0491	mg/L	98.2	90 - 110		

* Exceeds LIMITS Criteria

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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-19
Instrument ID: ICP-MS2 Run Time: 16:58 Method: 6020A
File ID: NI.082917.165844 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0485	mg/L	97.0	90 - 110		

* Exceeds LIMITS Criteria

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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-22
Instrument ID: ICP-MS2 Run Time: 17:39 Method: 6020A
File ID: NI.082917.173901 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0488	mg/L	97.7	90 - 110		

* Exceeds LIMITS Criteria

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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-24
Instrument ID: ICP-MS2 Run Time: 18:16 Method: 6020A
File ID: NI.082917.181611 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0490	mg/L	98.1	90 - 110		

* Exceeds LIMITS Criteria

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Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-28
Instrument ID: ICP-MS2 Run Time: 18:50 Method: 6020A
File ID: NI.082917.185016 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0492	mg/L	98.3	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5450661
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-07
Instrument ID: ICP-MS2 Run Time: 13:54 Method: 6020A
File ID: NI.082417.135400 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.400	0.363	ug/L	90.8	50 - 150		
Chromium		0.800	0.489	ug/L	61.1	50 - 150		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450663
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627130-24
Instrument ID: ICP-MS2 Run Time: 16:54 Method: 6020A
File ID: NI.082417.165413 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 24-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.400	0.414	ug/L	104	50 - 150		
Chromium		0.800	0.533	ug/L	66.6	50 - 150		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450663
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-07
Instrument ID: ICP-MS2 Run Time: 12:48 Method: 6020A
File ID: NI.083017.124838 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.400	0.409	ug/L	102	50 - 150		
Chromium		0.800	0.938	ug/L	117	50 - 150		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450663
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/30/2017 Sample ID: WG627861-18
Instrument ID: ICP-MS2 Run Time: 14:06 Method: 6020A
File ID: NI.083017.140604 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627096 Cal ID: ICP-MS - 30-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.400	0.449	ug/L	112	50 - 150		
Chromium		0.800	0.782	ug/L	97.8	50 - 150		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450663
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-08
Instrument ID: ICP-MS2 Run Time: 14:53 Method: 6020A
File ID: NI.082917.145321 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.400	0.368	ug/L	91.9	50 - 150		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450663
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-21
Instrument ID: ICP-MS2 Run Time: 17:04 Method: 6020A
File ID: NI.082917.170457 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.400	0.378	ug/L	94.6	50 - 150		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450663
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17081212 Run Date: 08/29/2017 Sample ID: WG627739-30
Instrument ID: ICP-MS2 Run Time: 18:56 Method: 6020A
File ID: NI.082917.185629 Analyst: JYH QC Key: WATERL00
Workgroup (AAB#): WG627433 Cal ID: ICP-MS - 29-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.400	0.384	ug/L	96.1	50 - 150		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5450663
Report generated 08/30/2017 14:52



Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-MS2
Sol. A : WG627130-08
Sol. AB : WG627130-09

File ID: NI.082417.135705
File ID: NI.082417.140011

Workgroup (AAB#): WG627096
Method: 6020A
Units: ug/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Arsenic	NS	-0.0334	NS	100	102	102	
Chromium	NS	-0.239	NS	100	99.3	99.3	

NS = Not spiked

* = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-MS2
Sol. A : WG627130-20
Sol. AB : WG627130-21

File ID: NI.082417.164147
File ID: NI.082417.164453

Workgroup (AAB#): WG627096
Method: 6020A
Units: ug/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Arsenic	NS	-0.110	NS	100	101	101	
Chromium	NS	-0.185	NS	100	98.2	98.2	

NS = Not spiked

*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5450645
Report generated 08/30/2017 14:52



**Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES**

Login number: L17081212
Instrument ID: ICP-MS2
Sol. A : WG627861-08
Sol. AB : WG627861-09

File ID: NI.083017.125143
File ID: NI.083017.125449

Workgroup (AAB#): WG627096
Method: 6020A
Units: ug/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Arsenic	NS	-0.0519	NS	100	102	102	
Chromium	NS	-0.230	NS	100	99.7	99.7	

NS = Not spiked

*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.



**Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES**

Login number: L17081212
Instrument ID: ICP-MS2
Sol. A : WG627861-14
Sol. AB : WG627861-15

File ID: NI.083017.135339
File ID: NI.083017.135644

Workgroup (AAB#): WG627096
Method: 6020A
Units: ug/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Arsenic	NS	-0.0290	NS	100	101	101	
Chromium	NS	-0.246	NS	100	96.2	96.2	

NS = Not spiked

*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.



Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-MS2
Sol. A : WG627739-09
Sol. AB : WG627739-10

File ID: NI.082917.145626
File ID: NI.082917.145932

Workgroup (AAB#): WG627433
Method: 6020A
Units: ug/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Arsenic	NS	-0.0470	NS	100	101	101	

NS = Not spiked

* = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-MS2
Sol. A : WG627739-17
Sol. AB : WG627739-18

File ID: NI.082917.165231
File ID: NI.082917.165537

Workgroup (AAB#): WG627433
Method: 6020A
Units: ug/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Arsenic	NS	-0.0948	NS	100	102	102	

NS = Not spiked

* = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17081212
Instrument ID: ICP-MS2
Sol. A : WG627739-26
Sol. AB : WG627739-27

File ID: NI.082917.184404
File ID: NI.082917.184709

Workgroup (AAB#): WG627433
Method: 6020A
Units: ug/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Arsenic	NS	-0.0379	NS	100	102	102	

NS = Not spiked

* = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

INTERNAL STANDARD REPORT

Login: L17081212 Analytical Method: 6020
 Analytical Workgroup: WG627096 Matrix: 1
 Instrument: ICP-MS2 Analyst: JYH
 ICAL Date: 24-AUG-2017 13:35

Sample	Type	Run Date	BISMUTH % Rec	GERMANIUM % Rec	INDIUM % Rec
L17081212-02	SAMP	24-AUG-2017 15:18	85.874	97.361	90.348
L17081212-03	SAMP	24-AUG-2017 15:21	87.882	97.187	90.889
L17081212-04	SAMP	24-AUG-2017 15:30	89.473	102.607	91.666
L17081212-05	SAMP	24-AUG-2017 15:33	89.423	102.46	92.033
L17081212-06	SAMP	24-AUG-2017 15:36	88.44	100.403	90.944
L17081212-07	SAMP	24-AUG-2017 15:39	87.091	100.465	90.18
L17081212-11	SAMP	24-AUG-2017 15:42	93.318	108.087	95.84
L17081212-12	SAMP	24-AUG-2017 15:46	88.179	102.237	91.562
L17081212-13	SAMP	24-AUG-2017 15:49	87.978	101.858	90.354
L17081212-14	SAMP	24-AUG-2017 15:52	88.074	100.569	90.588
L17081212-15	SAMP	24-AUG-2017 15:55	88.463	102.646	91.043
L17081212-16	SAMP	24-AUG-2017 15:58	87.391	101.037	89.823
L17081212-17	SAMP	24-AUG-2017 16:07	84.4	98.066	86.959
L17081212-18	SAMP	24-AUG-2017 16:10	84.473	97.208	86.814
L17081212-19	SAMP	24-AUG-2017 16:13	84.974	98.383	87.242
L17081212-20	SAMP	24-AUG-2017 16:17	85.455	98.225	87.338
WG627041-05	BLANK	24-AUG-2017 14:53	99.698	101.775	99.038
WG627041-06	LCS	24-AUG-2017 14:56	99.638	101.067	101.351
WG627041-07	FLT_BLK	24-AUG-2017 14:59	100.577	100.732	101.657
WG627096-01	PSPK	24-AUG-2017 16:20	83.963	97.162	86.301
WG627096-02	SERIAL	24-AUG-2017 16:23	85.031	93.412	83.785
WG627130-05	ICV	24-AUG-2017 13:47	97.522	98.46	99.637
WG627130-06	ICB	24-AUG-2017 13:50	93.671	92.584	94.719
WG627130-07	LLICV	24-AUG-2017 13:54	98.431	97.482	98.174
WG627130-08	ICS	24-AUG-2017 13:57	89.656	89.4	91.866
WG627130-09	ICS	24-AUG-2017 14:00	97.072	98.33	99.435
WG627130-10	CCV	24-AUG-2017 14:03	97.578	99.712	101.348
WG627130-11	CCB	24-AUG-2017 14:06	91.768	91.868	94.623
WG627130-12	CCV	24-AUG-2017 14:34	96.184	98.621	100.343
WG627130-13	CCB	24-AUG-2017 14:37	96.189	96.892	98.15
WG627130-14	CCV	24-AUG-2017 15:24	92.848	99.689	94.763
WG627130-15	CCB	24-AUG-2017 15:27	87.994	93.089	87.624
WG627130-16	CCV	24-AUG-2017 16:01	93.736	102.919	92.941
WG627130-17	CCB	24-AUG-2017 16:04	87.836	94.11	85.619
WG627130-18	CCV	24-AUG-2017 16:32	91.426	99.05	89.098
WG627130-19	CCB	24-AUG-2017 16:35	91.284	98.544	87.992
WG627130-20	ICS	24-AUG-2017 16:41	83.787	91.3	81.319
WG627130-21	ICS	24-AUG-2017 16:44	88.965	97.832	87.385
WG627130-22	CCV	24-AUG-2017 16:48	90.14	97.437	87.774
WG627130-23	CCB	24-AUG-2017 16:51	91.289	99.294	89.346

Acceptance criteria: 30% - 120% Underlined recoveries are out of range
 Acceptance criteria for CCVs and CCBs for method SW846-6020: 80% - 120%

INT_STD_ICPMS - Modified 07/28/2010
 PDF File ID: 5450641
 Report generated: 08/30/2017 14:52



Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L17081212 Analytical Method: 6020
 Analytical Workgroup: WG627096 Matrix: 1
 Instrument: ICP-MS2 Analyst: JYH
 ICAL Date: 24-AUG-2017 13:35

Sample	Type	Run Date	BISMUTH	GERMANIUM	INDIUM
			% Rec	% Rec	% Rec
WG627130-24	LLCCV	24-AUG-2017 16:54	91.062	98.528	89.432

Acceptance criteria: 30% - 120% Underlined recoveries are out of range
 Acceptance criteria for CCVs and CCBs for method SW846-6020: 80% - 120%

INT_STD_ICPMS - Modified 07/28/2010
 PDF File ID: 5450641
 Report generated: 08/30/2017 14:52



INTERNAL STANDARD REPORT

Login: L17081212 Analytical Method: 6020
 Analytical Workgroup: WG627096 Matrix: 1
 Instrument: ICP-MS2 Analyst: JYH
 ICAL Date: 30-AUG-2017 12:30

Sample	Type	Run Date	BISMUTH	GERMANIUM	INDIUM
			% Rec	% Rec	% Rec
L17081212-02	SAMP	30-AUG-2017 13:10	91.593	94.967	99.68
L17081212-03	SAMP	30-AUG-2017 13:13	91.874	95.629	100.476
L17081212-04	SAMP	30-AUG-2017 13:16	91.698	96.138	101.298
L17081212-05	SAMP	30-AUG-2017 13:19	92.885	95.977	102.507
L17081212-06	SAMP	30-AUG-2017 13:22	91.268	94.714	101.061
L17081212-07	SAMP	30-AUG-2017 13:25	91.492	94.307	100.963
WG627041-05	BLANK	30-AUG-2017 13:04	93.742	91.42	96.031
WG627041-06	LCS	30-AUG-2017 13:07	100.593	99.925	101.781
WG627096-03	PSPK	30-AUG-2017 13:28	92.114	95.469	101.843
WG627096-04	SERIAL	30-AUG-2017 13:31	92.768	92.918	99.954
WG627861-05	ICV	30-AUG-2017 12:42	98.492	99.805	101.688
WG627861-06	ICB	30-AUG-2017 12:45	98.913	99.235	101.672
WG627861-07	LLICV	30-AUG-2017 12:48	100.028	100.728	102.053
WG627861-08	ICS	30-AUG-2017 12:51	91.09	90.677	95.592
WG627861-09	ICS	30-AUG-2017 12:54	94.306	92.85	96.733
WG627861-10	CCV	30-AUG-2017 12:57	98.046	98.866	102.55
WG627861-11	CCB	30-AUG-2017 13:01	99.671	98.298	102.188
WG627861-12	CCV	30-AUG-2017 13:35	99.639	98.566	105.346
WG627861-13	CCB	30-AUG-2017 13:38	101.271	98.33	103.909
WG627861-14	ICS	30-AUG-2017 13:53	96.638	94.234	100.245
WG627861-15	ICS	30-AUG-2017 13:56	95.987	95.466	99.177
WG627861-16	CCV	30-AUG-2017 13:59	99.689	99.095	103.531
WG627861-17	CCB	30-AUG-2017 14:02	99.942	98.876	103.093
WG627861-18	LLCCV	30-AUG-2017 14:06	100.692	99.204	103.017

Acceptance criteria: 30% - 120% Underlined recoveries are out of range
 Acceptance criteria for CCVs and CCBs for method SW846-6020: 80% - 120%

INT_STD_ICPMS - Modified 07/28/2010
 PDF File ID: 5450641
 Report generated: 08/30/2017 14:52



INTERNAL STANDARD REPORT

Login: L17081212 Analytical Method: 6020
 Analytical Workgroup: WG627433 Matrix: 1
 Instrument: ICP-MS2 Analyst: JYH
 ICAL Date: 29-AUG-2017 14:21

Sample	Type	Run Date	BISMUTH	GERMANIUM	INDIUM
			% Rec	% Rec	% Rec
L17081212-08	SAMP	29-AUG-2017 17:45	85.788	82.721	94.337
L17081212-09	SAMP	29-AUG-2017 17:48	85.787	83.048	94.202
L17081354-02	SAMP	29-AUG-2017 17:26	97.982	94.935	104.299
L17081354-02	SAMP	29-AUG-2017 17:32	94.526	88.513	99.31
WG627377-02	BLANK	29-AUG-2017 17:08	101.16	94.279	105.518
WG627377-03	LCS	29-AUG-2017 17:11	101.347	95.98	106.031
WG627433-01	PSPK	29-AUG-2017 17:29	98.992	95.298	104.259
WG627433-02	SERIAL	29-AUG-2017 17:32	94.526	88.513	99.31
WG627433-02	SERIAL	29-AUG-2017 17:35	94.232	86.725	98.035
WG627739-05	ICV	29-AUG-2017 14:33	98.921	96.955	101.543
WG627739-06	ICB	29-AUG-2017 14:36	99.923	98.234	102.488
WG627739-08	LLICV	29-AUG-2017 14:53	106.111	104.133	104.34
WG627739-09	ICS	29-AUG-2017 14:56	92.505	89.656	95.314
WG627739-10	ICS	29-AUG-2017 14:59	98.436	95.96	99.863
WG627739-11	CCV	29-AUG-2017 15:02	101.072	98.011	104.036
WG627739-12	CCB	29-AUG-2017 15:05	99.292	96.862	102.008
WG627739-15	CCV	29-AUG-2017 16:21	99.329	94.87	109.186
WG627739-16	CCB	29-AUG-2017 16:24	100.784	94.011	108.04
WG627739-17	ICS	29-AUG-2017 16:52	89.503	83.659	95.524
WG627739-18	ICS	29-AUG-2017 16:55	95.657	90.264	101.598
WG627739-19	CCV	29-AUG-2017 16:58	99.925	96.144	106.676
WG627739-20	CCB	29-AUG-2017 17:01	101.643	94.488	105.953
WG627739-21	LLCCV	29-AUG-2017 17:04	101.607	95.699	107.355
WG627739-22	CCV	29-AUG-2017 17:39	100.411	95.87	104.682
WG627739-23	CCB	29-AUG-2017 17:42	100.85	94.247	103.969
WG627739-24	CCV	29-AUG-2017 18:16	98.907	95.484	108.311
WG627739-25	CCB	29-AUG-2017 18:19	101.117	95.47	107.511
WG627739-26	ICS	29-AUG-2017 18:44	91.861	85.637	96.868
WG627739-27	ICS	29-AUG-2017 18:47	94.988	90.852	100.992
WG627739-28	CCV	29-AUG-2017 18:50	99.451	94.712	106.097
WG627739-29	CCB	29-AUG-2017 18:53	100.802	94.359	104.964
WG627739-30	LLCCV	29-AUG-2017 18:56	101.702	96.156	105.91

Acceptance criteria: 30% - 120% Underlined recoveries are out of range
 Acceptance criteria for CCVs and CCBs for method SW846-6020: 80% - 120%

INT_STD_ICPMS - Modified 07/28/2010
 PDF File ID: 5450641
 Report generated: 08/30/2017 14:52



Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17081212

Date: 04/12/2017

Instrument ID: ICP-MS2

Method: 6020A

Analyte	Integration Time (Sec.)	Concentration (ug/L)
Antimony	1.00	100.0
Arsenic	1.00	100.0
Barium	1.00	100.0
Cadmium	1.00	100.0
Chromium	1.00	100.0
Cobalt	1.00	100.0
Copper	1.00	100.0
Lead	1.00	100.0
Manganese	1.00	100.0
Nickel	1.00	100.0
Selenium	1.00	100.0
Silver	1.00	100.0
Thallium	1.00	100.0
Uranium	1.00	100.0
Vanadium	1.00	100.0
Zinc	1.00	100.0

Comments:

All analytes passed acceptance criteria at the specified concentration.

LINEAR_RANGE - Modified 03/06/2008
PDF File ID: 5450640
Report generated: 08/30/2017 14:52



2.3 General Chemistry Data

2.3.1 Method 9056

2.3.1.1 Summary Data



Login Number: L17081212
Department: General Chromatography
Analyst: Craig Smith

METHOD

Analysis EPA300.0/SW846 9056

HOLDING TIMES

Sample Analysis: Hold times for NO₂ and NO₃ are 48 hours and the hold times for F, Cl, Br, and SO₄ are 28 days. The hold time forms calculate the hold time based on 48 hours. All samples were analyzed in hold.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration Verification: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: The client did not specify an MS/MSD for this sample delivery group. The laboratory selected sample 02 for MS/MSD analysis and recoveries out of range were observed for chloride and sulfate. Please see the applicable QC report for a detailed presentation of the failures.

The parent sample's initial results for chloride and sulfate were greater than that of the MS/MSD spiking solution concentrations for those analytes.

SAMPLES

Samples: Sample 02 was analyzed at a dilution only due to its pre-run screen results for CL and SO₄ which were greater than their calibration range maxima.

Samples 08, 11, and 17 were analyzed at dilutions only due to their pre-run screen results for CL which were greater than 200 ppm. Any sample that has a single anion load greater than 200 ppm will be diluted in order to prevent damage to the ion chromatograph, which is caused by repeated overloading of the analytical column and oversaturation of the conductivity suppressor and/or detector.

MANUAL INTEGRATION: No manual integrations were required.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128684

Approved By: Eric Lawson

A handwritten signature in black ink, appearing to read "Eric C. Lawson", is written over a light gray rectangular background.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: IC2
Client ID: MW02-082217	Prep Method: 300.0	Prep Date: 08/23/2017 17:30
Matrix: Water	Analytical Method: 300.0	Cal Date: 04/11/2017 18:31
Workgroup #: WG627007	Analyst: CAS	Run Date: 08/23/2017 20:04
Collect Date: 08/22/2017 12:23	Dilution: 10	File ID: I2_082317-11
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	144		2.00	1.00
Sulfate	14808-79-8	651		10.0	5.00

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: IC3
Client ID: MW21-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 03:40
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: I3_082517-32
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	312	E	2.00	1.00
Sulfate	14808-79-8	813		10.0	5.00
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: IC3
Client ID: MW21-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 04:00
Collect Date: 08/22/2017 12:35	Dilution: 50	File ID: I3_082517-33
Sample Tag: DL02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	380		10.0	5.00
Sulfate	14808-79-8	854		50.0	25.0

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: IC3
Client ID: MW35-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 06:02
Collect Date: 08/22/2017 15:28	Dilution: 5	File ID: I3_082517-39
Sample Tag: DL01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	386	E	1.00	0.500
Sulfate	14808-79-8	168		5.00	2.50
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: IC3
Client ID: MW35-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 06:23
Collect Date: 08/22/2017 15:28	Dilution: 50	File ID: I3_082517-40
Sample Tag: DL02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	452		10.0	5.00
Sulfate	14808-79-8	168		50.0	25.0

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: IC3
Client ID: MW36-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 06:43
Collect Date: 08/22/2017 15:50	Dilution: 5	File ID: I3_082517-41
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	230	E	1.00	0.500
Sulfate	14808-79-8	171		5.00	2.50
E	Semiquantitative result (out of calibration range)				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: IC3
Client ID: MW36-082217	Prep Method: 300.0	Prep Date: 08/25/2017 17:49
Matrix: Water	Analytical Method: 300.0	Cal Date: 06/26/2017 19:12
Workgroup #: WG627352	Analyst: CAS	Run Date: 08/26/2017 07:03
Collect Date: 08/22/2017 15:50	Dilution: 50	File ID: I3_082517-42
Sample Tag: DL02	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	249		10.0	5.00
Sulfate	14808-79-8	172		50.0	25.0

2.3.1.2 QC Summary Data

The concentrations (ppm) of the calibration standards and the resulting area counts are used to determine the equation of a linear or quadratic plot.

The slope and y-intercept of that line are used to calculate the quantity of the analyzed unknown samples.

$\text{Amount(ppm)} = [(\text{slope})(\text{area count of unknown}) + \text{y-intercept}](\text{dilution})$

(The slope is the amt/area also identified as the CF or calibration factor)

Microbac Laboratories Inc.
Instrument Run Log

Instrument: IC2 Dataset: 041117 IC2 ICAL.SEQ
 Analyst1: CAS Analyst2: NA
 Method: IC01 SOP: 300/9056 Rev: 19

Maintenance Log ID: _____ Syringe Filter Lot#: 160804254
 Eluent ID#: RGT39823

Workgroups: Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM

Internal STD: NA Surrogate STD: NA Calibration STD STD81395 (04-11-2017)
 CCV STD: STD81395 LCS STD: STD81396 MS/MSD STD: NA

Comments: ICAL WG609755: Alternate Source STD81396
 Guard Column: Ionpac AG14A (4x50mm)
 Dionex S/N 012640
 Analytical Column: Ionpac AS14A (4x250mm)
 Dionex S/N 010066
 Cond Suppressor: AERS 500 (4mm)
 Dionex S/N 140122040
 System Backpressure: 1836 psi

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I2_041117-01	ELUENT	1	1		04/11/17 16:16
2	I2_041117-02	DI WATER	1	1		04/11/17 16:35
3	I2_041117-03	WG609755-01 STD	1	1		04/11/17 16:55
4	I2_041117-04	WG609755-02 STD	1	1		04/11/17 17:14
5	I2_041117-05	WG609755-03 STD	1	1		04/11/17 17:33
6	I2_041117-06	WG609755-04 STD	1	1		04/11/17 17:52
7	I2_041117-07	WG609755-05 STD	1	1		04/11/17 18:11
8	I2_041117-08	WG609755-06 STD	1	1		04/11/17 18:31
9	I2_041117-09	WG609755-07 SSCV	1	1		04/11/17 18:50
10	I2_041117-10	LCRV @Level-6	1	1		04/11/17 19:09
11	I2_041117-11	LCRV @Level-4	1	1		04/11/17 19:28
12	I2_041117-12	LCRV @Level-2	1	1		04/11/17 19:48
13	I2_041117-13	LCRV @Level-0	1	1		04/11/17 20:07
14	I2_041117-14	END	1	1		04/11/17 20:26

Comments

Seq.	Rerun	Dil.	Reason	Analytes
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Page: 1

Approved: 12-APR-17




Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC3 Dataset: 062617 ICAL IC3.SEQ
 Analyst1: CAS Analyst2: NA
 Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254
 Eluent ID#: RGT40584

Workgroups: Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM
 Analytical WGs: WG618468 (MDL x7 Waters), WG618469 (MDL x7 Soils)
 Internal STD: NA Surrogate STD: NA Calibration STD: STD81395(26-JUN-2017)
 CCV STD: STD81395 LCS STD: STD81396 MS/MSD STD: NS

Comments: System Backpressure: 2189 psi
 SSCV STD: STD81396
 Guard Column: AG14A-4MM S/N 160604051
 Analytical Column: AS14A-4MM S/N 010871
 Suppressor:: AERS 500 S/N 082540

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I3_062617-01	ELUENT	1	1		06/26/17 16:50
2	I3_062617-02	DI WATER	1	1		06/26/17 17:10
3	I3_062617-03	WG619464-01 STD	1	1	STD81395	06/26/17 17:31
4	I3_062617-04	WG619464-02 STD	1	1	STD81395	06/26/17 17:51
5	I3_062617-05	WG619464-03 STD	1	1	STD81395	06/26/17 18:11
6	I3_062617-06	WG619464-04 STD	1	1	STD81395	06/26/17 18:32
7	I3_062617-07	WG619464-05 STD	1	1	STD81395	06/26/17 18:52
8	I3_062617-08	WG619464-06 STD	1	1	STD81395	06/26/17 19:12
9	I3_062617-09	WG619464-07 SSCV	1	1	STD81396	06/26/17 19:33
10	I3_062617-10	LCRV @ Lvl 6	1	1	STD81396	06/26/17 19:53
11	I3_062617-11	LCRV @ Lvl 4	1	1	STD81396	06/26/17 20:13
12	I3_062617-12	LCRV @ Lvl 2	1	1	STD81396	06/26/17 20:34
13	I3_062617-13	LCRV @ Lvl 0	1	1		06/26/17 20:54
14	I3_062617-14	WG618473-01 ANION CCV	1	1	STD81395	06/26/17 21:15
15	I3_062617-15	WG618473-02 ANION CCB	1	1		06/26/17 21:35
16	I3_062617-16	WG618468-01 ANION BLANK	1	1		06/26/17 21:55
17	I3_062617-17	WG618468-02 ANION LCS	1	1	STD81396	06/26/17 22:16
18	I3_062617-18	WG618468-03 ANION LCS2	1	1	STD81396	06/26/17 22:36
19	I3_062617-19	L17060001-08 (F,CL,BR,SO4) MDL #1	1	1	STD81396	06/26/17 22:56
20	I3_062617-20	L17060001-09 (F,CL,BR,SO4) MDL #2	1	1	STD81396	06/26/17 23:17
21	I3_062617-21	L17060001-08 (NO2,NO3) MDL #1	1	1	STD81396	06/26/17 23:37
22	I3_062617-22	L17060001-09 (NO2,NO3) MDL #2	1	1	STD81396	06/26/17 23:57
23	I3_062617-23	WG618473-03 ANION CCV	1	1	STD81395	06/27/17 00:18
24	I3_062617-24	WG618473-04 ANION CCB	1	1		06/27/17 00:38
25	I3_062617-25	WG618469-01 ANION BLANK	7	1		06/27/17 00:58
26	I3_062617-26	WG618469-02 ANION LCS	7	1	STD81396	06/27/17 01:19
27	I3_062617-27	WG618469-03 ANION LCS2	7	1	STD81396	06/27/17 01:39
28	I3_062617-28	L17060001-15 (F,CL,BR,SO4) MDL #1	7	1	STD81396	06/27/17 02:00
29	I3_062617-29	L17060001-16 (F,CL,BR,SO4) MDL #2	7	1	STD81396	06/27/17 02:20
30	I3_062617-30	L17060001-15 (NO2,NO3) MDL #1	7	1	STD81396	06/27/17 02:40
31	I3_062617-31	L17060001-16 (NO2,NO3) MDL #2	7	1	STD81396	06/27/17 03:01

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Approved: 27-JUN-17




Microbac Laboratories Inc.
Instrument Run Log

Instrument: IC2 Dataset: 082317 IC2.SEQ
 Analyst1: CAS Analyst2: NA
 Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254
 Eluent ID#: RGT41049

Workgroups: Column 1 ID: AG14A 4MM Column 2 ID: AS14A 4MM
 Analytical WG627007 (Waters)
 Internal STD: NA Surrogate STD: NA Calibration STD STD77046 (04-11-2017)
 CCV STD: STD81395 LCS STD: STD81396 MS/MSD STD: STD81396

Comments: System Backpressure: 1784 psi

Samples L17081192 (-01,03,05,07) were analyzed at dilutions only due to their pre-run screen results for sulfate, which were greater than the calibration maximum.

Sample L17081212-02 was analyzed at a dilution only due to its pre-run screen results for chloride and sulfate, which were greater than their calibration maxima.

Samples L17081212 (-08,11,17) and L17081090-01 were not reported due to a CCB failure; WG627011(-06,10) contained amounts of sulfate greater than the MDL, and these samples associated with those CCBs also contained sulfate.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I2_082317-01	ELUENT	1	1		08/23/17 16:52
2	I2_082317-02	DI WATER	1	1		08/23/17 17:11
3	I2_082317-03	WG627011-01 ANION CCV	1	1	STD81395	08/23/17 17:30
4	I2_082317-04	WG627011-02 ANION CCB	1	1		08/23/17 17:49
5	I2_082317-05	WG627007-01 ANION BLANK	1	1		08/23/17 18:09
6	I2_082317-06	WG627007-02 ANION LCS	1	1	STD81396	08/23/17 18:28
7	I2_082317-07	L17081192-01 (SO4) 100x	2	100		08/23/17 18:47
8	I2_082317-08	L17081192-03 (SO4) 50x	2	50		08/23/17 19:06
9	I2_082317-09	L17081192-05 (SO4) 100x	2	100		08/23/17 19:26
10	I2_082317-10	L17081192-07 (SO4) 50x	2	50		08/23/17 19:45
11	I2_082317-11	L17081212-02 (CL,SO4) REF 10x	1	10		08/23/17 20:04
12	I2_082317-12	WG627007-04 DUP 1212-02 10x	1	10		08/23/17 20:23
13	I2_082317-13	WG627007-05 MS 1212-02 10x	1	10	STD81396	08/23/17 20:43
14	I2_082317-14	WG627007-06 MSD 1212-02 10x	1	10	STD81396	08/23/17 21:02
15	I2_082317-15	WG627011-03 ANION CCV	1	1	STD81395	08/23/17 21:21
16	I2_082317-16	WG627011-04 ANION CCB	1	1		08/23/17 21:40
17	I2_082317-17	L17081212-08 (CL,SO4) 5x (NR)	1	5		08/23/17 22:00
18	I2_082317-18	L17081212-08 (CL,SO4) 50x (NR)	1	50		08/23/17 22:19
19	I2_082317-19	L17081212-11 (CL,SO4) 5x (NR)	1	5		08/23/17 22:38
20	I2_082317-20	L17081212-11 RR CL 50x (NR)	1	50		08/23/17 22:57
21	I2_082317-21	L17081212-17 (CL,SO4) 5x (NR)	1	5		08/23/17 23:17
22	I2_082317-22	L17081212-17 RR CL 50x (NR)	1	50		08/23/17 23:36
23	I2_082317-23	L17081090-01 RR SO4 100x (NR)	2	100		08/23/17 23:55
24	I2_082317-24	WG627011-05 ANION CCV (NR)	1	1	STD81395	08/24/17 00:14
25	I2_082317-25	WG627011-06 ANION CCB (NR)	1	1		08/24/17 00:33
26	I2_082317-26	WG627011-07 ANION CCV (NR)	1	1	STD81395	08/24/17 10:03
27	I2_082317-27	WG627011-08 ANION CCB (NR)	1	1		08/24/17 10:22
28	I2_082317-28	L17081212-08 (CL,SO4) 10x (NR)	1	10		08/24/17 10:41

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Approved: 25-AUG-17




Microbac Laboratories Inc.
Instrument Run Log

Instrument: IC2 Dataset: 082317 IC2.SEQ
 Analyst1: CAS Analyst2: NA
 Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254

Eluent ID#: RGT41049

Workgroups: Column 1 ID: AG14A 4MM Column 2 ID: AS14A 4MM
 Analytical WG627007 (Waters)
 Internal STD: NA Surrogate STD: NA STD77046 (04-11-2017)
 CCV STD: STD81395 LCS STD: STD81396 STD81396

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
29	I2_082317-29	L17081212-08 (CL,SO4) 50x (NR)	1	50		08/24/17 11:00
30	I2_082317-30	L17081212-11 (CL,SO4) 5x (NR)	1	5		08/24/17 11:20
31	I2_082317-31	L17081212-11 RR CL 50x (NR)	1	50		08/24/17 11:39
32	I2_082317-32	L17081212-17 (CL,SO4) 5x (NR)	1	5		08/24/17 11:58
33	I2_082317-33	L17081212-17 RR CL 50x (NR)	1	50		08/24/17 12:17
34	I2_082317-34	L17081090-01 RR SO4 100x (NR)	2	100		08/24/17 12:36
35	I2_082317-35	WG627011-09 ANION CCV (NR)	1	1	STD81395	08/24/17 12:56
36	I2_082317-36	WG627011-10 ANION CCB (NR)	1	1		08/24/17 13:15
37	I2_082317-37	END	1	1		08/24/17 13:34

Comments

Seq.	Rerun	Dil.	Reason	Analytes
13				
			Sample WG627007-05 MS 1212-02 10x had MS %Recs below the advisory limits for chloride and sulfate. This was due to the parent sample's initial results, which were greater than the respective concentrations of the anions in the MS spiking solution.	
14				
			Sample WG627007-06 MSD 1212-02 10x had MSD %Recs below the advisory limits for chloride and sulfate. This was due to the parent sample's initial results, which were greater than the respective concentrations of the anions in the MSD spiking solution.	

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Approved: 25-AUG-17

Eri C. Zuma



Microbac Laboratories Inc.
Instrument Run Log

Instrument:	IC3	Dataset:	082517 IC3.SEQ
Analyst1:	CAS	Analyst2:	NA
Method:	300/9056	SOP:	IC01
			Rev: 19

Maintenance Log ID: _____ Syringe Filter Lot#: 161205254
Eluent ID#: RGT41063

Workgroups:	Column 1 ID: <u>AG14A-4MM</u>	Column 2 ID: <u>AS14A-4MM</u>
Internal STD:	<u>Analytical WGs: WG627352 (Waters), WG627353 (Soils)</u>	
CCV STD:	<u>NA</u>	Surrogate STD: <u>NA</u>
	<u>STD81395</u>	Calibration STD <u>STD81395(26-JUN-2017)</u>
	<u>LCS STD: STD81396</u>	<u>MS/MSD STD: STD81396</u>

Comments: System Backpressure: 2204 psi

Samples L17081298-01 and L17081299-03 were analyzed at dilutions only due to their pre-run screen results for sulfate, which were greater than the calibration maximum.

Samples L17081305 (-08,10,12) and L17081212 (-08,11,17) were analyzed at dilutions only due to their pre-run screen results for chloride, which were greater than 200 ppm.

Sample L17081262-01 was analyzed at a dilution only due to its pre-run screen result for chloride, which was greater than the calibration maximum.

Sample L17081305-03 was analyzed at a dilution only due to its pre-run screen results for chloride and sulfate, which were greater than their calibration maxima.

Sample L17081299-02 was analyzed at a dilution only due to its sample matrix. In order for a sample to be analyzed, it must first pass through a 0.45 um PTFE filter. This sample, as neat, would not do so. The minimum required dilution for filtration was a 10x.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I3_082517-01	ELUENT	1	1		08/25/17 17:09
2	I3_082517-02	DI WATER	1	1		08/25/17 17:29
3	I3_082517-03	WG627354-01 ANION CCV	1	1	STD81395	08/25/17 17:49
4	I3_082517-04	WG627354-02 ANION CCB	1	1		08/25/17 18:10
5	I3_082517-05	WG627353-01 ANION BLANK	7	1		08/25/17 18:30
6	I3_082517-06	WG627353-02 ANION LCS	7	1	STD81396	08/25/17 18:51
7	I3_082517-07	WG627353-03 ANION LCS2	7	1	STD81396	08/25/17 19:11
8	I3_082517-08	L17081262-01 (CL) 10x	7	10		08/25/17 19:31
9	I3_082517-09	WG627352-01 ANION BLANK	1	1		08/25/17 19:52
10	I3_082517-10	WG627352-02 ANION LCS	1	1	STD81396	08/25/17 20:12
11	I3_082517-11	L17081298-01 (SO4) 100x	2	100		08/25/17 20:32
12	I3_082517-12	L17081299-02 (SO4) 10x REF	1	10		08/25/17 20:53
13	I3_082517-13	WG627352-04 DUP 1299-02	2	10		08/25/17 21:13
14	I3_082517-14	L17081299-03 (SO4) 400x	2	400		08/25/17 21:33
15	I3_082517-15	WG627354-03 ANION CCV	1	1	STD81395	08/25/17 21:54
16	I3_082517-16	WG627354-04 ANION CCB	1	1		08/25/17 22:14
17	I3_082517-17	L17081305-01 (CL,SO4)	1	1		08/25/17 22:34
18	I3_082517-18	L17081305-01 RR CL 10x	1	10		08/25/17 22:55
19	I3_082517-19	L17081305-03 (CL,SO4) 20x REF	1	20		08/25/17 23:15
20	I3_082517-20	WG627352-06 DUP 1305-03 20x	1	20		08/25/17 23:36
21	I3_082517-21	WG627352-07 MS 1305-03 20x	1	20	STD81396	08/25/17 23:56
22	I3_082517-22	WG627352-08 MSD 1305-03 20x	1	20	STD81396	08/26/17 00:16
23	I3_082517-23	L17081305-08 (CL,SO4) 5x	1	5		08/26/17 00:37
24	I3_082517-24	L17081305-08 RR CL 50x	1	50		08/26/17 00:57

Page: 1

Approved: 28-AUG-17

En C. Zuma



Microbac Laboratories Inc.
Instrument Run Log

Instrument:	IC3	Dataset:	082517 IC3.SEQ	
Analyst1:	CAS	Analyst2:	NA	
Method:	300/9056	SOP:	IC01	Rev: 19

Maintenance Log ID: _____ Syringe Filter Lot#: 161205254
Eluent ID#: RGT41063

Workgroups:	Column 1 ID: <u>AG14A-4MM</u>	Column 2 ID: <u>AS14A-4MM</u>
Internal STD:	<u>Analytical WGs: WG627352 (Waters), WG627353 (Soils)</u>	
CCV STD:	<u>NA</u>	<u>Surrogate STD: NA</u>
	<u>STD81395</u>	<u>STD81395(26-JUN-2017)</u>
	<u>LCS STD: STD81396</u>	<u>STD81396</u>

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
25	I3_082517-25	DI WATER	1	1		08/26/17 01:17
26	I3_082517-26	WG627354-05 ANION CCV	1	1	STD81395	08/26/17 01:38
27	I3_082517-27	WG627354-06 ANION CCB	1	1		08/26/17 01:58
28	I3_082517-28	L17081305-10 (CL,SO4) 5x	1	5		08/26/17 02:18
29	I3_082517-29	L17081305-10 RR CL 50x	1	50		08/26/17 02:39
30	I3_082517-30	L17081305-12 (CL,SO4) 5x	1	5		08/26/17 02:59
31	I3_082517-31	L17081305-12 RR CL 50x	1	50		08/26/17 03:20
32	I3_082517-32	L17081212-08 (CL,SO4) 10x	1	10		08/26/17 03:40
33	I3_082517-33	L17081212-08 RR CL 50x	1	50		08/26/17 04:00
34	I3_082517-34	DI WATER	1	1		08/26/17 04:21
35	I3_082517-35	WG627354-07 ANION CCV	1	1	STD81395	08/26/17 04:41
36	I3_082517-36	WG627354-08 ANION CCB	1	1		08/26/17 05:01
37	I3_082517-37	L17080945-01 (F,CL,SO4) RR 50x	2	50		08/26/17 05:22
38	I3_082517-38	L17080945-01 RR CL 500x	2	500		08/26/17 05:42
39	I3_082517-39	L17081212-11 (CL,SO4) 5x	1	5		08/26/17 06:02
40	I3_082517-40	L17081212-11 RR CL 50x	1	50		08/26/17 06:23
41	I3_082517-41	L17081212-17 (CL,SO4) 5x	1	5		08/26/17 06:43
42	I3_082517-42	L17081212-17 RR CL 50x	1	50		08/26/17 07:03
43	I3_082517-43	DI WATER	1	1		08/26/17 07:24
44	I3_082517-44	WG627354-09 ANION CCV	1	1	STD81395	08/26/17 07:44
45	I3_082517-45	WG627354-10 ANION CCB	1	1		08/26/17 08:05
46	I3_082517-46	END	1	1		08/26/17 08:25

Comments

Seq.	Rerun	Dil.	Reason	Analytes
21				
22				Sample WG627352-07 MS 1305-03 20x had MS %Recs below the advisory limits for chloride and sulfate. This was due to the parent sample's initial matrix, which contained amounts of those analytes greater than their respective concentrations in the MS spiking solution.
37				Sample WG627352-08 MSD 1305-03 20x had MSD %Recs below the advisory limits for chloride and sulfate. This was due to the parent sample's initial matrix, which contained amounts of those analytes greater than their respective concentrations in the MSD spiking solution.
				Sample L17080945-01 was not reported. This sample was re-analyzed to ensure that the correct dilutions were previously reported.

Microbac Laboratories Inc.

Data Checklist

Date: 11-APR-2017

Analyst: CAS

Analyst: NA

Method: 300/9056

Instrument: IC2

Curve Workgroup: WG609755

Runlog ID: 81498

Analytical Workgroups: ICAL ONLY

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	NA
Endrin/DDT breakdown (8081/MS)	NA
Pentachlorophenol/benzidine tailing (MS)	NA
Eluent check (IC)/system pressure (HPLC)	1836PSI
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	NA
% D/% Drift	NA
Minimum response factors (MS)	NA
Continuing calibration blank (CCB) (IC)	NA
Special standards	NA
Blanks	NA
TCL hits	NA
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	NA
Recoveries	NA
Surrogate recoveries	NA
MS/MSD/Sample duplicates	NA
Recoveries	NA
%RPD	NA
Samples	NA
TCL hits	NA
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	NA
Library searches (MS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	X
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	NA
Check for completeness	X
Primary Reviewer	CAS
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	ECL

Primary Reviewer:
12-APR-2017



Secondary Reviewer:
12-APR-2017



CHECKLIST1 - Modified 03/05/2008

Generated: APR-12-2017 14:52:54



Microbac Laboratories Inc.

Data Checklist

Date: 26-JUN-2017

Analyst: CAS

Analyst: NA

Method: 300/9056

Instrument: IC3

Curve Workgroup: WG619464

Runlog ID: 83004

Analytical Workgroups: L17060001

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	NA
Endrin/DDT breakdown (8081/MS)	NA
Pentachlorophenol/benzidine tailing (MS)	NA
Eluent check (IC)/system pressure (HPLC)	2189 PSI
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (MS)	NA
Continuing calibration blank (CCB) (IC)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	NA
Recoveries	NA
%RPD	NA
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	NA
Library searches (MS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	NA
Check for completeness	X
Primary Reviewer	CAS
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	ECL

Primary Reviewer:
27-JUN-2017



Secondary Reviewer:
27-JUN-2017




Microbac Laboratories Inc.

Data Checklist

Date: 23-AUG-2017

Analyst: CAS

Analyst: NA

Method: 300/9056

Instrument: IC2

Curve Workgroup: NA

Runlog ID: 84175

Analytical Workgroups: L17081192, L17081212

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	NA
Endrin/DDT breakdown (8081/MS)	NA
Pentachlorophenol/benzidine tailing (MS)	NA
Eluent check (IC)/system pressure (HPLC)	1784 PSI
Window standard (FID)	NA
Initial Calibration	NA
Average RF	NA
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	NA
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (MS)	NA
Continuing calibration blank (CCB) (IC)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	NA
Library searches (MS)	NA
Calculations & correct factors	X
Compounds above calibration range	X
Reruns	X
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	X
Check for completeness	X
Primary Reviewer	CAS
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	ECL

Primary Reviewer:
25-AUG-2017



Secondary Reviewer:
25-AUG-2017



CHECKLIST1 - Modified 03/05/2008

Generated: AUG-25-2017 13:06:39



Microbac Laboratories Inc.

Data Checklist

Date: 25-AUG-2017

Analyst: CAS

Analyst: NA

Method: 300/9056

Instrument: IC3

Curve Workgroup: NA

Runlog ID: 84210

Analytical Workgroups: L17081212, L17081262, L17081298, L17081299, L17081305

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	NA
Endrin/DDT breakdown (8081/MS)	NA
Pentachlorophenol/benzidine tailing (MS)	NA
Eluent check (IC)/system pressure (HPLC)	2204 PSI
Window standard (FID)	NA
Initial Calibration	NA
Average RF	NA
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	NA
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (MS)	NA
Continuing calibration blank (CCB) (IC)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	NA
Library searches (MS)	NA
Calculations & correct factors	X
Compounds above calibration range	X
Reruns	X
Manual integrations	X
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	X
Check for completeness	X
Primary Reviewer	CAS
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	ECL

Primary Reviewer:
28-AUG-2017



Secondary Reviewer:
28-AUG-2017



CHECKLIST1 - Modified 03/05/2008

Generated: AUG-28-2017 12:29:09



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 300.0

AAB#: WG627007

Login Number: L17081212

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/23/2017	1.2	2		08/23/17	1.3	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5448160
Report generated 08/28/2017 13:09



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 300.0

AAB#: WG627352

Login Number: L17081212

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW21-082217	08	08/22/17					08/25/2017	3.2	2	*	08/26/17	3.6	2	*
MW21-082217	08	08/22/17					08/25/2017	3.2	2	*	08/26/17	3.6	2	*
MW35-082217	11	08/22/17					08/25/2017	3.1	2	*	08/26/17	3.6	2	*
MW35-082217	11	08/22/17					08/25/2017	3.1	2	*	08/26/17	3.6	2	*
MW36-082217	17	08/22/17					08/25/2017	3.1	2	*	08/26/17	3.6	2	*
MW36-082217	17	08/22/17					08/25/2017	3.1	2	*	08/26/17	3.6	2	*

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5448160
Report generated 08/28/2017 13:09



METHOD BLANK SUMMARY

Login Number: L17081212 Work Group: WG627007
Blank File ID: I2_082317-05 Blank Sample ID: WG627007-01
Prep Date: 08/23/17 17:30 Instrument ID: IC2
Analyzed Date: 08/23/17 18:09 Method: 300.0
Analyst: CAS

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627007-02	I2_082317-06	08/23/17 18:28	01
MW02-082217	L17081212-02	I2_082317-11	08/23/17 20:04	DL01
DUP	WG627007-04	I2_082317-12	08/23/17 20:23	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5448162
Report generated 08/28/2017 13:09



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: I3_082517-09
 Prep Date: 08/25/17 17:49
 Analyzed Date: 08/25/17 19:52
 Analyst: CAS

Work Group: WG627352
 Blank Sample ID: WG627352-01
 Instrument ID: IC3
 Method: 300.0

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627352-02	I3_082517-10	08/25/17 20:12	01
DUP	WG627352-04	I3_082517-13	08/25/17 21:13	DL01
DUP	WG627352-06	I3_082517-20	08/25/17 23:36	DL01
MW21-082217	L17081212-08	I3_082517-32	08/26/17 03:40	DL01
MW21-082217	L17081212-08	I3_082517-33	08/26/17 04:00	DL02
MW35-082217	L17081212-11	I3_082517-39	08/26/17 06:02	DL01
MW35-082217	L17081212-11	I3_082517-40	08/26/17 06:23	DL02
MW36-082217	L17081212-17	I3_082517-41	08/26/17 06:43	DL01
MW36-082217	L17081212-17	I3_082517-42	08/26/17 07:03	DL02

Report Name: BLANK_SUMMARY
 PDF File ID: 5448162
 Report generated 08/28/2017 13:09



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/23/17 17:30 Sample ID: WG627007-01
Instrument ID: IC2 Run Date: 08/23/17 18:09 Prep Method: 300.0
File ID: I2 082317-05 Analyst: CAS Method: 300.0
Workgroup (AAB#): WG627007 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: IC2 - 11-APR-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	0.100	0.200	0.100	1	U
Sulfate	0.500	1.00	0.500	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5448163

28-AUG-2017 13:09



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/25/17 17:49 Sample ID: WG627352-01
Instrument ID: IC3 Run Date: 08/25/17 19:52 Prep Method: 300.0
File ID: I3 082517-09 Analyst: CAS Method: 300.0
Workgroup (AAB#): WG627352 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: IC3 - 26-JUN-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	0.100	0.200	0.100	1	U
Sulfate	0.500	1.00	0.500	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5448163

28-AUG-2017 13:09



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Run Date: 08/23/2017 Sample ID: WG627007-02
Instrument ID: IC2 Run Time: 18:28 Prep Method: 300.0
File ID: I2 082317-06 Analyst: CAS Method: 300.0
Workgroup (AAB#): WG627007 Matrix: Water Units: mg/L
QC Key: WATERL00 Lot#: STD81396 Cal ID: IC2 - 11-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Chloride	8.00	8.32	104	90 - 110	
Sulfate	40.0	42.0	105	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5448164
Report generated: 08/28/2017 13:09



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627352-02
Instrument ID: IC3 Run Time: 20:12 Prep Method: 300.0
File ID: I3 082517-10 Analyst: CAS Method: 300.0
Workgroup (AAB#): WG627352 Matrix: Water Units: mg/L
QC Key: WATERL00 Lot#: STD81396 Cal ID: IC3 - 26-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Chloride	8.00	8.18	102	90 - 110	
Sulfate	40.0	41.5	104	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5448164
Report generated: 08/28/2017 13:09



Microbac Laboratories Inc.
DUPLICATE (DUP)

Sample Ref: L17081212-02 Cal ID: IC2 - Worknum: WG627007
Instrument ID: IC2 Method: 9056
Sample ID: WG627007-03 File ID: I2 082317-11 Dil: 10 Matrix: WATER
Duplicate ID: WG627007-04 File ID: I2 082317-12 Dil: 10 Units: mg/L

Analyte	Sample	Duplicate	RPD	RPD Limit	Q
Chloride	144	142	1.34	20	
Sulfate	651	652	0.104	20	

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

WG_DUP_DRYWT - Modified 03/06/2008
PDF File ID: 5448166
Report generated 08/28/2017 13:09



MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum: L17081212 Cal ID: IC2 - Worknum: WG627007
 Instrument ID: IC2 Contract #: _____ Method: 300.0
 Parent ID: WG627007-03 File ID: I2 082317-11 Dil: 10 Matrix: WATER
 Sample ID: WG627007-05 MS File ID: I2 082317-13 Dil: 10 Units: mg/L
 Sample ID: WG627007-06 MSD File ID: I2 082317-14 Dil: 10

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	144	8.00	138	-79.9	8.00	138	-84.5	0.268	90 - 110	20	*
Sulfate	651	40.0	637	-35.8	40.0	633	-46.3	0.660	90 - 110	20	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17081212
Analytical Method: 300.0
ICAL Workgroup: WG609755

Instrument ID: IC2
Initial Calibration Date: 11-APR-17 18:31
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R ²)
Chloride		4.765	8.91		0.99700
Sulfate		6.254	13.0		0.99600

R = Correlation coefficient; 0.995 minimum

R² = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5449572
Report generated 08/28/2017 13:09



Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17081212
Analytical Method: 300.0
ICAL Workgroup: WG619464

Instrument ID: IC3
Initial Calibration Date: 26-JUN-17 19:12
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R ²)
Chloride		5.722	6.14		1.00000
Sulfate		7.790	8.18		1.00000

R = Correlation coefficient; 0.995 minimum
R² = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5449572
Report generated 08/28/2017 13:09



Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number:L17081212
Analytical Method:300.0

Instrument ID:IC2
Initial Calibration Date:11-APR-17 18:31
Column ID:F

Analyte	WG609755-01			WG609755-02			WG609755-03		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloride	0.200	0.0390000000 0	5.128	1.00	0.1940000000	5.155	4.00	0.8050000000	4.969
Sulfate	1.00	0.1360000000	7.353	5.00	0.7300000000	6.849	20.0	3.096000000	6.460

INT_CAL - Modified 03/06/2008
PDF File ID: 5449572
Report generated 08/28/2017 13:09



Login Number: L17081212
Analytical Method: 300.0

Instrument ID: IC2
Initial Calibration Date: 11-APR-17 18:31
Column ID: F

Analyte	WG609755-04			WG609755-05			WG609755-06		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloride	8.00	1.70500000	4.692	12.0	2.64500000	4.537	24.0	5.83700000	4.112
Sulfate	40.0	6.67400000	5.993	60.0	10.4650000	5.733	120	23.3690000	5.135

INT_CAL - Modified 03/06/2008
PDF File ID: 5449572
Report generated 08/28/2017 13:09



Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17081212
Analytical Method: 300.0

Instrument ID: IC3
Initial Calibration Date: 26-JUN-17 19:12
Column ID: F

Analyte	WG619464-01			WG619464-02			WG619464-03		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloride	0.200	0.0366000000 0	5.464	1.00	0.1618000000	6.180	4.00	0.6645000000	6.020
Sulfate	1.00	0.1214000000	8.237	5.00	0.5871000000	8.516	20.0	2.491600000	8.027

INT_CAL - Modified 03/06/2008
PDF File ID: 5449572
Report generated 08/28/2017 13:09



Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17081212
Analytical Method: 300.0

Instrument ID: IC3
Initial Calibration Date: 26-JUN-17 19:12
Column ID: F

Analyte	WG619464-04			WG619464-05			WG619464-06		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloride	8.00	1.38450000	5.778	12.0	2.12160000	5.656	24.0	4.58380000	5.236
Sulfate	40.0	5.17720000	7.726	60.0	8.09040000	7.416	120	17.6000000	6.818

INT_CAL - Modified 03/06/2008
PDF File ID: 5449572
Report generated 08/28/2017 13:09



Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17081212 Run Date: 04/11/2017 Sample ID: WG609755-07
Instrument ID: IC2 Run Time: 18:50 Method: 300.0
File ID: I2 041117-09 Analyst: CAS QC Key: WATERL00
ICal Workgroup: WG609755 Cal ID: IC2 - 11-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Chloride		8.00	8.03	mg/L	4.73	0.400	10	
Sulfate		40.0	40.5	mg/L	6.04	1.20	10	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5449573
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17081212 Run Date: 06/26/2017 Sample ID: WG619464-07
Instrument ID: IC3 Run Time: 19:33 Method: 300.0
File ID: I3 062617-09 Analyst: CAS QC Key: WATERL00
ICal Workgroup: WG619464 Cal ID: IC3 - 26-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Chloride		8.00	8.00	mg/L	5.86	0	10	
Sulfate		40.0	40.2	mg/L	7.75	0.400	10	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5449573
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/23/2017 Sample ID: WG627011-02
Instrument ID: IC2 Run Time: 17:49 Method: 300.0
File ID: I2 082317-04 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG627007 Cal ID: IC2 - 11-APR-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.200	0.100	U
Sulfate	0.500	1.00	0.500	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5448168
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/23/2017 Sample ID: WG627011-04
Instrument ID: IC2 Run Time: 21:40 Method: 300.0
File ID: I2 082317-16 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG627007 Cal ID: IC2 - 11-APR-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.200	0.100	U
Sulfate	0.500	1.00	0.500	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5448168
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627354-02
Instrument ID: IC3 Run Time: 18:10 Method: 300.0
File ID: I3 082517-04 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.200	0.100	U
Sulfate	0.500	1.00	0.500	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5448168
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627354-04
Instrument ID: IC3 Run Time: 22:14 Method: 300.0
File ID: I3 082517-16 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.200	0.100	U
Sulfate	0.500	1.00	0.500	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5448168
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/26/2017 Sample ID: WG627354-06
Instrument ID: IC3 Run Time: 01:58 Method: 300.0
File ID: I3 082517-27 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.200	0.100	U
Sulfate	0.500	1.00	0.500	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5448168
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/26/2017 Sample ID: WG627354-08
Instrument ID: IC3 Run Time: 05:01 Method: 300.0
File ID: I3 082517-36 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.200	0.100	U
Sulfate	0.500	1.00	0.500	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5448168
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17081212 Run Date: 08/26/2017 Sample ID: WG627354-10
Instrument ID: IC3 Run Time: 08:05 Method: 300.0
File ID: I3 082517-45 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER QAPP: WATERLOO

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.200	0.100	U
Sulfate	0.500	1.00	0.500	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5448168
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/23/2017 Sample ID: WG627011-01
Instrument ID: IC2 Run Time: 17:30 Method: 300.0
File ID: I2 082317-03 Analyst: CAS QC Key: WATERL00
Workgroup (AAB#): WG627007 Cal ID: IC2 - 11-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.15	mg/L	4.66	1.91	15	
Sulfate		40.0	41.1	mg/L	5.94	2.67	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5448167
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/23/2017 Sample ID: WG627011-03
Instrument ID: IC2 Run Time: 21:21 Method: 300.0
File ID: I2 082317-15 Analyst: CAS QC Key: WATERL00
Workgroup (AAB#): WG627007 Cal ID: IC2 - 11-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.08	mg/L	4.70	1.00	15	
Sulfate		40.0	41.3	mg/L	5.91	3.22	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5448167
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627354-01
Instrument ID: IC3 Run Time: 17:49 Method: 300.0
File ID: I3 082517-03 Analyst: CAS QC Key: WATERL00
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.01	mg/L	5.86	0.0750	15	
Sulfate		40.0	40.5	mg/L	7.69	1.17	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5448167
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627354-03
Instrument ID: IC3 Run Time: 21:54 Method: 300.0
File ID: I3 082517-15 Analyst: CAS QC Key: WATERL00
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.05	mg/L	5.83	0.575	15	
Sulfate		40.0	40.6	mg/L	7.66	1.58	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5448167
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/26/2017 Sample ID: WG627354-05
Instrument ID: IC3 Run Time: 01:38 Method: 300.0
File ID: I3 082517-26 Analyst: CAS QC Key: WATERL00
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.04	mg/L	5.83	0.488	15	
Sulfate		40.0	40.6	mg/L	7.66	1.50	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5448167
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/26/2017 Sample ID: WG627354-07
Instrument ID: IC3 Run Time: 04:41 Method: 300.0
File ID: I3 082517-35 Analyst: CAS QC Key: WATERL00
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.04	mg/L	5.83	0.538	15	
Sulfate		40.0	40.6	mg/L	7.66	1.55	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5448167
Report generated 08/28/2017 13:10



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17081212 Run Date: 08/26/2017 Sample ID: WG627354-09
Instrument ID: IC3 Run Time: 07:44 Method: 300.0
File ID: I3 082517-44 Analyst: CAS QC Key: WATERL00
Workgroup (AAB#): WG627352 Cal ID: IC3 - 26-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.03	mg/L	5.84	0.388	15	
Sulfate		40.0	40.6	mg/L	7.67	1.45	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5448167
Report generated 08/28/2017 13:10



2.3 General Chemistry Data

2.3.2 Alkalinity Data

2.3.2.1 Summary Data



Login Number: L17081212
Department: Conventionals
Analyst: Todd Boyle

METHOD

Analysis EPA 310.2 (Alkalinity)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128837
Approved By: Deanna Hesson

A handwritten signature in cursive script, appearing to read "Deanna Hesson", is written over a horizontal line.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW02-082217	Prep Method: 310.2	Prep Date: N/A
Matrix: Water	Analytical Method: 310.2	Cal Date: 08/28/2017 11:13
Workgroup #: WG627416	Analyst: TB	Run Date: 08/28/2017 11:20
Collect Date: 08/22/2017 12:23	Dilution: 2	File ID: S2170828001.020
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Alkalinity, Total (as CaCO3)	11-43-8	482		40.0	20.0

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW21-082217	Prep Method: 310.2	Prep Date: N/A
Matrix: Water	Analytical Method: 310.2	Cal Date: 08/28/2017 12:24
Workgroup #: WG627619	Analyst: TB	Run Date: 08/28/2017 12:28
Collect Date: 08/22/2017 12:35	Dilution: 100	File ID: S2170828002.015
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Alkalinity, Total (as CaCO3)	11-43-8	14400		2000	1000

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW35-082217	Prep Method: 310.2	Prep Date: N/A
Matrix: Water	Analytical Method: 310.2	Cal Date: 08/28/2017 12:24
Workgroup #: WG627619	Analyst: TB	Run Date: 08/28/2017 12:29
Collect Date: 08/22/2017 15:28	Dilution: 2	File ID: S2170828002.016
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Alkalinity, Total (as CaCO3)	11-43-8	343		40.0	20.0

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW36-082217	Prep Method: 310.2	Prep Date: N/A
Matrix: Water	Analytical Method: 310.2	Cal Date: 08/28/2017 12:24
Workgroup #: WG627619	Analyst: TB	Run Date: 08/28/2017 12:29
Collect Date: 08/22/2017 15:50	Dilution: 2	File ID: S2170828002.017
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Alkalinity, Total (as CaCO3)	11-43-8	376		40.0	20.0

2.3.2.2 QC Summary Data

Example Alkalinity (Colormetric) Calculations

$$(\text{absorbance} - \text{intercept}) / (\text{slope} * \text{dilution}) = \text{mg/L}$$

where:

absorbance = reading from the spectrophotometer

intercept = calculated from calibration standard absorbencies

slope = calculated from calibration standard absorbencies

dilution = dilution of the distillate in decimal form (ex. 1/5 dilution = 0.2)

Microbac Laboratories Inc.

Data Checklist

Date: 28-AUG-2017

Analyst: TB

Analyst: NA

Method: ALK

Instrument: SC2

Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG627619 WG627416

Calibration/Linearity	08/28/2017
Second Source Check	X
ICV/CCV (std)	X
ICB/CCB	X
Blank	X
LCS/LCS Dup	X
MS/MSD	X
Duplicate	X
Upload Results	X
Client Forms	X
QC Violation Sheet	X
Case Narratives	X
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	TB
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
29-AUG-2017

Todd Boyle

Secondary Reviewer:
29-AUG-2017

Dennar/Johnson

CHECKLIST1 - Modified 03/05/2008

Generated: AUG-29-2017 11:15:53



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 310.2
Login Number: L17081212

AAB#: WG627416

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/28/2017	6	14		08/28/17	6	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5452969
Report generated 08/29/2017 10:50



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 310.2
 Login Number: L17081212

AAB#: WG627619

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW21-082217	08	08/22/17					08/28/2017	6	14		08/28/17	6	14	
MW35-082217	11	08/22/17					08/28/2017	5.9	14		08/28/17	5.9	14	
MW36-082217	17	08/22/17					08/28/2017	5.9	14		08/28/17	5.9	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
 PDF File ID: 5452969
 Report generated 08/29/2017 10:50



METHOD BLANK SUMMARY

Login Number: <u>L17081212</u>	Work Group: <u>WG627416</u>
Blank File ID: <u>S2170828001.012</u>	Blank Sample ID: <u>WG627416-01</u>
Prep Date: <u>08/28/17 11:15</u>	Instrument ID: <u>SMARTCHEM2</u>
Analyzed Date: <u>08/28/17 11:15</u>	Method: <u>310.2</u>
Analyst: <u>TB</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627416-02	S2170828001.013	08/28/17 11:16	01
LCS2	WG627416-03	S2170828001.014	08/28/17 11:17	01
MW02-082217	L17081212-02	S2170828001.020	08/28/17 11:20	DL01
DUP	WG627416-05	S2170828001.039	08/28/17 11:31	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 5452970
 Report generated 08/29/2017 10:50



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: S2170828002.012
 Prep Date: 08/28/17 12:26
 Analyzed Date: 08/28/17 12:26
 Analyst: TB

Work Group: WG627619
 Blank Sample ID: WG627619-01
 Instrument ID: SMARTCHEM2
 Method: 310.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627619-02	S2170828002.013	08/28/17 12:27	01
LCS2	WG627619-03	S2170828002.014	08/28/17 12:28	01
MW21-082217	L17081212-08	S2170828002.015	08/28/17 12:28	DL01
MW35-082217	L17081212-11	S2170828002.016	08/28/17 12:29	DL01
MW36-082217	L17081212-17	S2170828002.017	08/28/17 12:29	DL01
DUP	WG627619-05	S2170828002.031	08/28/17 12:38	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 5452970
 Report generated 08/29/2017 10:50



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/28/17 11:15 Sample ID: WG627416-01
Instrument ID: SMARTCHEM2 Run Date: 08/28/17 11:15 Prep Method: 310.2
File ID: S2170828001.012 Analyst: TB Method: 310.2
Workgroup (AAB#): WG627416 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 28-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Alkalinity, Total (as CaCO3)	10.0	20.0	16.3	1	J

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5452971

29-AUG-2017 10:50



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/28/17 12:26 Sample ID: WG627619-01
Instrument ID: SMARTCHEM2 Run Date: 08/28/17 12:26 Prep Method: 310.2
File ID: S2170828002.012 Analyst: TB Method: 310.2
Workgroup (AAB#): WG627619 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 28-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Alkalinity, Total (as CaCO3)	10.0	20.0	10.0	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5452971

29-AUG-2017 10:50



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Analyst: TB Prep Method: 310.2
Instrument ID: SMARTCHEM2 Matrix: Water Method: 310.2
Workgroup (AAB#): WG627416 Units: mg/L
QC Key: WATERLOO Lot #: STD83579
Sample ID: WG627416-02 LCS File ID: S2170828001.013 Run Date: 08/28/2017 11:16
Sample ID: WG627416-03 LCS2 File ID: S2170828001.014 Run Date: 08/28/2017 11:17

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Alkalinity, Total (as CaCO ₃)	200	196	98.1	200	201	100	2.37	85 - 115	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5452972
Report generated: 08/29/2017 10:50



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Analyst: TB Prep Method: 310.2
Instrument ID: SMARTCHEM2 Matrix: Water Method: 310.2
Workgroup (AAB#): WG627619 Units: mg/L
QC Key: WATERLOO Lot #: STD83579
Sample ID: WG627619-02 LCS File ID: S2170828002.013 Run Date: 08/28/2017 12:27
Sample ID: WG627619-03 LCS2 File ID: S2170828002.014 Run Date: 08/28/2017 12:28

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Alkalinity, Total (as CaCO ₃)	200	196	98.0	200	197	98.6	0.528	85 - 115	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5452972
Report generated: 08/29/2017 10:50



2.3.2.3 Raw Data

SMARTCHEM RUN LOG

(smartchem2, smartchem3)

WORKGROUP: WG627416

619

Daily Check

- ☒ Lamp On
☒ Probe Rinse Full
☒ DI Water > 1/2 Full
☒ Wash Solution > 1/2 Full
☐ NO3 Reagent bottle connected / purged
☐ NO3 pH adj to pH 5-9
 Syringe filter lot # _____
 pH paper Lot #: _____
- ☒ WBL Run
☒ Reagents Full
☒ Dilution H2O Full
☒ Waste Container Check

- 1) Workgroup _____
 Plan # _____
 2) Workgroup _____
 Plan # _____
 3) Workgroup _____
 Plan # _____
 Instrument: SC1 ☐ SC2 ☒

Analyte	1	2	3
AK			
Dilution			
SC Prepared Curve			
Position			
1-1	ICV		
1-2	BH		
1-3	LLS		
1-4	WSDP		
1-5	8-119-02	1/4	color
1-6	03	1/4	
1-7	05	1/4	
1-8	06	1/4	
1-9	1200-07	1/5	
1-10	1212-02	1/2	
1-11	08	1/50	color
1-12	11	1/2	
1-13	17	1/2	
1-14	1305-01	1/2	
1-15	03	1/10	
1-16	08	1/50	color
1-17	10	1/2	
1-18	12	1/2	
1-19	1352-02	1/4	color
1-20	03	1/4	
1-21	05	1/4	
1-22	06	1/4	
2-1	08	1/4	
2-2	09	1/4	
2-3	DUP 1191-02	1/4	

Position	Analyte	1	2	3
2-1	ICV			
2-2	BH			
2-3	LLS			
2-4	WSDP			
2-5	8-1212-08	1/100		
2-6	11	1/2		
2-7	17	1/2		
2-8	1305-01	1/2		
2-9	03	1/10		
2-10	08	1/50		
2-11	10	1/5		
2-12	12	1/2		
2-13	1352-02	1/4		
2-14	03	1/4		
2-15	05	1/4		
2-16	06	1/4		
2-17	08	1/4		
2-18	09	1/4		
2-19	DUP ↓	1/4		
2-20				
2-21				
2-22				
2-23				
2-24				
2-25				
2-26				
3-1				
3-2				

NOTES:
 * Run NO2 std on NO3 runs
 * LCSD must be run if no MS or Duplicate
 *MS(10% sample): NO3, TKN, NH3, PHOS

DCN#127914



SMARTCHEM RUN LOG

(smartchem2, smartchem3)

WORKGROUP: WG627416

Analyte	1	2	3
Position			
3-3			
3-4			
3-5			
3-6			
3-7			
3-8			
3-9			
3-10			
3-11			
3-12			
3-13			
3-14			
3-15			

Analyte	1	2	3
Position			
3-16			
3-17			
3-18			
3-19			
3-20			
3-21			
3-22			
3-23			
3-24			
3-25			
3-26			
3-27			
3-28			

Chloride	EPA 325.2/SM 4500-Cl E-2000
Nitrate-Nitrite	EPA 353.2/SM 4500-NO3 F-2000
Alkalinity	EPA 310.2
Sulfate	EPA 375.4/SM 426C (15 th)/ SM4500-504 E-1997

Ammonia	EPA 350.1/SM 4500-NH3 B-1997
TKN	EPA 351.2
Phos	EPA 365.4

Analyte	Alk	Reagents
SOP & Revision	13102 R17	
Curve Stock (SC made)	Std 81960	41115
NO2 STD		
ICV	83578	
CCV	83186	
LCS	83579	
MS	81112 9. Dilution	

Comments: _____

Analyst: Tom Bayle

Date: 8/28/17

DCN#127914



MICROBAC (OVD)
 SMARTCHEM200 INST2 (VER3.1.14)
 NH3, TKN, NO3NO2 (MG/L N)
 ALK (MG/L CaCO3) CL, SO4 (MG/L)

Method : WALK -Unit [mg/L] -ALKALINITY EPA 310.2

Smp#[Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Flag	Analysis Time
DIL-1	RBL	0.0	0.6285	0.00		11:07:32 AM
DIL-1	RBL	0.0	0.6346	0.00		11:07:50 AM
DIL-1	RBL	0.0	0.6196	0.00		11:08:44 AM
DIL-1	Std-1	0.0	-0.0031	0.00		11:09:02 AM
SR5-1	Std-2	10.0	-0.0150	0.00		11:09:56 AM
SR5-2	Std-3	20.0	-0.0185	0.00		11:10:14 AM
SR5-3	Std-4	50.0	-0.0587	0.00		11:11:08 AM
SR5-4	Std-5	100.0	-0.1043	0.00		11:11:26 AM
SR5-5	Std-6	200.0	-0.2347	0.00		11:12:20 AM
SR5-6	Std-7	250.0	-0.2979	0.00		11:12:38 AM
SR5-7	Std-8	300.0	-0.3606	0.00		11:13:32 AM
ST-3	1CCV (150 mg/L)	151.6	-0.1718	101.08		11:13:50 AM
ST-2	2CCB (0 mg/L)	15.6	-0.0180	0.00		11:14:44 AM
1	ICV	245.1	-0.2890	0.00		11:15:02 AM
2	WG627416-01 BLK	16.3	-0.0188	0.00		11:15:56 AM
3	WG627416-02 LCS	196.1	-0.2262	0.00		11:16:14 AM
4	WG627416-03 LCSDUP	200.8	-0.2321	0.00		11:17:08 AM
5	L17081191-02 (4)	236.3	-0.2774	0.00		11:17:26 AM
6	L17081191-03 (4)	144.6	-0.1634	0.00		11:18:20 AM
7	L17081191-05 (4)	225.1	-0.2629	0.00		11:18:38 AM
8	L17081191-06 (4)	140.3	-0.1583	0.00		11:19:32 AM
9	^{T3} L17081200-07 (5)	195.8	-0.2258	0.00		11:19:50 AM
10	^{8/25/17} L17081212-02 (2)	241.2	-0.2839	0.00		11:20:44 AM
ST-3	1CCV (150 mg/L)	158.5	-0.1800	105.64		11:21:02 AM
ST-2	2CCB (0 mg/L)	19.5	-0.0222	0.00		11:21:56 AM
11	L17081212-08 (50)	X 305.6	-0.3714	0.00	><,LH	11:22:14 AM
12	L17081212-11 (2)	180.4	-0.2067	0.00		11:23:08 AM
13	L17081212-17 (2)	192.4	-0.2215	0.00		11:23:26 AM
14	L17081305-01 (2)	192.0	-0.2210	0.00		11:24:20 AM
15	L17081305-03 (10)	143.0	-0.1615	0.00		11:24:38 AM
16	L17081305-08 (50)	110.8	-0.1238	0.00		11:25:33 AM
17	L17081305-10 (2)	✓ 307.5	-0.3741	0.00	><,LH	11:25:50 AM

Report Date :08/28/2017 Run Date :8/28/2017 Operator : SMARTCHEM2 Plan # :20170828001
 Plan Description : ALK-A2-TB/08/28/2017

MICROBAC (OVD)
 SMARTCHEM200 INST2 (VER3.1.14)
 NH3, TKN, NO3NO2 (MG/L N)
 ALK (MG/L CaCO3) CL, SO4 (MG/L)

Method : WALK -Unit [mg/L] -ALKALINITY EPA 310.2

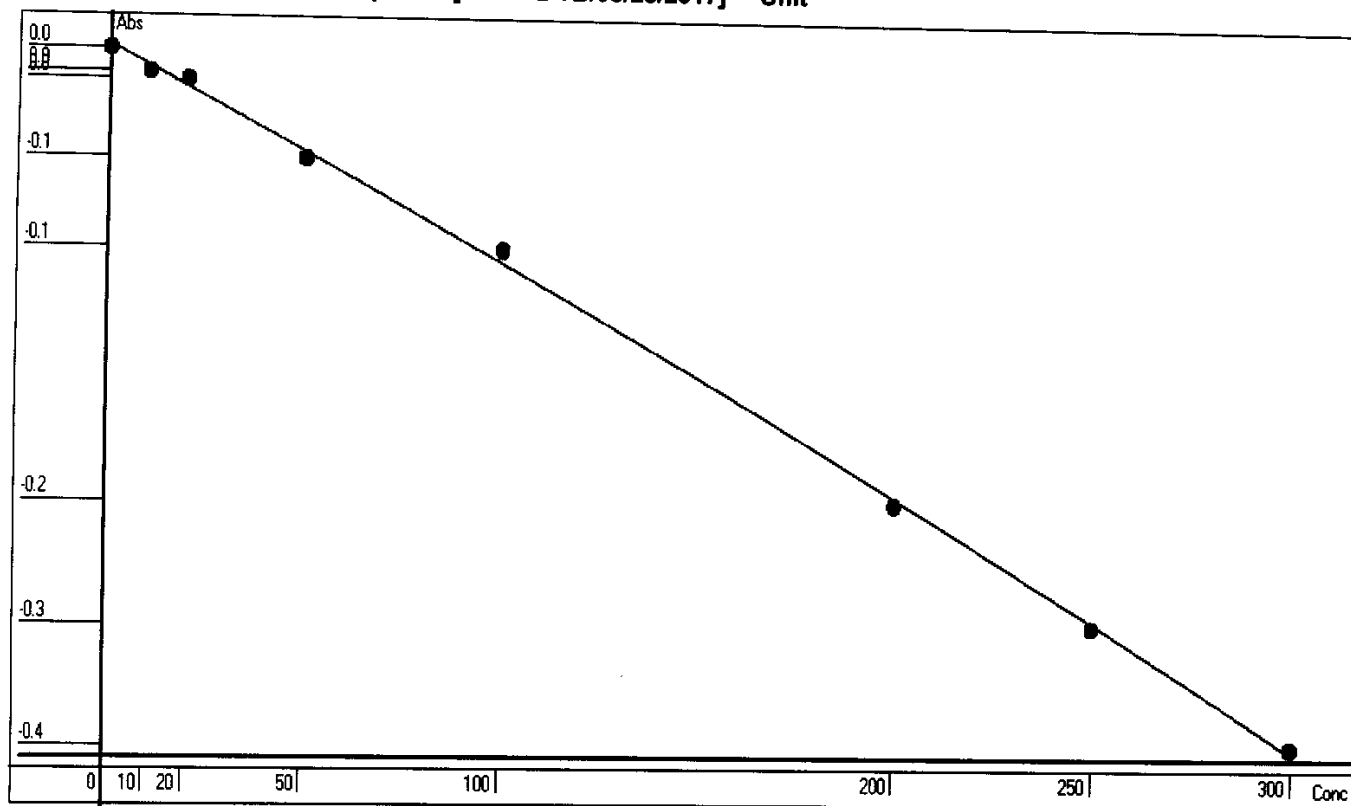
Smp#[Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Flag	Analysis Time
18	L17081305-12 (2)	195.6	-0.2256	0.00		11:26:44 AM
19	L17081352-02 (4)	239.8	-0.2820	0.00		11:27:03 AM
20	L17081352-03 (4)	113.1	-0.1265	0.00		11:27:56 AM
ST-3	1CCV (150 mg/L)	171.2	-0.1954	114.11		11:28:14 AM
ST-2	2CCB (0 mg/L)	45.5	-0.0504	0.00		11:29:08 AM
21	L17081352-05 (4)	226.2	-0.2643	0.00		11:29:26 AM
22	L17081352-06 (4)	104.0	-0.1160	0.00		11:30:20 AM
23	L17081352-08 (4)	230.4	-0.2698	0.00		11:30:38 AM
24	L17081352-09 (4)	115.0	-0.1287	0.00		11:31:32 AM
25	WG627416-05 (4) DUP	243.8	-0.2872	0.00		11:31:50 AM
ST-3	1CCV (150 mg/L)	175.3	-0.2004	116.84		11:32:44 AM
ST-2	2CCB (0 mg/L)	42.3	-0.0469	0.00		11:33:02 AM
10-[1/2]	L17081212-02	332.0	-0.1891	0.00	LH	11:40:42 AM
11-[1/2]	L17081212-08 (50)	381.7	-0.2196	0.00	LH	11:41:54 AM
17-[1/2]	L17081305-10 (2)	385.0	-0.2217	0.00	LH	11:43:06 AM
ST-3	1CCV (150 mg/L)	186.1	-0.2138	124.10		11:43:06 AM
ST-2	2CCB (0 mg/L)	55.3	-0.0612	0.00		11:44:00 AM

Report Date :08/28/2017 Run Date :8/28/2017 Operator : SMARTCHEM2 Plan # :20170828001
 Plan Description : ALK-A2-TB/08/28/2017

Calibrant Report - WALK -

Calib Lot #:010104 Exp Date:6/21/2020 User:MICROBAC

Plan # : 20170828001 Description : [ALK-A2-TB/08/28/2017] Unit



Point	OD	Conc	Recalc Conc	% Error
1	-0.0031	0	1.6255	162.55
2	-0.0150	10	12.8069	28.07
3	-0.0185	20	16.0783	-19.61
4	-0.0587	50	53.0899	6.18
5	-0.1042	100	93.7324	-6.27
6	-0.2347	200	202.9448	1.47
7	-0.2979	250	251.9148	0.77
8	-0.3605	300	297.8980	-0.70
Conc= -320.2549*Abso^2 -945.4108*Abso -1.3022 R ² =0.9991				RBL 0.6316 0

Report Date 8/28/2017 Run Date 8/28/2017

MICROBAC (OVD)
 SMARTCHEM200 INST2 (VER3.1.14)
 NH3, TKN, NO3NO2 (MG/L N)
 ALK (MG/L CaCO3) CL, SO4 (MG/L)

Method : WALK -Unit [mg/L] -ALKALINITY EPA 310.2

Smp#[/Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Flag	Analysis Time
DIL-1	RBL	0.0	0.5217	0.00		12:18:34 PM
DIL-1	RBL	0.0	0.5225	0.00		12:18:52 PM
DIL-1	RBL	0.0	0.5102	0.00		12:19:46 PM
DIL-1	Std-1	0.0	-0.0086	0.00		12:20:04 PM
SR5-1	Std-2	10.0	-0.0246	0.00		12:20:58 PM
SR5-2	Std-3	20.0	-0.0261	0.00		12:21:16 PM
SR5-3	Std-4	50.0	-0.0568	0.00		12:22:10 PM
SR5-4	Std-5	100.0	-0.0978	0.00		12:22:28 PM
SR5-5	Std-6	200.0	-0.2067	0.00		12:23:22 PM
SR5-6	Std-7	250.0	-0.2579	0.00		12:23:40 PM
SR5-7	Std-8	300.0	-0.3158	0.00		12:24:34 PM
ST-3	1CCV (150 mg/L)	150.9	-0.1526	100.61		12:24:52 PM
ST-2	2CCB (0 mg/L)	6.8	-0.0165	0.00		12:25:46 PM
1	ICV	247.9	-0.2559	0.00		12:26:04 PM
2	WG627416-01 BLK	5.2	-0.0151	0.00		12:26:58 PM
3	619- WG627416-02 LCS	196.1	-0.1993	0.00		12:27:16 PM
4	WG627416-03 LCSDUP	197.1	-0.2004	0.00		12:28:10 PM
5	73 L17081212-08 (100)	144.2	-0.1458	0.00		12:28:28 PM
6	8/2/17 L17081212-11 (2)	171.5	-0.1736	0.00		12:29:22 PM
7	L17081212-17 (2)	188.0	-0.1908	0.00		12:29:40 PM
8	L17081305-01 (2)	181.2	-0.1836	0.00		12:30:34 PM
9	L17081305-03 (10)	126.8	-0.1285	0.00		12:30:52 PM
10	L17081305-08 (50)	92.6	-0.0954	0.00		12:31:46 PM
ST-3	1CCV (150 mg/L)	151.6	-0.1533	101.07		12:32:04 PM
ST-2	2CCB (0 mg/L)	5.5	-0.0153	0.00		12:32:58 PM
11	L17081305-10 (5)	123.4	-0.1252	0.00		12:33:16 PM
12	L17081305-12 (2)	183.4	-0.1859	0.00		12:34:10 PM
13	L17081352-02 (4)	227.2	-0.2328	0.00		12:34:28 PM
14	L17081352-03 (4)	91.9	-0.0947	0.00		12:35:22 PM
15	L17081352-05 (4)	212.0	-0.2163	0.00		12:35:40 PM
16	L17081352-06 (4)	79.9	-0.0833	0.00		12:36:34 PM
17	L17081352-08 (4)	221.1	-0.2262	0.00		12:36:52 PM

Report Date :08/28/2017 Run Date :8/28/2017 Operator : SMARTCHEM2 Plan # :20170828002
 Plan Description : ALK-B2-TB/08/28/2017

MICROBAC (OVD)
 SMARTCHEM200 INST2 (VER3.1.14)
 NH3, TKN, NO3NO2 (MG/L N)
 ALK (MG/L CaCO3) CL, SO4 (MG/L)

Method : WALK -Unit [mg/L] -ALKALINITY EPA 310.2

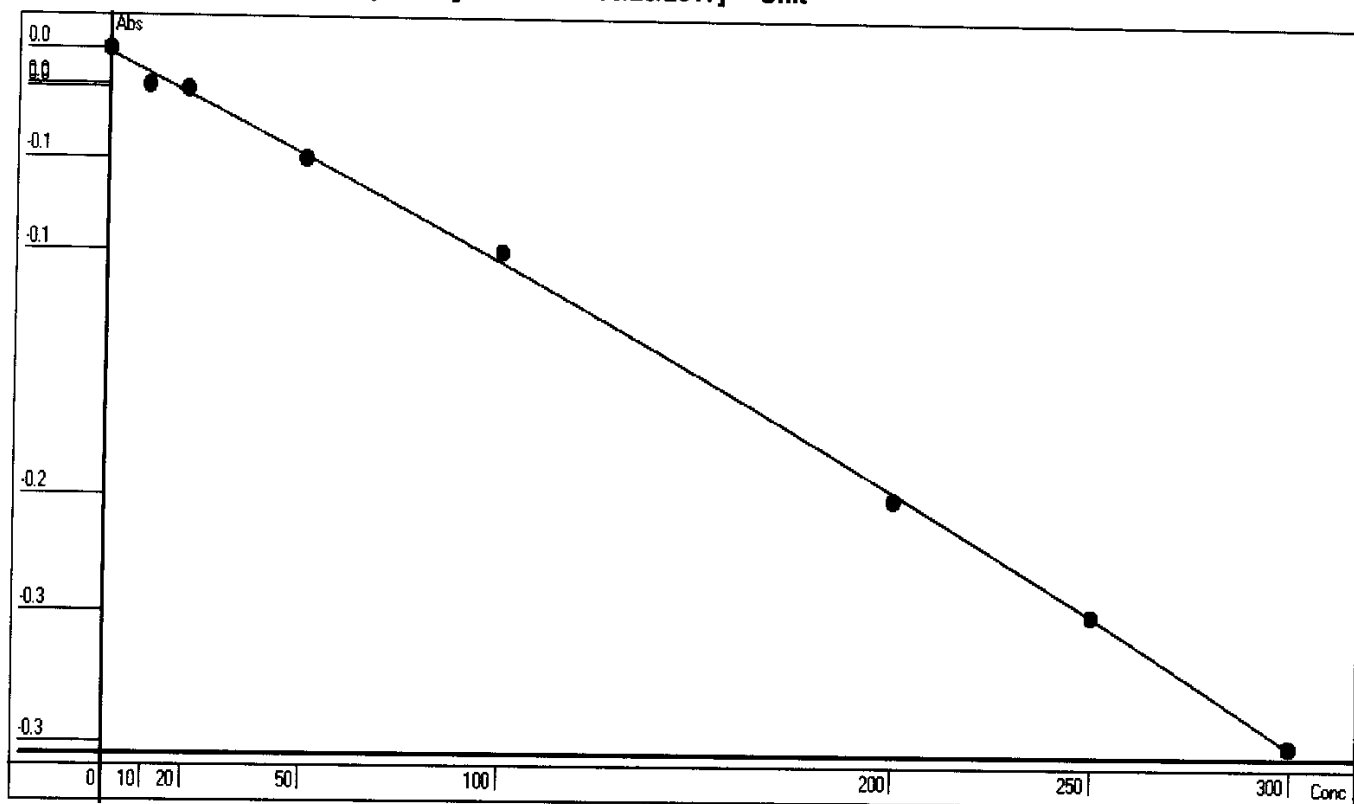
Smp#[Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Flag	Analysis Time
18	L17081352-09 (4)	93.0	-0.0958	0.00		12:37:46 PM
19	619 WG627416-05 (4) DUP	93.3	-0.0961	0.00		12:38:04 PM
20	ID 20	12.6	-0.0216	0.00		12:38:58 PM
ST-3	79 1CCV (150 mg/L)	162.4	-0.1643	108.29		12:39:16 PM
ST-2	8/29/17 2CCB (0 mg/L)	17.6	-0.0261	0.00		12:40:10 PM

Report Date :08/28/2017 Run Date :8/28/2017 Operator : SMARTCHEM2 Plan # :20170828002
 Plan Description : ALK-B2-TB/08/28/2017

Calibrant Report - WALK -

Calib Lot #:010104 Exp Date:6/21/2020 User:MICROBAC

Plan #: 20170828002 Description : [ALK-B2-TB/08/28/2017] Unit



Point	OD	Conc	Recalc Conc	% Error
1	-0.0086	0	-2.1083	-210.83
2	-0.0246	10	15.9180	59.18
3	-0.0261	20	17.5949	-12.03
4	-0.0568	50	51.4204	2.84
5	-0.0978	100	95.1256	-4.87
6	-0.2067	200	203.0536	1.53
7	-0.2579	250	249.7006	-0.12
8	-0.3158	300	299.2952	-0.23

Conc= -499.6979*Abso^2 -1143.233*Abso -11.9031 R²=0.9992

RBL
0.5221
0

Report Date 8/28/2017 Run Date 8/28/2017

2.3 General Chemistry Data

2.3.3 Ammonia Data

2.3.3.1 Summary Data



Login Number: L17081212
Department: Conventionals
Analyst: Todd Boyle

METHOD

Analysis EPA 350.1/SM4500-NH3 B(NH3)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128838
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over the printed name.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW02-082217	Prep Method: 350.1	Prep Date: N/A
Matrix: Water	Analytical Method: 350.1	Cal Date: 08/24/2017 17:42
Workgroup #: WG627134	Analyst: TB	Run Date: 08/24/2017 17:49
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: S2170824003.014
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.81		0.100	0.0500

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW21-082217	Prep Method: 350.1	Prep Date: N/A
Matrix: Water	Analytical Method: 350.1	Cal Date: 08/24/2017 17:42
Workgroup #: WG627134	Analyst: TB	Run Date: 08/24/2017 18:15
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: S2170824003.030
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	16.1		1.00	0.500

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW35-082217	Prep Method: 350.1	Prep Date: N/A
Matrix: Water	Analytical Method: 350.1	Cal Date: 08/24/2017 17:42
Workgroup #: WG627134	Analyst: TB	Run Date: 08/24/2017 17:50
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: S2170824003.016
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.308		0.100	0.0500

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW36-082217	Prep Method: 350.1	Prep Date: N/A
Matrix: Water	Analytical Method: 350.1	Cal Date: 08/24/2017 17:42
Workgroup #: WG627134	Analyst: TB	Run Date: 08/24/2017 17:51
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: S2170824003.017
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.369		0.100	0.0500

2.3.3.2 QC Summary Data

Example Ammonia Calculations

$$(\text{absorbance} - \text{intercept}) / (\text{slope} * \text{dilution}) = \text{mg/L}$$

where:

absorbance = reading from the spectrophotometer

intercept = calculated from calibration standard absorbencies

slope = calculated from calibration standard absorbencies

dilution = dilution of the distillate in decimal form (ex. 1/5 dilution = 0.2)

Microbac Laboratories Inc.

Data Checklist

Date: 24-AUG-2017

Analyst: TB

Analyst: NA

Method: NH3

Instrument: SC2

Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG627134

Calibration/Linearity	08/24/2017
Second Source Check	X
ICV/CCV (std)	X
ICB/CCB	X
Blank	X
LCS/LCS Dup	X
MS/MSD	X
Duplicate	X
Upload Results	X
Client Forms	X
QC Violation Sheet	X
Case Narratives	X
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	TB
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
28-AUG-2017

Todd Boyle

Secondary Reviewer:
29-AUG-2017

Dennar/Johnson



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1
Login Number: L17081212

AAB#: WG627134

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/24/2017	2.2	28		08/24/17	2.2	28	
MW21-082217	08	08/22/17					08/24/2017	2.2	28		08/24/17	2.2	28	
MW35-082217	11	08/22/17					08/24/2017	2.1	28		08/24/17	2.1	28	
MW36-082217	17	08/22/17					08/24/2017	2.1	28		08/24/17	2.1	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5452917
Report generated 08/29/2017 10:38



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: S2170824003.011
 Prep Date: 08/24/17 17:45
 Analyzed Date: 08/24/17 17:45
 Analyst: TB

Work Group: WG627134
 Blank Sample ID: WG627134-01
 Instrument ID: SMARTCHEM2
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627134-02	S2170824003.012	08/24/17 17:47	01
MW02-082217	L17081212-02	S2170824003.014	08/24/17 17:49	01
MW35-082217	L17081212-11	S2170824003.016	08/24/17 17:50	01
MW36-082217	L17081212-17	S2170824003.017	08/24/17 17:51	01
DUP	WG627134-04	S2170824003.025	08/24/17 17:58	01
MW21-082217	L17081212-08	S2170824003.030	08/24/17 18:15	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 5452918
 Report generated 08/29/2017 10:38



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/24/17 17:45 Sample ID: WG627134-01
Instrument ID: SMARTCHEM2 Run Date: 08/24/17 17:45 Prep Method: 350.1
File ID: S2170824003.011 Analyst: TB Method: 350.1
Workgroup (AAB#): WG627134 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 24-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.0500	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5452919

29-AUG-2017 10:38



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Run Date: 08/24/2017 Sample ID: WG627134-02
Instrument ID: SMARTCHEM2 Run Time: 17:47 Prep Method: 350.1
File ID: S2170824003.012 Analyst: TB Method: 350.1
Workgroup (AAB#): WG627134 Matrix: Water Units: mg/L
QC Key: WATERLOO Lot#: STD83234 Cal ID: SMARTC - 24-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.85	92.5	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5452920
Report generated: 08/29/2017 10:38



2.3 General Chemistry Data

2.3.4 Nitrate Data

2.3.4.1 Summary Data



Login Number: L17081212
Department: Conventional
Analyst: Tammy Morris

METHOD

Analysis EPA 353.2/SM4500-NO3 F (Nitrate)

HOLDING TIMES

Sample Analysis: The instrument used for the analysis of nitrate only analyzes for nitrate-nitrite (NO₃NO₂) which is the amount of total nitrate (NO₃) and nitrite (NO₂) combined. The NO₃ concentration is determined by analyzing for NO₃NO₂ and NO₂ and calculating NO₃ by the difference. An unpreserved bottle only has a 48 hour hold time for NO₃ and NO₂ separately. However if the bottle is preserved with sulfuric acid, the hold time for NO₃NO₂ is 28 days. The NO₂ was analyzed within 48 hours. The NO₃NO₂ was analyzed from a preserved container within 28 days..

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: The samples were diluted to reduce matrix interference. The reporting limits are elevated accordingly.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128818
Approved By: Deanna Hesson

Anna H. H. H.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW02-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 12:23	Dilution: 50	File ID: S217082916543901
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate-Nitrite (as N)			U	2.50	1.25
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW02-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 12:23	Dilution: 50	File ID: S217082916543501
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate (as N)	14797-55-8		U	2.50	1.25
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW21-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 12:35	Dilution: 100	File ID: S217082916544501
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate (as N)	14797-55-8		U	5.00	2.50
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW21-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 12:35	Dilution: 100	File ID: S217082916545201
Sample Tag:	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate-Nitrite (as N)			U	5.00	2.50
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW35-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 15:28	Dilution: 4	File ID: S217082916550401
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate-Nitrite (as N)		0.260		0.200	0.100

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW35-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 15:28	Dilution: 4	File ID: S217082916545801
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate (as N)	14797-55-8	0.260		0.200	0.100

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW36-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 15:50	Dilution: 4	File ID: S217082916551601
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate-Nitrite (as N)		0.164	J	0.200	0.100
J	The analyte was positively identified, but the quantitation was below the RL.				

Certificate of Analysis

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM2
Client ID: MW36-082217	Prep Method: 353.2	Prep Date: N/A
Matrix: Water	Analytical Method: 353.2	Cal Date: 08/25/2017 09:29
Workgroup #: WG627180	Analyst: TMM	Run Date: 08/25/2017 11:33
Collect Date: 08/22/2017 15:50	Dilution: 4	File ID: S217082916551001
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrate (as N)	14797-55-8	0.164	J	0.200	0.100
J	The analyte was positively identified, but the quantitation was below the RL.				

2.3.4.2 QC Summary Data

Example Nitrate Calculations

$$(\text{absorbance} - \text{intercept}) / (\text{slope} * \text{dilution}) = \text{mg/L}$$

where:

absorbance = reading from the spectrophotometer

intercept = calculated from calibration standard absorbencies

slope = calculated from calibration standard absorbencies

dilution = dilution of the distillate in decimal form (ex. 1/5 dilution = 0.2)

Microbac Laboratories Inc.

Data Checklist

Date: 25-AUG-2017

Analyst: TMM

Analyst: NA

Method: NO3

Instrument: SC2

Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG627180

Calibration/Linearity	8/25/17
Second Source Check	
ICV/CCV (std)	X
ICB/CCB	X
Blank	X
LCS/LCS Dup	X
MS/MSD	X
Duplicate	X
Upload Results	X
Client Forms	X
QC Violation Sheet	X
Case Narratives	
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	TMM
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
29-AUG-2017

Sammy Morris

Secondary Reviewer:
30-AUG-2017

Arne H. H. H. H.



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 353.2
Login Number: L17081212

AAB#: WG627180

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/25/2017	3	2	*	08/25/17	3	2	*
MW21-082217	08	08/22/17					08/25/2017	3	2	*	08/25/17	3	2	*
MW35-082217	11	08/22/17					08/25/2017	2.8	2	*	08/25/17	2.8	2	*
MW36-082217	17	08/22/17					08/25/2017	2.8	2	*	08/25/17	2.8	2	*

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5454119
Report generated 08/30/2017 09:02



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 353.2
Login Number: L17081212

AAB#: WG627180

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/25/2017	3	28		08/25/17	3	28	
MW21-082217	08	08/22/17					08/25/2017	3	28		08/25/17	3	28	
MW35-082217	11	08/22/17					08/25/2017	2.8	28		08/25/17	2.8	28	
MW36-082217	17	08/22/17					08/25/2017	2.8	28		08/25/17	2.8	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5454123
Report generated 08/30/2017 09:03



METHOD BLANK SUMMARY

Login Number: <u>L17081212</u>	Work Group: <u>WG627180</u>
Blank File ID: <u>S217082916535901</u>	Blank Sample ID: <u>WG627180-01</u>
Prep Date: <u>08/25/17 11:33</u>	Instrument ID: <u>SMARTCHEM2</u>
Analyzed Date: <u>08/25/17 11:33</u>	Method: <u>353.2</u>
Analyst: <u>TMM</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
MW35-082217	L17081212-11	S217082916545801	08/25/17 11:33	
MW02-082217	L17081212-02	S217082916543901	08/25/17 11:33	
LCS2	WG627180-03	S217082916541201	08/25/17 11:33	
MW02-082217	L17081212-02	S217082916543501	08/25/17 11:33	
LCS	WG627180-02	S217082916540601	08/25/17 11:33	
MW21-082217	L17081212-08	S217082916545201	08/25/17 11:33	
DUP	WG627180-05	S217082916542201	08/25/17 11:33	
MW21-082217	L17081212-08	S217082916544501	08/25/17 11:33	
MW36-082217	L17081212-17	S217082916551001	08/25/17 11:33	
MW36-082217	L17081212-17	S217082916551601	08/25/17 11:33	
MW35-082217	L17081212-11	S217082916550401	08/25/17 11:33	

Report Name: BLANK_SUMMARY
 PDF File ID: 5454120
 Report generated 08/30/2017 09:02



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: S217082916535901
 Prep Date: 08/25/17 11:33
 Analyzed Date: 08/25/17 11:33
 Analyst: TMM

Work Group: WG627180
 Blank Sample ID: WG627180-01
 Instrument ID: SMARTCHEM2
 Method: 353.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
MW35-082217	L17081212-11	S217082916545801	08/25/17 11:33	
MW02-082217	L17081212-02	S217082916543901	08/25/17 11:33	
LCS2	WG627180-03	S217082916541201	08/25/17 11:33	
MW02-082217	L17081212-02	S217082916543501	08/25/17 11:33	
LCS	WG627180-02	S217082916540601	08/25/17 11:33	
MW21-082217	L17081212-08	S217082916545201	08/25/17 11:33	
DUP	WG627180-05	S217082916542201	08/25/17 11:33	
MW21-082217	L17081212-08	S217082916544501	08/25/17 11:33	
MW36-082217	L17081212-17	S217082916551001	08/25/17 11:33	
MW36-082217	L17081212-17	S217082916551601	08/25/17 11:33	
MW35-082217	L17081212-11	S217082916550401	08/25/17 11:33	

Report Name: BLANK_SUMMARY
 PDF File ID: 5454124
 Report generated 08/30/2017 09:03



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/25/17 11:33 Sample ID: WG627180-01
Instrument ID: SMARTCHEM2 Run Date: 08/25/17 11:33 Prep Method: 353.2
File ID: S217082916535901 Analyst: TMM Method: 353.2
Workgroup (AAB#): WG627180 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 25-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrate (as N)	0.0250	0.0500	0.0250	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5454121

30-AUG-2017 09:02



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/25/17 11:33 Sample ID: WG627180-01
Instrument ID: SMARTCHEM2 Run Date: 08/25/17 11:33 Prep Method: 353.2
File ID: S217082916535901 Analyst: TMM Method: 353.2
Workgroup (AAB#): WG627180 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 25-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrate-Nitrite (as N)	0.0250	0.0500	0.0250	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5454125

30-AUG-2017 09:03



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Analyst: TMM Prep Method: 353.2
Instrument ID: SMARTCHEM2 Matrix: Water Method: 353.2
Workgroup (AAB#): WG627180 Units: mg/L
QC Key: WATERLOO Lot #: STD83524
Sample ID: WG627180-02 LCS File ID: S217082916540601 Run Date: 08/25/2017 11:33
Sample ID: WG627180-03 LCS2 File ID: S217082916541201 Run Date: 08/25/2017 11:33

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrate (as N)	1.00	1.00	100	1.00	1.04	104	3.73	90 - 110	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5454122
Report generated: 08/30/2017 09:02



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Analyst: TMM Prep Method: 353.2
Instrument ID: SMARTCHEM2 Matrix: Water Method: 353.2
Workgroup (AAB#): WG627180 Units: mg/L
QC Key: WATERLOO Lot #: STD83524
Sample ID: WG627180-02 LCS File ID: S217082916540601 Run Date: 08/25/2017 11:33
Sample ID: WG627180-03 LCS2 File ID: S217082916541201 Run Date: 08/25/2017 11:33

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrate-Nitrite (as N)	1.00	1.00	100	1.00	1.04	104	3.73	90 - 110	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5454126
Report generated: 08/30/2017 09:03



2.3.4.3 Raw Data

SMARTCHEM RUN LOG

(smartchem2, smartchem3)

WORKGROUP: WG627180

Daily Check

- | | |
|---|--|
| ☒ Lamp On | ☒ WBL Run |
| ☒ Probe Rinse Full | ☒ Reagents Full |
| ☒ DI Water > 1/2 Full | ☒ Dilution H ₂ O Full |
| ☒ Wash Solution > 1/2 Full | ☒ Waste Container Check |
| ☒ NO ₃ Reagent bottle connected / purged | |
| ☒ NO ₃ pH adj to pH 5-9 | |

Syringe filter lot # 09222462
pH paper Lot #: HC693124

1) Workgroup
Plan # 20170825002

2) Workgroup
Plan # _____

3) Workgroup
Plan # _____

Instrument: SC1 ☐ SC2 ☒

Analyte	1	2	3
NO ₃			
Dilution			
SC Prepared Curve			
Position			
1-1	ICV		
1-2	BK		
1-3	LCS		
1-4	LCS2		
1-5	NO ₂ ck		
1-6	8-127-01		
1-7	02 1/5		
1-8	03		
1-9	8-1295-01		
1-10	02		
1-11	03 1/5		
1-12	04 1/5		
1-13	8-1212-02 1/50		
1-14	08 1/100		
1-15	11 1/4		
1-16	17 1/4		
1-17	8-1305-01 1/5		
1-18	03 1/25		
1-19	08 1/100		
1-20	10 1/100		
1-21	12 1/4		
1-22	Dup 08-1311-01		
2-1	MS 08-1311-01		
2-2	08-1311-01		
2-3			

Analyte	1	2	3
Position			
2-4			
2-5			
2-6			
2-7			
2-8			
2-9			
2-10			
2-11			
2-12			
2-13			
2-14			
2-15			
2-16			
2-17			
2-18			
2-19			
2-20			
2-21			
2-22			
2-23			
2-24			
2-25			
2-26			
3-1			
3-2			

NOTES:
* Run NO₂ std on NO₃ runs
* LCS2 must be run if no MS or Duplicate
*MS(10% sample): NO₃, TKN, NH₃, PHOS

* Samples diluted for matrix interference kills low Calumans.

DCN#127875



SMARTCHEM RUN LOG

(smartchem2, smartchem3)

Analyte	1	2	3
Position			
3-3			
3-4			
3-5			
3-6			
3-7			
3-8			
3-9			
3-10			
3-11			
3-12			
3-13			
3-14			
3-15			

Analyte	1	2	3
Position			
3-16			
3-17			
3-18			
3-19			
3-20			
3-21			
3-22			
3-23			
3-24			
3-25			
3-26			
3-27			
3-28			

Chloride	EPA 325.2/SM 4500-Cl E-2000
Nitrate-Nitrite	EPA 353.2/SM 4500-NO3 F-2000
Alkalinity	EPA 310.2
Sulfate	EPA 375.4/SM 426C (15 th)/ SM4500-504 E-1997

Ammonia	EPA 350.1/SM 4500-NH3 B-1997
TKN	EPA 351.2
Phos	EPA 365.4

Analyte	NO3	Reagents
SOP & Revision		40827
Curve Stock (SC made)	83567	40195
NO2 STD	Std 83569	
ICV	Std 83523	
CCV	Std 83568	
LCS	Std 83524	
MS	Std 82988 0.1(25)/5 Dilution	

Comments: _____

Analyst: Yammy MorrisDate: 8/25/17

DCN#127875



MICROBAC (OVD)
 SMARTCHEM200 INST2 (VER3.1.14)
 NH3, TKN, NO3NO2 (MG/L N)
 ALK (MG/L CaCO3) CL, SO4 (MG/L)

Method : WNO3 -Unit [mg/L] - EPA 353.2 Nitrate-Nitrite

Smp#[Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Flag	Analysis Time
DIL-1	RBL	0.000	0.1576	0.00	R	11:33:28 AM
DIL-1	RBL	0.000	0.0953	0.00		11:34:40 AM
DIL-1	RBL	0.000	0.0993	0.00		11:35:52 AM
DIL-1	RBL	0.000	0.0983	0.00		11:37:04 AM
DIL-1	Std-1	0.000	-0.0018	0.00	INV	11:38:17 AM
SR5-1	Std-2	0.040	0.0091	0.00		11:39:28 AM
SR5-2	Std-3	0.100	0.0326	0.00		11:40:41 AM
SR5-3	Std-4	0.500	0.1795	0.00		11:41:52 AM
SR5-4	Std-5	1.000	0.3588	0.00		11:43:05 AM
ST-1	Std-6	2.000	0.7241	0.00		11:44:17 AM
ST-3	1CCV (1 mg/L)	1.039	0.3743	103.91		11:45:29 AM
ST-2	2CCB (0 mg/L)	0.003	-0.0024	0.00	INV,><	11:46:41 AM
1	ICV	1.572	0.5682	0.00		11:47:53 AM
2	WG627180-01 BLK	-0.005	-0.0055	0.00	INV,><,LL	11:49:05 AM
3	WG627180-02 LCS	1.000	0.3601	0.00		11:50:17 AM
4	WG627180-03 LCS2	1.038	0.3738	0.00		11:51:29 AM
5	NO2 CK	1.104	0.3979	0.00		11:52:41 AM
6	L17081277-01	0.056	0.0167	0.00		11:53:53 AM
7	L17081277-02 (5)	X 0.002	-0.0027	0.00	INV,><	11:55:05 AM
8	L17081277-03	0.051	0.0150	0.00		11:56:17 AM
9	L17081295-01	0.470	0.1675	0.00		11:57:29 AM
10	L17081295-02	0.356	0.1260	0.00		11:58:41 AM
ST-3	1CCV (1 mg/L)	1.007	0.3625	100.66		11:59:53 AM
ST-2	2CCB (0 mg/L)	0.002	-0.0027	0.00	INV,><	12:01:05 PM
11	L17081295-03 (5)	0.018	0.0031	0.00		12:02:17 PM
12	L17081295-04 (5)	0.015	0.0017	0.00		12:03:29 PM
13	L17081212-05 (50) 8/25/17	-0.005	-0.0054	0.00 0.0179	INV,><,LL	12:04:41 PM
14	L17081212-08 (100)	0.014	0.0015	0.00 0		12:05:53 PM
15	L17081212-11 (4)	0.065	0.0199	0.00 0		12:07:05 PM
16	L17081212-17 (4)	0.041	0.0114	0.00 0		12:08:17 PM
17	L17081305-01 (5)	0.060	0.0181	0.00 0.031		12:09:29 PM
18	L17081305-03 (25)	-0.008	-0.0063	0.00 0.021	INV,><,LL	12:10:41 PM

Report Date :08/25/2017 Run Date :8/25/2017 Operator : SMARTCHEM2 Plan # :20170825002
 Plan Description : NO3-A2/TMM/018/25/2017

MICROBAC (OVD)
 SMARTCHEM200 INST2 (VER3.1.14)
 NH3, TKN, NO3NO2 (MG/L N)
 ALK (MG/L CaCO3) CL, SO4 (MG/L)

Method : WNO3 -Unit [mg/L] - EPA 353.2 Nitrate-Nitrite

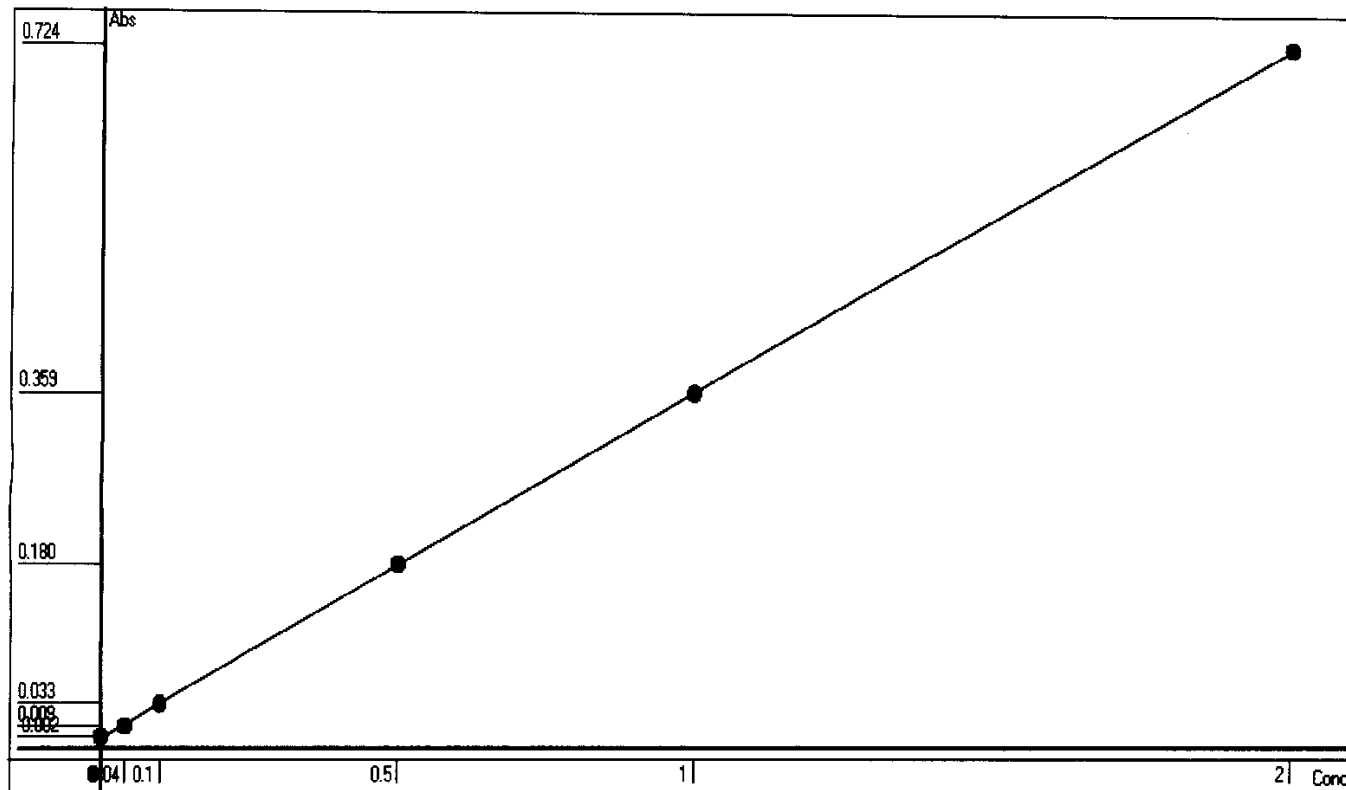
Smp#[Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Flag	Analysis Time
19	L17081305-08 (100)	-0.001	-0.0039	0.00	INV,><,LL	12:11:53 PM
20	L17081305-10 (100)	-0.007	-0.0061	0.00	INV,><,LL	12:13:05 PM
ST-3	1CCV (1 mg/L)	0.983	0.3540	98.33		12:14:17 PM
ST-2	2CCB (0 mg/L)	-0.019	-0.0106	0.00	INV,><,LL	12:15:29 PM
21	L17081305-12 (4)	0.020	0.0036	0.00		12:16:41 PM
22	WG627180-05 DUP	0.011	0.0004	0.00		12:17:53 PM
23	WG627180-06 MS	0.499	0.1779	0.00		12:19:05 PM
24	L17081311-01	0.092	0.0298	0.00		12:20:17 PM
25	ID 25	1.014	0.3652	0.00		12:21:29 PM
ST-3	1CCV (1 mg/L)	0.943	0.3392	94.26		12:22:41 PM
ST-2	2CCB (0 mg/L)	-0.005	-0.0053	0.00	INV,><,LL	12:23:53 PM

Report Date :08/25/2017 Run Date :8/25/2017 Operator : SMARTCHEM2 Plan # :20170825002
 Plan Description : NO3-A2/TMM/018/25/2017

Calibrant Report - WNO3 -

Calib Lot #:010104 Exp Date:6/17/2020 User:MICROBAC

Plan # : 20170825002 Description : [NO3-A2/TMM/018/25/2017] Unit



Point	OD	Conc	Recalc Conc	% Error
1	-0.0018	0	0.0049	0.49
2	0.0091	0.04	0.0348	-13.00
3	0.0326	0.1	0.0994	-0.60
4	0.1795	0.5	0.5034	0.68
5	0.3588	1	0.9965	-0.35
6	0.7241	2	2.0010	0.05
Conc= +2.7499*Abso +0.0098 R²=1.0000				RBL 0.0988 0

Report Date 8/25/2017 Run Date 8/25/2017

2.3 General Chemistry Data

2.3.5 Phosphorus Data

2.3.5.1 Summary Data



Login Number: L17081212
Department: Conventional
Analyst: Todd Boyle

METHOD

Analysis EPA 365.4 (Phosphorus)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128839
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over a horizontal line.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW02-082217	Prep Method: 365.4	Prep Date: N/A
Matrix: Water	Analytical Method: 365.4	Cal Date: 08/25/2017 12:10
Workgroup #: WG627266	Analyst: TB	Run Date: 08/25/2017 12:14
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: SC170825002.013
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Phosphorus, Total	7723-14-0	0.182	J	0.200	0.100
J	The analyte was positively identified, but the quantitation was below the RL.				

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW21-082217	Prep Method: 365.4	Prep Date: N/A
Matrix: Water	Analytical Method: 365.4	Cal Date: 08/25/2017 12:10
Workgroup #: WG627266	Analyst: TB	Run Date: 08/25/2017 12:29
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: SC170825002.026
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Phosphorus, Total	7723-14-0	18.3		2.00	1.00

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW35-082217	Prep Method: 365.4	Prep Date: N/A
Matrix: Water	Analytical Method: 365.4	Cal Date: 08/25/2017 12:10
Workgroup #: WG627266	Analyst: TB	Run Date: 08/25/2017 12:15
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: SC170825002.015
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Phosphorus, Total	7723-14-0		U	0.200	0.100
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW36-082217	Prep Method: 365.4	Prep Date: N/A
Matrix: Water	Analytical Method: 365.4	Cal Date: 08/25/2017 12:10
Workgroup #: WG627266	Analyst: TB	Run Date: 08/25/2017 12:16
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: SC170825002.016
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Phosphorus, Total	7723-14-0		U	0.200	0.100

Certificate of Analysis

U	Not detected at or above adjusted sample detection limit.
---	---

2.3.5.2 QC Summary Data

Example Phosphorus Calculations

$$(\text{absorbance} - \text{intercept}) / (\text{slope} * \text{dilution}) = \text{mg/L}$$

where:

absorbance = reading from the spectrophotometer

intercept = calculated from calibration standard absorbencies

slope = calculated from calibration standard absorbencies

dilution = dilution of the distillate in decimal form (ex. 1/5 dilution = 0.2)

Microbac Laboratories Inc.

Data Checklist

Date: 25-AUG-2017

Analyst: TB

Analyst: NA

Method: PHOS

Instrument: SC

Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG627266

Calibration/Linearity	08/25/2017
Second Source Check	X
ICV/CCV (std)	X
ICB/CCB	X
Blank	X
LCS/LCS Dup	X
MS/MSD	X
Duplicate	X
Upload Results	X
Client Forms	X
QC Violation Sheet	X
Case Narratives	X
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	TB
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
25-AUG-2017

Todd Boyle

Secondary Reviewer:
28-AUG-2017

Dennar/Johnson



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.4
 Login Number: L17081212

AAB#: WG627266

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/25/2017	3	28		08/25/17	3	28	
MW21-082217	08	08/22/17					08/25/2017	3	28		08/25/17	3	28	
MW35-082217	11	08/22/17					08/25/2017	2.9	28		08/25/17	2.9	28	
MW36-082217	17	08/22/17					08/25/2017	2.9	28		08/25/17	2.9	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
 PDF File ID: 5450272
 Report generated 08/28/2017 08:55



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: SC170825002.010
 Prep Date: 08/25/17 12:13
 Analyzed Date: 08/25/17 12:13
 Analyst: TB

Work Group: WG627266
 Blank Sample ID: WG627266-01
 Instrument ID: SMARTCHEM
 Method: 365.4

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627266-02	SC170825002.011	08/25/17 12:13	01
MW02-082217	L17081212-02	SC170825002.013	08/25/17 12:14	01
MW35-082217	L17081212-11	SC170825002.015	08/25/17 12:15	01
MW36-082217	L17081212-17	SC170825002.016	08/25/17 12:16	01
DUP	WG627266-04	SC170825002.022	08/25/17 12:20	01
MW21-082217	L17081212-08	SC170825002.026	08/25/17 12:29	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 5450273
 Report generated 08/28/2017 08:55



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/25/17 12:13 Sample ID: WG627266-01
Instrument ID: SMARTCHEM Run Date: 08/25/17 12:13 Prep Method: 365.4
File ID: SC170825002.010 Analyst: TB Method: 365.4
Workgroup (AAB#): WG627266 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 25-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Phosphorus, Total	0.100	0.200	0.100	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5450274

28-AUG-2017 08:55



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627266-02
Instrument ID: SMARTCHEM Run Time: 12:13 Prep Method: 365.4
File ID: SC170825002.011 Analyst: TB Method: 365.4
Workgroup (AAB#): WG627266 Matrix: Water Units: mg/L
QC Key: WATERLOO Lot#: STD83438 Cal ID: SMARTC - 25-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Phosphorus, Total	1.00	0.936	93.6	70 - 130	

LCS - Modified 03/06/2008
PDF File ID: 5450275
Report generated: 08/28/2017 08:55



2.3.5.3 Raw Data

SMARTCHEM RUN LOG

(smartchem2, smartchem3)

Daily Check

- ☒ Lamp On
☒ Probe Rinse Full
☒ DI Water > 1/2 Full
☒ Wash Solution > 1/2 Full
☐ NO3 Reagent bottle connected / purged
☐ NO3 pH adj to pH 5-9
 Syringe filter lot # _____
 pH paper Lot #: _____
- ☒ WBL Run
☒ Reagents Full
☒ Dilution H₂O Full
☒ Waste Container Check

- 1) Workgroup _____
 Plan # _____
 2) Workgroup _____
 Plan # _____
 3) Workgroup _____
 Plan # _____
 Instrument: SC1 ☒ SC2 ☐

Analyte	1	2	3
Phos			
Dilution			
SC Prepared Curve			
Position			
1-1	TCW		
1-2	Blk		
1-3	LCS		
1-4	8-1200-07	1/10	
1-5	1212-02		
1-6	08	1/15	
1-7	11		
1-8	17		
1-9	1215-02	1/25	
1-10	03	1/250	
1-11	Ref 941-01		
1-12	DUP		
1-13	MS		
1-14			
1-15			
1-16			
1-17			
1-18			
1-19			
1-20			
1-21			
1-22			
2-1			
2-2			
2-3			

NOTES: * Run NO2 std on NO3 runs
 * LCSD must be run if no MS or Duplicate
 *MS(10% sample): NO3, TKN, NH3, PHOS

Analyte	1	2	3
Position			
2-4			
2-5			
2-6			
2-7			
2-8			
2-9			
2-10			
2-11			
2-12			
2-13			
2-14			
2-15			
2-16			
2-17			
2-18			
2-19			
2-20			
2-21			
2-22			
2-23			
2-24			
2-25			
2-26			
3-1			
3-2			

DCN#127890



SMARTCHEM RUN LOG

(smartchem2, smartchem3)

	Analyte	1	2	3
Position				
3-3				
3-4				
3-5				
3-6				
3-7				
3-8				
3-9				
3-10				
3-11				
3-12				
3-13				
3-14				
3-15				

	Analyte	1	2	3
Position				
3-16				
3-17				
3-18				
3-19				
3-20				
3-21				
3-22				
3-23				
3-24				
3-25				
3-26				
3-27				
3-28				

Chloride	EPA 325.2/SM 4500-Cl E-2000
Nitrate-Nitrite	EPA 353.2/SM 4500-NO3 F-2000
Alkalinity	EPA 310.2
Sulfate	EPA 375.4/SM 426C (15 th)/ SM4500-504 E-1997

Ammonia	EPA 350.1/SM 4500-NH3 B-1997
TKN	EPA 351.2
Phos	EPA 365.4

Analyte	Phos		Reagents
SOP & Revision	k 3654 R19		
Curve Stock (SC made)			
NO2 STD	See		40937
ICV			40746
CCV	Prep		41101
LCS			
MS	Long		
	Dilution		

Comments: _____

Analyst: Paul BayleDate: 8/25/17

DCN#127890



TKN/Phosphorus Digestion Log

TKN WG: _____ Phos WG: _____
 TKN Std: 83448 Phos Std: 83448
 TKN CCV: 1/2 (83448) Phos CCV: 1/2 (83448)
 TKN ICV: 83446 Phos ICV: 83437
 TKN LCS: 83447 Phos LCS: 83438

MS/MSD: 82628

Daily Dilution: 1 mL / 25

Block Digester Temperature: 380 °C

Digest Reagent: 40718

	Sample	Volume	TKN Dilution	Phos Dilution		Sample	Volume	TKN Dilution	Phos Dilution
1	SW T/P				26				
2	SW T/P				27				
3	ICV T				28				
4	LCS T				29				
5	ICV P				30				
6	LCS P				31				
7	8-1191-02	1/50	-		32				
8	05	1/50	-		33				
9	1212-02		-	+	34				
* 10	08	5 mL / 25	-	+	35				
11	11		-	+	36				
12	17		-	+	37				
* 13	1200-07	2.5 mL / 25		+	38				
14	1215-02	1/25		+	39				
15	03	1/250		+	40				
16	Ref 941-01		-	+	41				
17	DNB ↓		-	+	42				
18	MS ↓		-	+	43				
19					44				
20					45				
21					46				
22					47				
23					48				
24					49				
25					50				

* Diluted for Matrix Interference
 • 1212-08 colored / reacted with Digest Acid
 • 1200-07 Violently reacts with Acid
 Analyst: Tom Bayle

Date: 8/24/17

MICROBAC (OVD)
 SMARTCHEM200 INST1 (VER3.1.14)
 NH3, TKN, NO3NO2 (MG/L N)
 ALK (MG/L CaCO3) CL, SO4 (MG/L)

Method : WTPH -Unit [mg/L] - EPA 365.4 TOTAL PHOSPHORUS

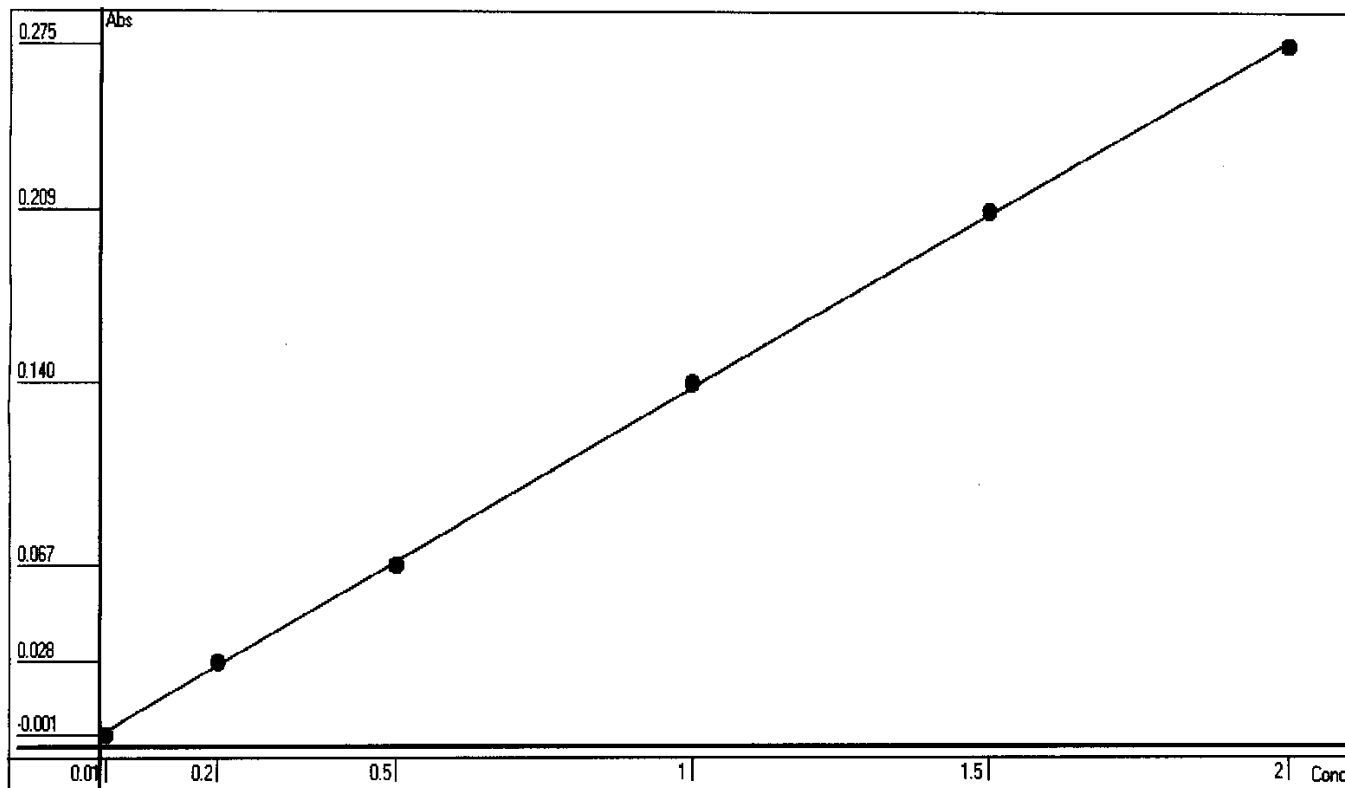
Smp#[Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Flag	Analysis Time
DIL-1	RBL	0.000	0.0661	0.00	R	12:05:51 PM
DIL-1	RBL	0.000	0.0620	0.00	R	12:06:08 PM
DIL-1	RBL	0.000	0.0687	0.00	R	12:07:03 PM
SR5-1	Std-1	0.010	-0.0012	0.00	INV	12:07:20 PM
SR5-2	Std-2	0.200	0.0282	0.00		12:08:16 PM
SR5-3	Std-3	0.500	0.0671	0.00		12:08:32 PM
SR5-4	Std-4	1.000	0.1399	0.00		12:09:27 PM
SR5-5	Std-5	1.500	0.2089	0.00	EPL	12:09:45 PM
ST-1	Std-6	2.000	0.2753	0.00		12:10:39 PM
ST-3	1CCV (1 mg/L)	1.035	0.1429	103.51		12:10:57 PM
ST-2	2CCB (0 mg/L)	-0.051	-0.0082	0.00	INV,><,LL	12:11:51 PM
1	ICV	1.390	0.1923	0.00		12:12:09 PM
2	WG627266-01 BLK	0.088	0.0111	0.00	EPL	12:13:03 PM
3	WG627266-02 LCS	0.936	0.1291	0.00		12:13:21 PM
4	L17081200-07 (10)	0.992	0.1369	0.00		12:14:15 PM
5	L17081212-02	0.182	0.0243	0.00		12:14:33 PM
6	L17081212-08 (5)	X 3.714	0.5155	0.00	EPL,><,LH	12:15:27 PM
7	L17081212-11	-0.052	-0.0083	0.00	INV,><,LL	12:15:45 PM
8	L17081212-17	-0.030	-0.0053	0.00	INV,><,LL	12:16:39 PM
9	L17081215-02 (25)	1.588	0.2198	0.00		12:16:57 PM
10	L17081215-03 (250)	1.433	0.1983	0.00		12:17:51 PM
ST-3	1CCV (1 mg/L)	0.987	0.1362	98.70		12:18:09 PM
ST-2	2CCB (0 mg/L)	-0.053	-0.0084	0.00	INV,><,LL	12:19:03 PM
11	WG627266-03	0.291	0.0394	0.00		12:19:21 PM
12	WG627266-04 DUP	0.137	0.0180	0.00		12:20:15 PM
13	WG627266-05 MS	1.337	0.1849	0.00		12:20:33 PM
ST-3	1CCV (1 mg/L)	0.982	0.1355	98.19		12:21:27 PM
ST-2	2CCB (0 mg/L)	-0.081	-0.0123	0.00	INV,><,LL	12:21:45 PM
6-[1/2]	L17081212-08 (5)	3.654	0.2530	0.00	LH	12:29:25 PM
ST-3	1CCV (1 mg/L)	0.973	0.1343	97.33		12:29:25 PM
ST-2	2CCB (0 mg/L)	-0.048	-0.0077	0.00	INV,><,LL	12:30:19 PM

Report Date :08/25/2017 Run Date :8/25/2017 Operator : SMARTCHEM1 Plan # :20170825002
 Plan Description : PHOS-A1-TB/08/25/2017

Calibrant Report - WTPH -

Calib Lot #:010104 Exp Date:6/18/2020 User:MICROBAC

Plan # : 20170825002 Description : [PHOS-A1-TB/08/25/2017] Unit



Point	OD	Conc	Recalc Conc	% Error
1	-0.0012	0.01	-0.0009	-109.00
2	0.0282	0.2	0.2104	5.20
3	0.0671	0.5	0.4901	-1.98
4	0.1399	1	1.0135	1.35
5	0.2089	1.5	1.5096	0.64
6	0.2753	2	1.9870	-0.65
				RBL 0.0674 0

Conc= +7.1897*Abso +0.0077 R²=0.9997

Report Date 8/25/2017 Run Date 8/25/2017

2.3 General Chemistry Data

2.3.6 Orthophosphate Data

2.3.6.1 Summary Data



Login Number: L17081212
Department: Conventional
Analyst: Dorothy Payne

METHOD

Analysis EPA 365.2/SM4500-P E (Orthophosphate)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128841
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over a horizontal line.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: V-1200
Client ID: MW02-082217	Prep Method: SM4500-P-E-1999	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-P-E-1999	Cal Date: 06/07/2017 15:45
Workgroup #: WG626980	Analyst: DLP	Run Date: 08/23/2017 14:15
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: 00.1708231415-06
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Orthophosphate	14265-44-2	0.310		0.0500	0.0250

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: V-1200
Client ID: MW21-082217	Prep Method: SM4500-P-E-1999	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-P-E-1999	Cal Date: 06/07/2017 15:45
Workgroup #: WG626980	Analyst: DLP	Run Date: 08/23/2017 14:15
Collect Date: 08/22/2017 12:35	Dilution: 50	File ID: 00.1708231415-07
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Orthophosphate	14265-44-2	18.7		2.50	1.25

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: V-1200
Client ID: MW35-082217	Prep Method: SM4500-P-E-1999	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-P-E-1999	Cal Date: 06/07/2017 15:45
Workgroup #: WG626980	Analyst: DLP	Run Date: 08/23/2017 14:15
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: 00.1708231415-08
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Orthophosphate	14265-44-2		U	0.0500	0.0250
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: V-1200
Client ID: MW36-082217	Prep Method: SM4500-P-E-1999	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-P-E-1999	Cal Date: 06/07/2017 15:45
Workgroup #: WG626980	Analyst: DLP	Run Date: 08/23/2017 14:15
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: 00.1708231415-09
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Orthophosphate	14265-44-2		U	0.0500	0.0250
U	Not detected at or above adjusted sample detection limit.				

Certificate of Analysis

2.3.6.2 QC Summary Data

Example Calculations for Visible Spectrophotometric Methods

Linear Calibration Model

Step 1 - Retrieve Curve Data from ICAL

m = slope of the linear equation
b = intercept from the linear equation
y = instrument response as absorbance or OD
x = concentration of analyte (mg/L)
 $y = mx + b$

Step 2: Calculate the instrument concentration, x

Where:

$$x = (y - b)/m$$

Step 3: Solve for analyte concentration in sample, Cx

$$Cx = (x)(D)$$

Example Calculation (LCS):

Value of m from plot:	7.809
Value of b from plot:	0.0004135
Absorbance of unknown from quantitation report (y):	0.31
Calculated concentration (x):	0.03964483
Dilution factor (D):	1.00
Concentration of analyte in sample, Cy:	0.0396 mg/L

SmartChem Autoanalyzer - Quadratic Calibration for Chloride and Sulfate

Step 1 - Retrieve Curve Data from Smartchem ICAL

A, B, C = constants from the ICAL quadratic regression

x = instrument response as absorbance or OD

y = concentration of analyte (mg/L)

Step 2: Calculate the instrument concentration, y

Where:

$$y = Ax^2 + Bx + C$$

Step 3: Solve for analyte concentration in sample, Cy

$$Cy = (y)(D)$$

Example Calculation (LCS):

Value of A from plot:	101.2796
Value of B from plot:	318.9056
Value of C from plot:	-2.2712
Absorbance of unknown from quantitation report (x):	0.1583
Calculated concentration (y):	50.7495108
Dilution factor (D):	1.00
Concentration of analyte in sample, Cy:	50.75 mg/L

Microbac Laboratories Inc.

Data Checklist

Date: 23-AUG-2017

Analyst: DLP

Analyst: NA

Method: PO4

Instrument: V-1200

Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG626980

Calibration/Linearity	06-07-17
Second Source Check	
ICV/CCV (std)	X
ICB/CCB	X
Blank	X
LCS/LCS Dup	X
MS/MSD	X
Duplicate	X
Upload Results	X
Client Forms	
QC Violation Sheet	
Case Narratives	
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	
Primary Reviewer	DLP
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
23-AUG-2017



Secondary Reviewer:
25-AUG-2017



CHECKLIST1 - Modified 03/05/2008

Generated: AUG-25-2017 10:47:55



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: SM4500-P-E-1999
 Login Number: L17081212

AAB#: WG626980

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/23/2017	1.1	2		08/23/17	1.1	2	
MW21-082217	08	08/22/17					08/23/2017	1.1	2		08/23/17	1.1	2	
MW35-082217	11	08/22/17					08/23/2017	.9	2		08/23/17	.9	2	
MW36-082217	17	08/22/17					08/23/2017	.9	2		08/23/17	.9	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
 PDF File ID: 5447041
 Report generated 08/24/2017 12:58



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: 00.1708231415-03
 Prep Date: 08/23/17 14:15
 Analyzed Date: 08/23/17 14:15
 Analyst: DLP

Work Group: WG626980
 Blank Sample ID: WG626980-01
 Instrument ID: V-1200
 Method: SM4500-P-E-1999

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG626980-02	00.1708231415-04	08/23/17 14:15	
LCS2	WG626980-03	00.1708231415-05	08/23/17 14:15	
MW02-082217	L17081212-02	00.1708231415-06	08/23/17 14:15	
MW21-082217	L17081212-08	00.1708231415-07	08/23/17 14:15	
MW35-082217	L17081212-11	00.1708231415-08	08/23/17 14:15	
MW36-082217	L17081212-17	00.1708231415-09	08/23/17 14:15	
DUP	WG626980-06	00.1708231415-12	08/23/17 14:15	

Report Name: BLANK_SUMMARY
 PDF File ID: 5447042
 Report generated 08/24/2017 12:58



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/23/17 14:15 Sample ID: WG626980-01
Instrument ID: V-1200 Run Date: 08/23/17 14:15 Prep Method: SM4500-P-E-1999
File ID: 00.1708231415-03 Analyst: DLP Method: SM4500-P-E-1999
Workgroup (AAB#): WG626980 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: V-1200 - 11-JUL-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Orthophosphate	0.0250	0.0500	0.0250	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5447043

24-AUG-2017 12:58



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Analyst: DLP Prep Method: SM4500-P-E-1999
 Instrument ID: V-1200 Matrix: Water Method: SM4500-P-E-1999
 Workgroup (AAB#): WG626980 Units: mg/L
 QC Key: WATERLOO Lot #: STD83414
 Sample ID: WG626980-02 LCS File ID: 00.1708231415-04 Run Date: 08/23/2017 14:15
 Sample ID: WG626980-03 LCS2 File ID: 00.1708231415-05 Run Date: 08/23/2017 14:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Orthophosphate	1.00	1.00	100	1.00	1.01	101	0.639	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 5447044
 Report generated: 08/24/2017 12:58



2.3.6.3 Raw Data

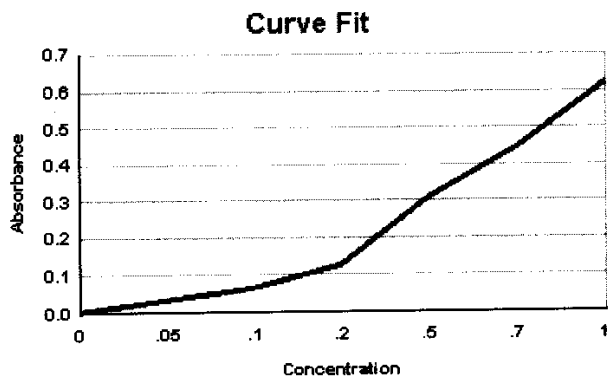
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup: WG616997
Analytical Method: 300
Instrument ID: V-1200

Analyst: TMM
Initial Calibration Date: 06/07/2017

Analyte: ORTHOPHOSPHATE
Number of Points: 7
Slope: 0.624028
Y-Intercept: 0.00124690
Coef. Of Correlation (R^2): 0.999788
Coef. Of Correlation (R): 0.999894

Concentration X	Absorbance Y	X^2	$X * Y$	Y-Fitted (mX^2+B)
0.00	0.00100	0.00	0.00	0.00124690
0.0500	0.0310	0.00250	0.00155	0.0324483
0.100	0.0630	0.0100	0.00630	0.0636497
0.200	0.127	0.0400	0.0254	0.126053
0.500	0.312	0.250	0.156	0.313261
0.700	0.445	0.490	0.312	0.438067
1.00	0.621	1.00	0.621	0.625275



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 06/07/2017 16:28



Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG616997
File ID: 00.1706071545-08
CCV ID: WG616997-08
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 06/07/2017
Run Time: 15:45
Analyst: TMM
Cal ID: V-1200 - 07-JUN-17 15:45:07

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	1	1.02	0.637	2.0	

* Exceeds %D Limit

CCC Calibration Check Compounds

SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 06/07/2017 16:28



Orthophosphate

(orthophosphate1)

EPA 365.2 / SM4500-P E

SOP K3653 Rev 11

Color Reagent Chemicals

RGT 40722RGT 40466RGT 29475COA 18278CCV: 85083415Daily Dilution: 5(5)/100Daily Dilution: 0.5Spectrophotometer: V-1200LCS: 85083414Daily Dilution: 10(10)/100Daily Dilution: 1Curve ID: 6169976-07-17Spike: 85083414Daily Dilution: 2(10)/100Daily Dilution: 0.40

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: <u>0.5</u> mg/L	50			<u>0.319</u>
BLK/CCB:	50			<u>0.001</u>
LCS: <u>1.0</u> ppm	50			<u>0.625</u>
LCSD: <u>1.0</u> ppm	50			<u>0.629</u>
<u>08-1212-02</u>	50	✓		<u>0.195</u>
<u>-08</u>	50	✓	<u>V80</u>	<u>0.225</u>
<u>-11</u>	50	✓		<u>0.003</u>
<u>-17</u>	50	✓		<u>0.005</u>
<u>08-1214-01</u>	50	✓	<u>V50</u>	<u>0.416</u>
<u>02</u>	50	✓	<u>V200</u>	<u>0.614</u>
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP <u>08-1212-11</u>	50	✓		<u>0.003</u>
MS: (<u>1212-17</u>)	50	✓		<u>0.232</u>
MSD: ()	50			
CCV: (<u>0.5</u>)	50			<u>0.322</u>
CCB:	50			<u>0.003</u>

Analyst: Quinty PappDate / Time: 08-23-17 , 1415

* Diluted because of color

DCN#127846



Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG626980
Analyte: ORTHOPHOSPHATE

Analyst: DLP
Date: 08/23/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG626980-01	50	50	0.00100	0.6240	0.001247	-0.00039565	-0.00039565	1	mg/L
WG626980-02	50	50	0.625	0.6240	0.001247	0.99956	0.99956	1	mg/L
WG626980-03	50	50	0.629	0.6240	0.001247	1.0060	1.0060	1	mg/L
L17081212-02	50	50	0.195	0.6240	0.001247	0.31049	0.31049	1	mg/L
L17081212-08	50	50	0.235	0.6240	0.001247	0.37459	18.729	50	mg/L
WG626980-04	50	50	0.00300	0.6240	0.001247	0.0028093	0.0028093	1	mg/L
L17081212-11	50	50	0.00300	0.6240	0.001247	0.0028093	ND	1	mg/L
L17081212-17	50	50	0.00500	0.6240	0.001247	0.0060143	ND	1	mg/L
WG626980-05	50	50	0.00500	0.6240	0.001247	0.0060143	0.0060143	1	mg/L
L17081214-01	50	50	0.416	0.6240	0.001247	0.66464	33.232	50	mg/L
L17081214-02	50	50	0.614	0.6240	0.001247	0.98193	196.39	200	mg/L
WG626980-06	50	50	0.00300	0.6240	0.001247	0.0028093	0.0028093	1	mg/L
WG626980-07	50	50	0.232	0.6240	0.001247	0.36978	0.36978	1	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 08/23/2017 16:22



Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG627027
File ID: 00.1708231415-01
CCV ID: WG627027-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 08/23/2017
Run Time: 14:15
Analyst: DLP
Cal ID: V-1200 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.509	0.638	1.8	

* Exceeds %D Limit

CCC Calibration Check Compounds

SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 08/23/2017 16:19



Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG627027

Instrument ID: V-1200

File ID: 00.1708231415-14

Run Date: 08/23/2017

CCV ID: WG627027-03

Run Time: 14:15

Units: mg/L

Analyst: DLP

Analyte: ORTHOPHOSPHATE

Cal ID: V-1200 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.514	0.644	2.8	

* Exceeds %D Limit

CCC Calibration Check Compounds

SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 08/23/2017 16:19



2.3 General Chemistry Data

2.3.7 Sulfide Data

2.3.7.1 Summary Data



Login Number: L17081212
Department: Conventionals
Analyst: Ethan Tidd

METHOD

Analysis SW-846 9030/EPA 376.1/SM4500-S(-2) F (Sulfide)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128843
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over a horizontal line.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: BURET
Client ID: MW02-082217	Prep Method: SM4500-S-(-2)-F-2000	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-S-(-2)-F-2000	Cal Date:
Workgroup #: WG626985	Analyst: EPT	Run Date: 08/23/2017 15:10
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: ET.1708231510-05
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sulfide	18496-25-8	7.54		1.00	0.500

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: BURET
Client ID: MW21-082217	Prep Method: SM4500-S-(-2)-F-2000	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-S-(-2)-F-2000	Cal Date:
Workgroup #: WG626985	Analyst: EPT	Run Date: 08/23/2017 15:10
Collect Date: 08/22/2017 12:35	Dilution: 1	File ID: ET.1708231510-06
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sulfide	18496-25-8	28.4		1.00	0.500

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: BURET
Client ID: MW35-082217	Prep Method: SM4500-S-(-2)-F-2000	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-S-(-2)-F-2000	Cal Date:
Workgroup #: WG626985	Analyst: EPT	Run Date: 08/23/2017 15:10
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: ET.1708231510-07
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sulfide	18496-25-8		U	1.00	0.500
U	Not detected at or above adjusted sample detection limit.				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: BURET
Client ID: MW36-082217	Prep Method: SM4500-S-(-2)-F-2000	Prep Date: N/A
Matrix: Water	Analytical Method: SM4500-S-(-2)-F-2000	Cal Date:
Workgroup #: WG626985	Analyst: EPT	Run Date: 08/23/2017 15:10
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: ET.1708231510-08
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Sulfide	18496-25-8		U	1.00	0.500
U	Not detected at or above adjusted sample detection limit.				

Certificate of Analysis

2.3.7.2 QC Summary Data

Example Total Sulfide(Liquid) Calculations

$$[\text{mL Iodine} * \text{N Iodide}] - (\text{mL titrant} * \text{N titrant}) * 16000 / (\text{volume} * \text{dilution}) = \text{mg/L Sulfide}$$

where:

mL Iodine = mL of Iodine used

N Iodine = normality of Iodine

mL titrant = mL of titrant used

N titrant = normality of titrant

16000 = factor: 1mL of 0.025 N iodine reacts with 0.4mg sulfide

volume = mL filtered of mL titrated(if not filtered)

dilution = dilution in decimal form ($1/5 = 0.2$)

Example Total Sulfide(Soil) Calculations

$$[(\text{mL Iodine} * \text{N Iodine}) - (\text{mL titrant} * \text{N titrant})] * 16.03 / \text{weight} = \text{mg/kg sulfide}$$

where:

mL Iodine = mL of Iodine used

N Iodine = normality of Iodine

mL titrant = normality of titrant

16.03 = 32.06 grams per 2 equivalents

weight = kg of sample used

Microbac Laboratories Inc.

Data Checklist

Date: 23-AUG-2017

Analyst: EPT

Analyst: NA

Method: SULFIDE

Instrument: BURET

Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG626985

Calibration/Linearity	08/23/17
Second Source Check	
ICV/CCV (std)	
ICB/CCB	
Blank	X
LCS/LCS Dup	X
MS/MSD	
Duplicate	
Upload Results	X
Client Forms	
QC Violation Sheet	
Case Narratives	
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	
Primary Reviewer	EPT
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
24-AUG-2017

Edham Tidd

Secondary Reviewer:
25-AUG-2017

Dennafsson

CHECKLIST1 - Modified 03/05/2008

Generated: AUG-25-2017 16:30:18



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: SM4500-S-(-2)-F-
Login Number: L17081212

AAB#: WG626985

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/23/2017	1.1	7		08/23/17	1.1	7	
MW21-082217	08	08/22/17					08/23/2017	1.1	7		08/23/17	1.1	7	
MW35-082217	11	08/22/17					08/23/2017	1	7		08/23/17	1	7	
MW36-082217	17	08/22/17					08/23/2017	1	7		08/23/17	1	7	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5455420
Report generated 08/30/2017 14:18



METHOD BLANK SUMMARY

Login Number: <u>L17081212</u>	Work Group: <u>WG626985</u>
Blank File ID: <u>ET.1708231510-01</u>	Blank Sample ID: <u>WG626985-01</u>
Prep Date: <u>08/23/17 15:10</u>	Instrument ID: <u>BURET</u>
Analyzed Date: <u>08/23/17 15:10</u>	Method: <u>SM4500-S-(-2)-F-</u>
Analyst: <u>EPT</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG626985-02	ET.1708231510-02	08/23/17 15:10	
LCS2	WG626985-03	ET.1708231510-03	08/23/17 15:10	
MW02-082217	L17081212-02	ET.1708231510-05	08/23/17 15:10	
MW21-082217	L17081212-08	ET.1708231510-06	08/23/17 15:10	
MW35-082217	L17081212-11	ET.1708231510-07	08/23/17 15:10	
MW36-082217	L17081212-17	ET.1708231510-08	08/23/17 15:10	

Report Name: BLANK_SUMMARY
 PDF File ID: 5455421
 Report generated 08/30/2017 14:18



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/23/17 15:10 Sample ID: WG626985-01
Instrument ID: BURET Run Date: 08/23/17 15:10 Prep Method: SM4500-S-(-2)-F
File ID: ET.1708231510-01 Analyst: EPT Method: SM4500-S-(-2)-F
Workgroup (AAB#): WG626985 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: BURET -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Sulfide	0.500	1.00	0.500	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5455422

30-AUG-2017 14:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Analyst: EPT Prep Method: SM4500-S-(-2)-F
Instrument ID: BURET Matrix: Water Method: SM4500-S-(-2)-F
Workgroup (AAB#): WG626985 Units: mg/L
QC Key: WATERLOO Lot #: STD83537
Sample ID: WG626985-02 LCS File ID: ET.1708231510-02 Run Date: 08/23/2017 15:10
Sample ID: WG626985-03 LCS2 File ID: ET.1708231510-03 Run Date: 08/23/2017 15:10

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Sulfide	19.2	20.0	104	19.2	20.0	104	0.00	85 - 115	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5455423
Report generated: 08/30/2017 14:18



2.3.7.3 Raw Data

WORKGROUP: WG626985

Titrant: T- 1977-11-05

Stock standardization (in duplicate) 5.0 mL stock

mL I	1) <u>10.0</u>	2) <u>10.0</u>
NI	1) <u>0.100</u>	2) <u>0.100</u>
mL 0.025 titrant	1) <u>24.0</u>	2) <u>24.0</u>
LCS daily dilution:	<u>$\frac{3(280)}{200}$</u>	= <u>4.2</u> mg/L

Microbac Laboratories Inc.
TITRAMETRIC REPORT

Workgroup (AAB#): WG626985
Product: EPA 376.1\9034
Analyte: Sulfide

Analyst: EPT
Run Date: 08/23/2017 15:10

SAMPLE NUMBER	Volume	Vol I	Nor I	Vol T	Nor T	Dil	Analytical	Reported	Units
WG626985-01	200.0	15	.025	15	.025	1	0	0	mg/L
WG626985-02	200.0	15	.025	5	.025	1	20.0	20.00	mg/L
WG626985-03	200.0	15	.025	5	.025	1	20.0	20.00	mg/L
L17081200-07	540.0	15	.025	15	.025	1	0	ND	mg/L
L17081212-02	520.0	15	.025	5.2	.025	1	7.54	7.538	mg/L
L17081212-08	550.0	40	.025	1	.025	1	28.4	28.36	mg/L
L17081212-11	510.0	15	.025	14.6	.025	1	0.314	ND	mg/L
L17081212-17	550.0	15	.025	15	.025	1	0	ND	mg/L

SULFIDE_REPORT - Modified 03/06/2008

Report generated 08/24/2017 15:08



2.3 General Chemistry Data

2.3.8 Total Dissolved Solids Data

2.3.8.1 Summary Data



Login Number: L17081212
Department: Conventionals
Analyst: April Greene

METHOD

Analysis EPA 160.1/SM2540 C(Total Dissolved Solids)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128844
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over the printed name.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: OVEN
Client ID: MW02-082217	Prep Method: 160.1/SM2540C	Prep Date: N/A
Matrix: Water	Analytical Method: SM2540-C-1997	Cal Date:
Workgroup #: WG626984	Analyst: ADG	Run Date: 08/23/2017 15:48
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: EN.1708231548-11
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		1780		20.0	10.0

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: OVEN
Client ID: MW21-082217	Prep Method: 160.1/SM2540C	Prep Date: N/A
Matrix: Water	Analytical Method: SM2540-C-1997	Cal Date:
Workgroup #: WG626984	Analyst: ADG	Run Date: 08/23/2017 15:48
Collect Date: 08/22/2017 12:35	Dilution: 1	File ID: EN.1708231548-12
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		1690		20.0	10.0

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: OVEN
Client ID: MW35-082217	Prep Method: 160.1/SM2540C	Prep Date: N/A
Matrix: Water	Analytical Method: SM2540-C-1997	Cal Date:
Workgroup #: WG626984	Analyst: ADG	Run Date: 08/23/2017 15:48
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: EN.1708231548-13
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		1280		20.0	10.0

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: OVEN
Client ID: MW36-082217	Prep Method: 160.1/SM2540C	Prep Date: N/A
Matrix: Water	Analytical Method: SM2540-C-1997	Cal Date:
Workgroup #: WG626984	Analyst: ADG	Run Date: 08/23/2017 15:48
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: EN.1708231548-14
Sample Tag:	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		1050		20.0	10.0

2.3.8.2 QC Summary Data

Example Total Dissolved Solids Calculations

$$[(WT2 - WT1) * 1000000]/\text{volume} = \text{mg/L}$$

where:

WT1 = weight (grams) of empty container.

WT2 = weight (grams) of dried sample and container.

1000000 = factor to get to mg/L.

volume = mL of sample used.

Microbac Laboratories Inc.

Data Checklist

Date: 23-AUG-2017

Analyst: ADG

Analyst: NA

Method: TDS

Instrument: OVEN

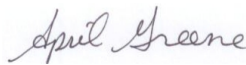
Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG626984

Calibration/Linearity	08/23/17
Second Source Check	
ICV/CCV (std)	
ICB/CCB	
Blank	X
LCS/LCS Dup	X
MS/MSD	
Duplicate	X
Upload Results	X
Client Forms	X
QC Violation Sheet	X
Case Narratives	X
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	ADG
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
25-AUG-2017



Secondary Reviewer:
25-AUG-2017



CHECKLIST1 - Modified 03/05/2008

Generated: AUG-25-2017 16:32:50



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: SM2540-C-1997
 Login Number: L17081212

AAB#: WG626984

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/23/2017	1.1	7		08/23/17	1.1	7	
MW21-082217	08	08/22/17					08/23/2017	1.1	7		08/23/17	1.1	7	
MW35-082217	11	08/22/17					08/23/2017	1	7		08/23/17	1	7	
MW36-082217	17	08/22/17					08/23/2017	1	7		08/23/17	1	7	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
 PDF File ID: 5449330
 Report generated 08/25/2017 13:01



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: EN.1708231548-01
 Prep Date: 08/23/17 15:48
 Analyzed Date: 08/23/17 15:48
 Analyst: ADG

Work Group: WG626984
 Blank Sample ID: WG626984-01
 Instrument ID: OVEN
 Method: SM2540-C-1997

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG626984-02	EN.1708231548-02	08/23/17 15:48	
LCS2	WG626984-03	EN.1708231548-03	08/23/17 15:48	
MW02-082217	L17081212-02	EN.1708231548-11	08/23/17 15:48	
MW21-082217	L17081212-08	EN.1708231548-12	08/23/17 15:48	
MW35-082217	L17081212-11	EN.1708231548-13	08/23/17 15:48	
MW36-082217	L17081212-17	EN.1708231548-14	08/23/17 15:48	
DUP	WG626984-05	EN.1708231548-17	08/23/17 15:48	
DUP	WG626984-07	EN.1708231548-18	08/23/17 15:48	

Report Name: BLANK_SUMMARY
 PDF File ID: 5449331
 Report generated 08/25/2017 13:01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/23/17 15:48 Sample ID: WG626984-01
Instrument ID: OVEN Run Date: 08/23/17 15:48 Prep Method: 160.1/SM2540C
File ID: EN.1708231548-01 Analyst: ADG Method: SM2540-C-1997
Workgroup (AAB#): WG626984 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	-8.00	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5449332

25-AUG-2017 13:01



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Analyst: ADG Prep Method: 160.1/SM2540C
Instrument ID: OVEN Matrix: Water Method: SM2540-C-1997
Workgroup (AAB#): WG626984 Units: mg/L
QC Key: WATERLOO Lot #: STD83110
Sample ID: WG626984-02 LCS File ID: EN.1708231548-02 Run Date: 08/23/2017 15:48
Sample ID: WG626984-03 LCS2 File ID: EN.1708231548-03 Run Date: 08/23/2017 15:48

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	472	94.4	500	448	89.6	5.22	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5449333
Report generated: 08/25/2017 13:01



2.3.8.3 Raw Data

61

WG 626 984

TOTAL DISSOLVED SOLIDS

(tds1)

Oven: TDS MICS1

☐ EPA 160.1 / SM2540C 14

LCS: 83110

Daily Dilution: 58500/150 = 390

Balance: AND GR-202 / Other

Matrix Spike:

Daily Dilution:

Filter Lot #:

9816842

		On Temp/Time:		104/1548	180/10048	180/1017	180/1007
SAMPLE	#	VOLUME (mL)	INITIAL WEIGHT WT1 (g)	DRY WEIGHT WT2A (g)	DRY WEIGHT WT2B (g)	DRY WEIGHT WT2C (g)	
BLANK	BLK E	100	88.7014	88.7004	88.7006		
LCS: mg/L	LCS1	50	70.5052	70.5295	70.5288		
LCSDUP: mg/L	LCS2	50	68.2404	68.2455	68.2673		
08 1173-01	1	50	58.7292	58.7777	58.7754		
08 1174-01	2	5 ml	105.6689	105.6917			
08 1176-01	3	10	70.5301	70.6273	70.6154		
08 1192-05	4	50	69.6076	70.2184	70.2059		
- 07	5	50	63.9708	64.1029	64.1084		
08 1200-07	6	50	72.8548	73.0223	73.0144		
08 1202-01	7	50	63.1530	63.1705	63.1684		
08 1205-01	8	50	64.3652	64.3818	64.3792		
08 1212-02	9	50	64.1262	64.2187	64.2146		
- 08	10	5	53.8528	53.9391	53.9366		
- 11	11	50	61.1956	61.2682	61.2593		
- 17	12	50	61.8745	61.9314	61.9265		
08 1224-01	13	50	56.3919	56.4578	56.4536		
- 03	14	50	62.4963	62.5583	62.5537		
08 1192-05	15	20	60.8615	61.0903	61.6837		
08 1192-05	16	10	72.5467	72.5467	72.6549	72.6505	
08 1192-05	17	5	65.5182	65.5692	65.5658		
	18		68.6930				
	19		59.0225				
	20		54.6911				
DUP: 1202-01	Dup1	50	106.5869	106.6060	106.6050		
DUP: 1205-01	Dup2	50	107.0125	107.0268	107.0261		
		Off Temp/Time:		104/1048	180/1083	180/1136	180/10709

ANALYST: April Greene

* Duplicate required on 10% of samples

DATE/TIME: (on) 8/23/17 1548

DATE/TIME: (off) 8/24/17

DATE/TIME: (off) 8/25/17

DATE/TIME: (off)

DCN#127829



Microbac Laboratories Inc.
GRAVIMETRIC REPORT

Workgroup (AAB#): WG626984

Analyst: ADG

Analyte: TOTAL DISSOLVED SOLIDS

Balance: BAL018

Method: 160.1/SM2540C

SOP: Revision

Spike Solution: STD83110

Daily Dilution: _____

SAMPLE ID	Instrument	OVER	INITIAL VOL	INITIAL WT	DRY WT A	DRY WT B	DRY WT C	Anal. Conc	Rep. Conc.	Units
WG626984-01	B		100	88.7014	88.7004	88.7006			-8.000	mg/L
WG626984-02	L		50	70.5052	70.5295	70.5288	70.5288	472.0	472.0	mg/L
WG626984-03	L2		50	68.2404	68.2655	68.2623	68.2628	448.0	448.0	mg/L
L17081173-01	1		50	58.7292	58.7777	58.7754	58.7759	934.0	934.0	mg/L
L17081176-01	3		10	70.5301	70.6273	70.6154	70.6158	8570	8570	mg/L
L17081192-05	4		50	69.6075	70.2184	70.2059	70.206	11970	11970	mg/L
L17081192-07	5		50	63.9708	64.1129	64.1084	64.1089	2762	2762	mg/L
L17081200-07	6		50	72.8545	73.0223	73.0368	73.037	3650	3650	mg/L
L17081202-01	7		50	63.153	63.1705	63.1684	63.1689	318.0	318.0	mg/L
WG626984-04	7		50	63.153	63.1705	63.1684	63.1689	318.0	318.0	mg/L
L17081205-01	8		50	64.3652	64.3818	64.3792	64.3797	290.0	290.0	mg/L
WG626984-06	8		50	64.3652	64.3818	64.3792	64.3797	290.0	290.0	mg/L
L17081212-02	9		50	64.1262	64.2187	64.2146	64.215	1776	1776	mg/L
L17081212-08	10		50	53.8528	53.9391	53.9366	53.9371	1686	1686	mg/L
L17081212-11	11		50	61.1956	61.2682	61.2593	61.2598	1284	1284	mg/L
L17081212-17	12		50	61.8745	61.9314	61.9265	61.927	1050	1050	mg/L
L17081224-01	13		50	56.3919	56.4578	56.4536	56.454	1242	1242	mg/L
L17081224-03	14		50	62.4963	62.5583	62.5534	62.5539	1152	1152	mg/L
WG626984-05	D		50	66.5869	66.606	66.605	66.6053	368.0	368.0	mg/L
WG626984-07	D2		50	67.0125	67.0288	67.0261	67.0265	280.0	280.0	mg/L
L17081192-05	15		20	60.8615	61.0903	61.0837	61.0842	11140	11140	mg/L
L17081192-05	16		10	72.5467	72.6549	72.6505	72.6509	10420	10420	mg/L
L17081192-05	17		5	65.5182	65.5692	65.5658	65.5662	9600	9600	mg/L

Analyst: April Greene

*Duplicate required on 10% of samples

Date/Time (on) : 08/23/2017 15:48

Date/Time (off) : 08/24/2017 10:09

Date/Time (off) : 08/24/2017 15:46

Date/Time (off) : 08/25/2017 12:15

CONT_GRAV_REPORT - Modified 02/18/2011

PDF ID: 5447990

Report generated: 08/25/2017 12:17

**Microbac Laboratories Inc.
GRAVIMETRIC REPORT**

Workgroup (AAB#): **WG626984**

Method: **160.1/SM2540C**

Analyst: **ADG**

SOP: **Revision**

Analyte: **TOTAL DISSOLVED SOLIDS**

Spike Solution: **STD83110**

Balance: **BAL018**

Daily Dilution:

SAMPLE INSTRUMENT#	OVEN	INITIAL VOL	INITIAL WT	DRY WT A	DRY WT B	DRY WT C	Anal. Conc	Rep. Conc.	Units
WG626984-01	B	100	88.7014	88.7004	88.7006			-8.000	mg/L
WG626984-02	L	50	70.5052	70.5295	70.5288	70.5288	472.0	472.0	mg/L
WG626984-03	L2	50	68.2404	68.2655	68.2623	68.2628	448.0	448.0	mg/L
L17081173-01	1	50	58.7292	58.7777	58.7754	58.7759	934.0	934.0	mg/L
L17081176-01	3	10	70.5301	70.6273	70.6154	70.6158	8570	8570	mg/L
L17081192-05	4	50	69.6075	70.2184	70.2059	70.206	11970	11970	mg/L
L17081192-07	5	50	63.9708	64.1129	64.1084	64.1089	2762	2762	mg/L
L17081200-07	6	50	72.8545	73.0223	73.0368	73.037	3650	3650	mg/L
L17081202-01	7	50	63.153	63.1705	63.1684	63.1689	318.0	318.0	mg/L
WG626984-04	7	50	63.153	63.1705	63.1684	63.1689	318.0	318.0	mg/L
L17081205-01	8	50	64.3652	64.3818	64.3792	64.3797	290.0	290.0	mg/L
WG626984-06	8	50	64.3652	64.3818	64.3792	64.3797	290.0	290.0	mg/L
L17081212-02	9	50	64.1262	64.2187	64.2146	64.215	1776	1776	mg/L
L17081212-08	10	50	53.8528	53.9391	53.9366	53.9371	1686	1686	mg/L
L17081212-11	11	50	61.1956	61.2682	61.2593	61.2598	1284	1284	mg/L
L17081212-17	12	50	61.8745	61.9314	61.9265	61.927	1050	1050	mg/L
L17081224-01	13	50	56.3919	56.4578	56.4536	56.454	1242	1242	mg/L
L17081224-03	14	50	62.4963	62.5583	62.5534	62.5539	1152	1152	mg/L
WG626984-05	D	50	66.5869	66.606	66.605	66.6053	368.0	368.0	mg/L
WG626984-07	D2	50	67.0125	67.0288	67.0261	67.0265	280.0	280.0	mg/L
L17081192-05	15	20	60.8615	61.0903	61.0837	61.0842	11140	11140	mg/L
L17081192-05	16	10	72.5467	72.6549	72.6505	72.6509	10420	10420	mg/L
L17081192-05	17	5	65.5182	65.5692	65.5658	65.5662	9600	9600	mg/L

Analyst: April Greene

Date/Time (on) : **08/23/2017 15:48**

Date/Time (off) : **08/24/2017 10:09**

Date/Time (off) : **08/24/2017 15:46**

Date/Time (off) : **08/25/2017 12:15**

*Duplicate required on 10% of samples

CONT_GRAV_REPORT - Modified 02/18/2011

PDF ID: 5447987

Report generated: 08/25/2017 12:17



2.3 General Chemistry Data

2.3.9 TKN Data

2.3.9.1 Summary Data



Login Number: L17081212
Department: Conventionals
Analyst: Todd Boyle

METHOD

Analysis EPA 351.2(TKN)

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128840
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over a horizontal line.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW02-082217	Prep Method: 351.2	Prep Date: N/A
Matrix: Water	Analytical Method: 351.2	Cal Date: 08/25/2017 10:53
Workgroup #: WG627196	Analyst: TB	Run Date: 08/25/2017 11:00
Collect Date: 08/22/2017 12:23	Dilution: 1	File ID: SC170825001.015
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Total Kjeldahl	7727-37-9	2.41		0.200	0.100

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW21-082217	Prep Method: 351.2	Prep Date: N/A
Matrix: Water	Analytical Method: 351.2	Cal Date: 08/25/2017 10:53
Workgroup #: WG627196	Analyst: TB	Run Date: 08/25/2017 11:23
Collect Date: 08/22/2017 12:35	Dilution: 10	File ID: SC170825001.026
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Total Kjeldahl	7727-37-9	34.1		2.00	1.00

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW35-082217	Prep Method: 351.2	Prep Date: N/A
Matrix: Water	Analytical Method: 351.2	Cal Date: 08/25/2017 10:53
Workgroup #: WG627196	Analyst: TB	Run Date: 08/25/2017 11:02
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: SC170825001.017
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Total Kjeldahl	7727-37-9	0.198	J	0.200	0.100
J	The analyte was positively identified, but the quantitation was below the RL.				

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: SMARTCHEM
Client ID: MW36-082217	Prep Method: 351.2	Prep Date: N/A
Matrix: Water	Analytical Method: 351.2	Cal Date: 08/25/2017 10:53
Workgroup #: WG627196	Analyst: TB	Run Date: 08/25/2017 11:04
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: SC170825001.018
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Nitrogen, Total Kjeldahl	7727-37-9	0.434		0.200	0.100

2.3.9.2 QC Summary Data

Example TKN Calculations

$$(\text{absorbance} - \text{intercept}) / (\text{slope} * \text{dilution}) = \text{mg/L}$$

where:

absorbance = reading from the spectrophotometer

intercept = calculated from calibration standard absorbencies

slope = calculated from calibration standard absorbencies

dilution = dilution of the distillate in decimal form (ex. 1/5 dilution = 0.2)

Microbac Laboratories Inc.

Data Checklist

Date: 25-AUG-2017

Analyst: TB

Analyst: NA

Method: TKN

Instrument: SC

Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG627196

Calibration/Linearity	08/25/2017
Second Source Check	X
ICV/CCV (std)	X
ICB/CCB	X
Blank	X
LCS/LCS Dup	X
MS/MSD	X
Duplicate	X
Upload Results	X
Client Forms	X
QC Violation Sheet	X
Case Narratives	X
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	TB
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
25-AUG-2017

Todd Boyle

Secondary Reviewer:
28-AUG-2017

Dennar/Johnson

CHECKLIST1 - Modified 03/05/2008

Generated: AUG-28-2017 08:59:14



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 351.2
Login Number: L17081212

AAB#: WG627196

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/25/2017	2.9	28		08/25/17	2.9	28	
MW21-082217	08	08/22/17					08/25/2017	3	28		08/25/17	3	28	
MW35-082217	11	08/22/17					08/25/2017	2.8	28		08/25/17	2.8	28	
MW36-082217	17	08/22/17					08/25/2017	2.8	28		08/25/17	2.8	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5450284
Report generated 08/28/2017 08:56



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: SC170825001.011
 Prep Date: 08/25/17 10:57
 Analyzed Date: 08/25/17 10:57
 Analyst: TB

Work Group: WG627196
 Blank Sample ID: WG627196-01
 Instrument ID: SMARTCHEM
 Method: 351.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627196-02	SC170825001.012	08/25/17 10:58	01
MW02-082217	L17081212-02	SC170825001.015	08/25/17 11:00	01
MW35-082217	L17081212-11	SC170825001.017	08/25/17 11:02	01
MW36-082217	L17081212-17	SC170825001.018	08/25/17 11:04	01
DUP	WG627196-04	SC170825001.022	08/25/17 11:07	01
MW21-082217	L17081212-08	SC170825001.026	08/25/17 11:23	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 5450285
 Report generated 08/28/2017 08:56



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/25/17 10:57 Sample ID: WG627196-01
Instrument ID: SMARTCHEM Run Date: 08/25/17 10:57 Prep Method: 351.2
File ID: SC170825001.011 Analyst: TB Method: 351.2
Workgroup (AAB#): WG627196 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 25-AUG-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Total Kjeldahl	0.100	0.200	0.100	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5450286

28-AUG-2017 08:56



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Run Date: 08/25/2017 Sample ID: WG627196-02
Instrument ID: SMARTCHEM Run Time: 10:58 Prep Method: 351.2
File ID: SC170825001.012 Analyst: TB Method: 351.2
Workgroup (AAB#): WG627196 Matrix: Water Units: mg/L
QC Key: WATERLOO Lot#: STD83447 Cal ID: SMARTC - 25-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Total Kjeldahl	1.00	1.02	102	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5450287
Report generated: 08/28/2017 08:56



2.3.9.3 Raw Data

SMARTCHEM RUN LOG

(smartchem2, smartchem3)

Daily Check

- ☒ Lamp On
☒ Probe Rinse Full
☒ DI Water > 1/2 Full
☒ Wash Solution > 1/2 Full
☐ NO3 Reagent bottle connected / purged
☐ NO3 pH adj to pH 5-9
 Syringe filter lot # _____
 pH paper Lot #: _____
- ☒ WBL Run
☒ Reagents Full
☒ Dilution H₂O Full
☒ Waste Container Check

1) Workgroup _____

Plan # _____

2) Workgroup _____

Plan # _____

3) Workgroup _____

Plan # _____

Instrument: SC1 ☒ SC2 ☐

Analyte		1	2	3
		TKN		
Dilution				
SC Prepared Curve				
Position				
1-1	ICW			
1-2	BLK			
1-3	LCS			
1-4	8-1191-02	1/50		
1-5	05	1/50		
1-6	1212-02			
1-7	08	1/5		
1-8	11			
1-9	17			
1-10	Ref 941-01			
1-11	DUP ↓			
1-12	MS			
1-13				
1-14				
1-15				
1-16				
1-17				
1-18				
1-19				
1-20				
1-21				
1-22				
2-1				
2-2				
2-3				

Analyte		1	2	3
Position				
2-4				
2-5				
2-6				
2-7				
2-8				
2-9				
2-10				
2-11				
2-12				
2-13				
2-14				
2-15				
2-16				
2-17				
2-18				
2-19				
2-20				
2-21				
2-22				
2-23				
2-24				
2-25				
2-26				
3-1				
3-2				

NOTES:

- * Run NO2 std on NO3 runs
- * LCSD must be run if no MS or Duplicate
- * MS(10% sample): NO3, TKN, NH3, PHOS

DCN#127880



SMARTCHEM RUN LOG

(smartchem2, smartchem3)

Analyte	1	2	3
Position			
3-3			
3-4			
3-5			
3-6			
3-7			
3-8			
3-9			
3-10			
3-11			
3-12			
3-13			
3-14			
3-15			

Analyte	1	2	3
Position			
3-16			
3-17			
3-18			
3-19			
3-20			
3-21			
3-22			
3-23			
3-24			
3-25			
3-26			
3-27			
3-28			

Chloride	EPA 325.2/SM 4500-Cl E-2000
Nitrate-Nitrite	EPA 353.2/SM 4500-NO3 F-2000
Alkalinity	EPA 310.2
Sulfate	EPA 375.4/SM 426C (15 th)/ SM4500-504 E-1997

Ammonia	EPA 350.1/SM 4500-NH3 B-1997
TKN	EPA 351.2
Phos	EPA 365.4

Analyte	TKN	Reagents
SOP & Revision	K 3512 R20	
Curve Stock (SC made)		41091
NO2 STD	See	41081
ICV		410620
CCV	Prep	
LCS		
MS	Log	
	Dilution	

Comments: _____

Analyst: Tom BoughDate: 8/25/17

DCN#127880



TKN/Phosphorus Digestion Log

TKN WG: _____
 TKN Std: 83448
 TKN CCV: 1/2 (83448)
 TKN ICV: 83446
 TKN LCS: 83447

Phos WG: _____
 Phos Std: 83448
 Phos CCV: 1/2 (83448)
 Phos ICV: 83437
 Phos LCS: 83438

MS/MSD: 82628

Daily Dilution: 1ml/25

Block Digester Temperature: 380 °C

Digest Reagent: 40718

	Sample	Volume	TKN Dilution	Phos Dilution		Sample	Volume	TKN Dilution	Phos Dilution
1	SW T/P				26				
2	SW T/P				27				
3	ICV T				28				
4	LCS T				29				
5	ICV P				30				
6	LCS P				31				
7	8-1191-02	1/50	-		32				
8	05	1/50	-		33				
9	1212-02		-	+	34				
* 10	08	5ml/25	-	+	35				
11	11		-	+	36				
12	17		-	+	37				
* 13	1200-07	2.5ml/25		+	38				
14	1215-02	1/25		+	39				
15	03	1/250		+	40				
16	Ref 941-01		-	+	41				
17	DMP ↓		-	+	42				
18	MS ↓		-	+	43				
19					44				
20					45				
21					46				
22					47				
23					48				
24					49				
25					50				

* Diluted for Matrix Interference
 • 1212-08 colored / reacted with Digest Acid
 • 1200-07 violently reacts with Acid
 Analyst: [Signature]

Date: 8/24/17

MICROBAC (OVD)
 SMARTCHEM200 INST1 (VER3.1.14)
 NH3, TKN, NO3NO2 (MG/L N)
 ALK (MG/L CaCO3) CL, SO4 (MG/L)

Method : WTKN -Unit [mg/L] - EPA 351.2 TKN

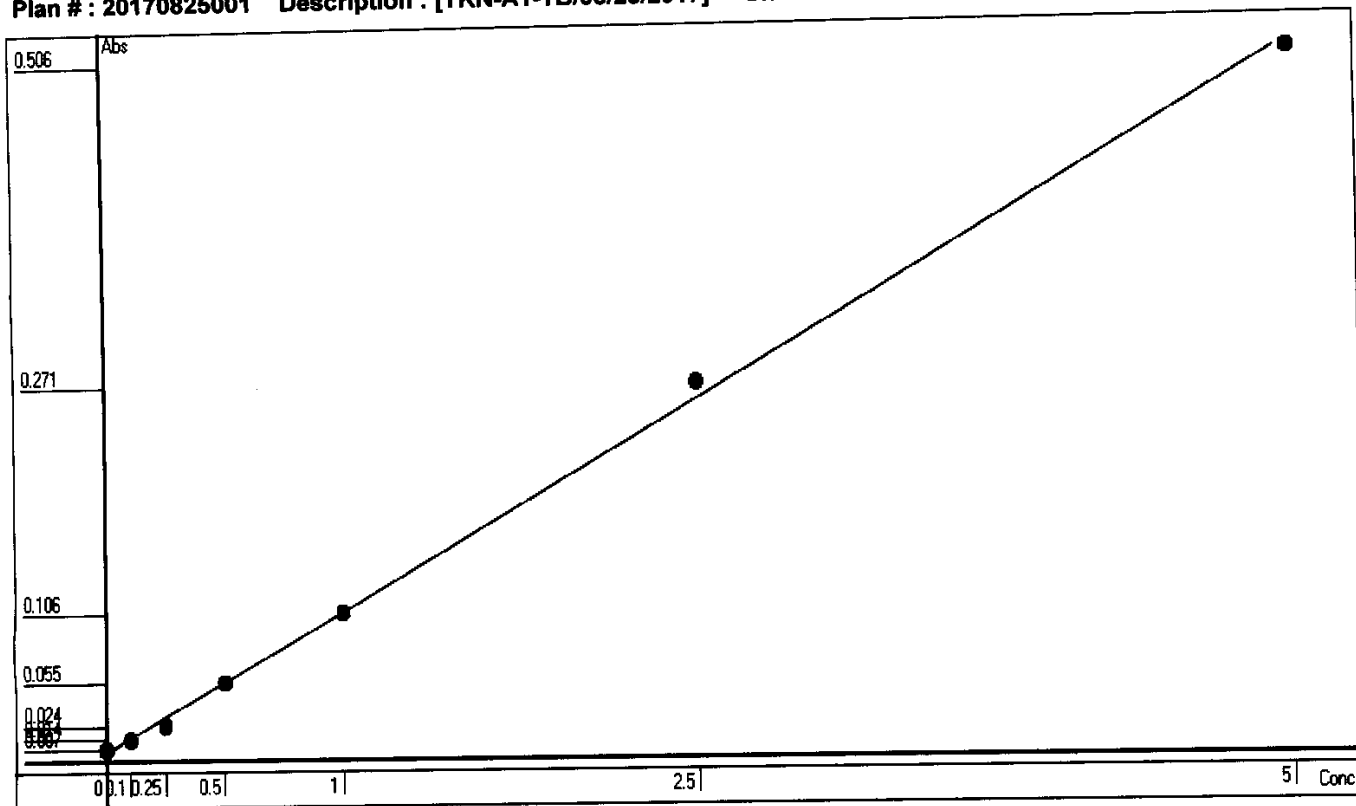
Smp#[/Dil Fact]	Sample ID	Conc	OD	%Recovery/RPD	Flag	Analysis Time
DIL-1	RBL	0.000	0.2131	0.00		10:46:08 AM
DIL-1	RBL	0.000	0.2160	0.00		10:46:26 AM
DIL-1	RBL	0.000	0.2126	0.00		10:47:56 AM
DIL-1	Std-1	0.000	0.0069	0.00		10:48:14 AM
SR5-1	Std-2	0.100	0.0143	0.00	EPL	10:49:44 AM
SR5-2	Std-3	0.250	0.0241	0.00		10:50:02 AM
SR5-3	Std-4	0.500	0.0550	0.00	EPL	10:51:33 AM
SR5-4	Std-5	1.000	0.1062	0.00	EPL	10:51:50 AM
SR5-5	Std-6	2.500	0.2707	0.00		10:53:20 AM
ST-1	Std-7	5.000	0.5062	0.00	EPL	10:53:38 AM
ST-3	1CCV (2.5 mg/L)	2.517	0.2603	100.66		10:55:08 AM
ST-2	2CCB (0 mg/L)	-0.073	-0.0025	0.00	INV,><,LL	10:55:26 AM
1	ICV	2.047	0.2127	0.00		10:56:56 AM
2	WG627196-01 BLK	-0.059	-0.0011	0.00	INV,EPL,><	10:57:14 AM
3	WG627196-02 LCS	1.024	0.1089	0.00		10:58:44 AM
4	L17081191-02 (50)	2.460	0.2546	0.00		10:59:02 AM
5	L17081191-05 (50)	2.618	0.2706	0.00	EPL	11:00:32 AM
6	L17081212-02	2.406	0.2491	0.00	EPL	11:00:50 AM
7	L17081212-08 (5)	X 6.831	0.6980	0.00	><,LH	11:02:20 AM
8	L17081212-11	0.198	0.0251	0.00		11:02:38 AM
9	L17081212-17	0.434	0.0489	0.00		11:04:08 AM
10	WG627196-03	0.884	0.0947	0.00		11:04:26 AM
ST-3	1CCV (2.5 mg/L)	2.565	0.2652	102.59		11:05:56 AM
ST-2	2CCB (0 mg/L)	-0.089	-0.0041	0.00	INV,><,LL	11:06:14 AM
11	WG627196-04 DUP	0.769	0.0830	0.00		11:07:44 AM
12	WG627196-05 MS	1.958	0.2036	0.00		11:08:02 AM
ST-3	1CCV (2.5 mg/L)	2.550	0.2637	102.00		11:09:32 AM
ST-2	2CCB (0 mg/L)	-0.104	-0.0055	0.00	INV,><,LL	11:09:50 AM
7-[1/2]	L17081212-08 (5)	6.825	0.3512	0.00	LH	11:23:02 AM
ST-3	1CCV (2.5 mg/L)	2.630	0.2718	105.19		11:23:02 AM
ST-2	2CCB (0 mg/L)	-0.055	-0.0007	0.00	INV,><,LL	11:24:32 AM

Report Date :08/25/2017 Run Date :8/25/2017 Operator : SMARTCHEM1 Plan # :20170825001
 Plan Description : TKN-A1-TB/08/25/2017

Calibrant Report - WTKN -

Calib Lot #:010104 Exp Date:6/18/2020 User:MICROBAC

Plan # : 20170825001 Description : [TKN-A1-TB/08/25/2017] Unit



Point	OD	Conc	Recalc Conc	% Error
1	0.0069	0	0.0191	1.91
2	0.0143	0.1	0.0921	-7.90
3	0.0240	0.25	0.1877	-24.92
4	0.0550	0.5	0.4933	-1.34
5	0.1062	1	0.9980	-0.20
6	0.2706	2.5	2.6185	4.74
7	0.5062	5	4.9410	-1.18

Conc= +9.8575*Abso -0.0489 R²=0.9989

RBL
0.2129
0

Report Date 8/25/2017 Run Date 8/25/2017

2.3 General Chemistry Data

2.3.10 Total Organic Carbon Data

2.3.10.1 Summary Data



Login Number: L17081212
Department: Conventionals
Analyst: Ethan Tidd

METHOD

Analysis Water: EPA 415.1/SM5310C/SW846 9060 (Total Organic Carbon)
Soil: Lloyd-Khan Methodology

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 128842
Approved By: Deanna Hesson

A handwritten signature in black ink, appearing to read "Deanna Hesson", is written over a horizontal line.

Certificate of Analysis

Sample #: L17081212-02	PrePrep Method: N/A	Instrument: TOC-VWP
Client ID: MW02-082217	Prep Method: SM5310-C-2011	Prep Date: N/A
Matrix: Water	Analytical Method: SM5310-C-2011	Cal Date: 02/10/2017 10:25
Workgroup #: WG627108	Analyst: EPT	Run Date: 08/24/2017 16:26
Collect Date: 08/22/2017 12:23	Dilution: 5	File ID: TC08242017.009
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	13.8		5.00	2.50

Sample #: L17081212-08	PrePrep Method: N/A	Instrument: TOC-VWP
Client ID: MW21-082217	Prep Method: SM5310-C-2011	Prep Date: N/A
Matrix: Water	Analytical Method: SM5310-C-2011	Cal Date: 02/10/2017 10:25
Workgroup #: WG627108	Analyst: EPT	Run Date: 08/24/2017 16:48
Collect Date: 08/22/2017 12:35	Dilution: 100	File ID: TC08242017.010
Sample Tag: DL01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	653		100	50.0

Sample #: L17081212-11	PrePrep Method: N/A	Instrument: TOC-VWP
Client ID: MW35-082217	Prep Method: SM5310-C-2011	Prep Date: N/A
Matrix: Water	Analytical Method: SM5310-C-2011	Cal Date: 02/10/2017 10:25
Workgroup #: WG627108	Analyst: EPT	Run Date: 08/24/2017 17:12
Collect Date: 08/22/2017 15:28	Dilution: 1	File ID: TC08242017.011
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	4.03		1.00	0.500

Sample #: L17081212-17	PrePrep Method: N/A	Instrument: TOC-VWP
Client ID: MW36-082217	Prep Method: SM5310-C-2011	Prep Date: N/A
Matrix: Water	Analytical Method: SM5310-C-2011	Cal Date: 02/10/2017 10:25
Workgroup #: WG627108	Analyst: EPT	Run Date: 08/24/2017 17:36
Collect Date: 08/22/2017 15:50	Dilution: 1	File ID: TC08242017.012
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	4.47		1.00	0.500

2.3.10.2 QC Summary Data

**Total Organic Carbon Example Calculations
(Direct Readout Parameter)**

$$(\text{Readout})/(\text{dilution}) = \text{mg/L}$$

where:

Readout = direct readout from the instrument

dilution = dilution in decimal form (ex. 1/5 dilution = 0.2)

Microbac Laboratories Inc.

Data Checklist

Date: 24-AUG-2017

Analyst: EPT

Analyst: NA

Method: TOC

Instrument: TOC-VWP

Curve Workgroup: NA

Runlog ID: _____

Analytical Workgroups: WG627108

Calibration/Linearity	02/10/17
Second Source Check	
ICV/CCV (std)	X
ICB/CCB	X
Blank	X
LCS/LCS Dup	X
MS/MSD	X
Duplicate	X
Upload Results	X
Client Forms	
QC Violation Sheet	
Case Narratives	
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	
Primary Reviewer	EPT
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
28-AUG-2017

Edham Tidd

Secondary Reviewer:
28-AUG-2017

Drenna Hesson



Microbac Laboratories Inc.
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: SM5310-C-2011
Login Number: L17081212

AAB#: WG627108

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
MW02-082217	02	08/22/17					08/24/2017	2.2	28		08/24/17	2.2	28	
MW21-082217	08	08/22/17					08/24/2017	2.2	28		08/24/17	2.2	28	
MW35-082217	11	08/22/17					08/24/2017	2.1	28		08/24/17	2.1	28	
MW36-082217	17	08/22/17					08/24/2017	2.1	28		08/24/17	2.1	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5451630
Report generated 08/28/2017 14:40



METHOD BLANK SUMMARY

Login Number: L17081212
 Blank File ID: TC08242017.004
 Prep Date: 08/24/17 15:01
 Analyzed Date: 08/24/17 15:01
 Analyst: EPT

Work Group: WG627108
 Blank Sample ID: WG627108-01
 Instrument ID: TOC-VWP
 Method: SM5310-C-2011

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG627108-02	TC08242017.005	08/24/17 15:25	01
LCS2	WG627108-03	TC08242017.006	08/24/17 15:37	01
MW02-082217	L17081212-02	TC08242017.009	08/24/17 16:26	DL01
MW21-082217	L17081212-08	TC08242017.010	08/24/17 16:48	DL01
MW35-082217	L17081212-11	TC08242017.011	08/24/17 17:12	01
MW36-082217	L17081212-17	TC08242017.012	08/24/17 17:36	01
DUP	WG627108-05	TC08242017.017	08/24/17 19:08	01

Report Name: BLANK_SUMMARY
 PDF File ID: 5451631
 Report generated 08/28/2017 14:40



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17081212 Prep Date: 08/24/17 15:01 Sample ID: WG627108-01
Instrument ID: TOC-VWP Run Date: 08/24/17 15:01 Prep Method: SM5310-C-2011
File ID: TC08242017.004 Analyst: EPT Method: SM5310-C-2011
Workgroup (AAB#): WG627108 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: TOC-VW - 10-FEB-17

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Organic Carbon	0.500	1.00	0.500	1	U

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 5451632

28-AUG-2017 14:40



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17081212 Analyst: EPT Prep Method: SM5310-C-2011
 Instrument ID: TOC-VWP Matrix: Water Method: SM5310-C-2011
 Workgroup (AAB#): WG627108 Units: mg/L
 QC Key: WATERLOO Lot #: STD80787
 Sample ID: WG627108-02 LCS File ID: TC08242017.005 Run Date: 08/24/2017 15:25
 Sample ID: WG627108-03 LCS2 File ID: TC08242017.006 Run Date: 08/24/2017 15:37

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	27.7	111	25.0	27.2	109	1.71	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 5451633
 Report generated: 08/28/2017 14:40



2.3.10.3 Raw Data

Curve

~~WG 602411~~
~~WG 602476~~ *duh/1/13/17*
 WG 602481

Total Organic Carbon

MAKE DAILY

CCV (TOC): (5/200)(1000) = 25mg/LLCS (TOC): (5/200)(1000) = 25mg/LCCV (TIC): (5/200)(1000) = 25mg/L

MS (TOC): _____

Calibration Curve Date: _____

Reagent: RET 35944
RET 37673
☒ SM5310-C : Matrix 2 WG _____
☐ EPA 415.1/9060A(mod): Matrix 1 WG _____
 WG _____
SOP: K 4151 Rev. 18 *duh/1/13/17*
Instrument: Shimadza TOC-VWP/ASI
☒ drain reservoir filled
☒ ASI water bottle full
☒ dilution water bottle full

☒ DAILY CHECK
☒ 3rd bottle full
☒ sufficient gas
☒ sufficient persulfate

☒ sufficient acid
☒ waste container

Position	Sample ID	Dilution
1	TC Curve	
2	TC ICV	
3	TIC Curve	
4	TIC ICV	
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19	<i>all points analyzed in duplicate</i>	
20		
21		
22		
23		
24		
25		

Position	Sample ID	Dilution
26	TC Curve	
27	Std 79318	
28		
29	TIC Curve	
30	Std 80415	
31		
32		
33	TOC (TC)	
34	ICV	
35	Std 77870	
36		
37	TIC ICV	
38	Std 80416	
39		
40		
41		
42		
43		
44	<i>all points analyzed in duplicate</i>	
45		
46		
47		
48		
49		
50		

Position	Sample ID	Dilution
51		
52	<i>See SOP for point preparation</i>	
53		
54		
55		
56		
57		
58		
59		
60	<i>5/200 (1000) = 25</i>	
61		
62		
63		
64		
65		
66		
67		
68		
69	<i>all points analyzed in duplicate</i>	
70		
71		
72		
73		
74		
75		

Analyst: David MerckliDate/Time: 2/10/17

DCN#123915



	Analysis	Sample Name	Result	Status	Date / Time	Vial
1	TC	TCCURVE		Complete	2/10/2017 10:29:51 A	0, 1, 2, 3, 4, 5
2	TC	TOC ICV	TC:23.90mg/L	Complete	2/10/2017 10:47:48 A	6
3	IC	TICCURVE		Complete	2/10/2017 3:55:41 PM	0, 1, 2, 3, 4, 5
4	IC	TIC CURVE	IC:24.27mg/L	Complete	2/10/2017 4:12:07 PM	6
5	TC		TC:0.000mg/L	Complete	2/10/2017 4:31:41 PM	7
6	IC	TOC/TIC	IC:8.571mg/L	Complete	2/10/2017 4:42:05 PM	7
7	TC	TOC/TIC	TC:32.10mg/L	Complete	2/10/2017 5:01:02 PM	7

2/13/2017 7:01:58 AM

1/1

Instr. Information

System
DetectorTOCVW ASI
Wet Chemical

Cal. Curve

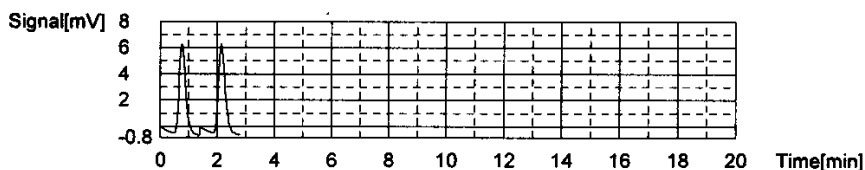
Sample Name: TCCURVE
 Sample ID: Untitled
 Cal. Curve: TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
 Status: Completed

Type	Anal.
Standard	TC

Conc: 0.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	10.83	500uL	1	*****		2/10/2017 9:36:31 AM
2	10.82	500uL	1	*****		2/10/2017 9:40:05 AM

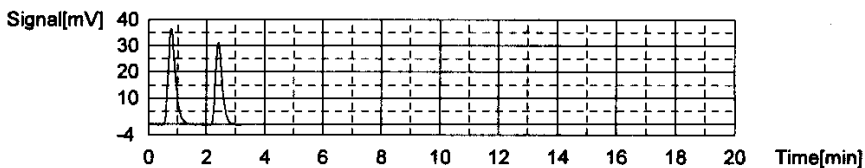
Acid Add. 0.000%
 Mean Area 10.82



Conc: 1.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	64.31	500uL	1	*****		2/10/2017 9:45:28 AM
2	51.52	500uL	1	*****		2/10/2017 9:49:19 AM

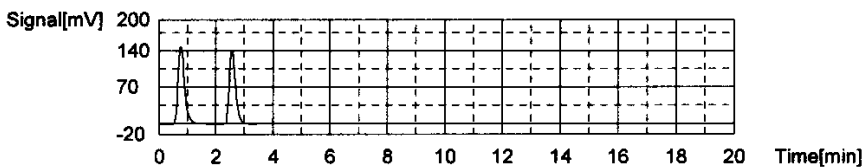
Acid Add. 0.000%
 Mean Area 57.92



Conc: 5.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	238.4	500uL	1	*****		2/10/2017 9:55:04 AM
2	216.3	500uL	1	*****		2/10/2017 9:58:58 AM

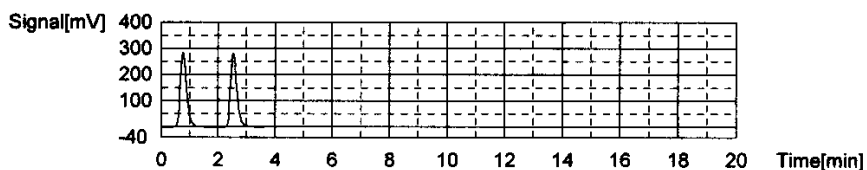
Acid Add. 0.000%
 Mean Area 227.4



Conc: 10.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	442.5	500uL	1	*****		2/10/2017 10:04:41 AM
2	437.9	500uL	1	*****		2/10/2017 10:08:48 AM

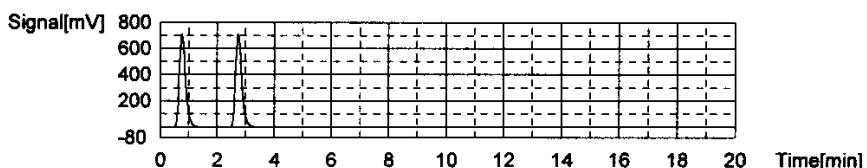
Acid Add. 0.000%
Mean Area 440.2



Conc: 25.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	1091	500uL	1	*****		2/10/2017 10:14:47 AM
2	1092	500uL	1	*****		2/10/2017 10:19:05 AM

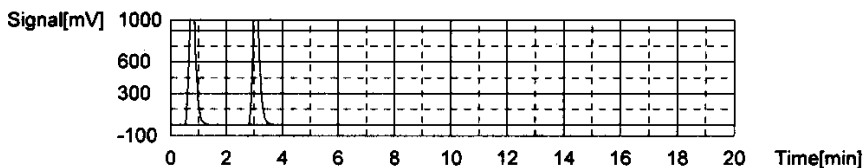
Acid Add. 0.000%
Mean Area 1092



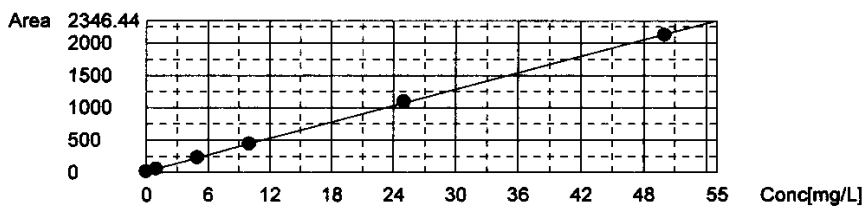
Conc: 50.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	2132	500uL	1	*H*****		2/10/2017 10:25:19 AM
2	2118	500uL	1	*H*****		2/10/2017 10:29:51 AM

Acid Add. 0.000%
Mean Area 2125



Slope: 42.33
Intercept 16.87
 r^2 0.999887
Zero Shift No



Sample

Sample Name: TOC ICV
Sample ID: Untitled
Origin: TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status: Completed
Chk. Result:

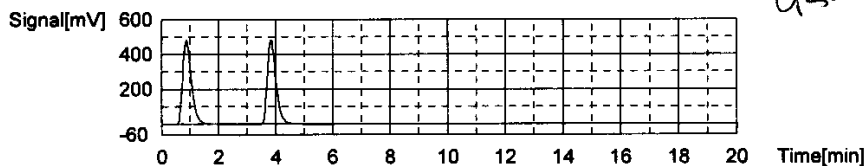
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:23.90mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1029	23.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_52	2/10/2017 10:42:11 AM
2	1028	23.89mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_52	2/10/2017 10:47:48 AM

Mean Area 1029
Mean Conc. 23.90mg/L



95.6%

Cal. Curve

Sample Name:
Sample ID:
Cal. Curve:
Status

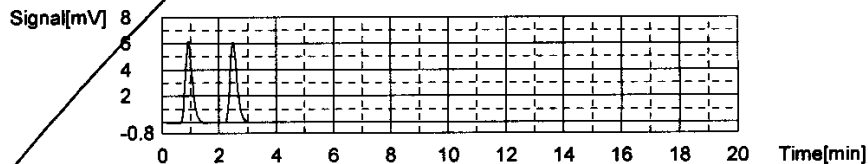
TICCURVE
Untitled
TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Completed

Type	Anal.
Standard	TC

Conc: 0.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	10.59	500uL	1	*****		2/10/2017 2:49:09 PM
2	10.43	500uL	1	*****		2/10/2017 2:53:06 PM

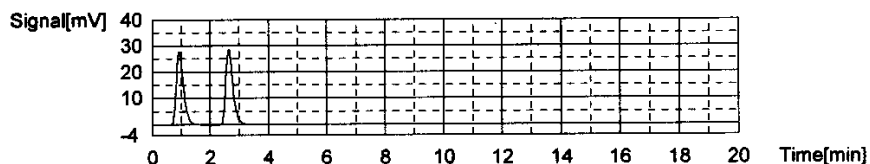
Acid Add. 3.000%
Mean Area 10.51



Conc: 1.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	48.13	500uL	1	*****		2/10/2017 3:00:24 PM
2	49.13	500uL	1	*****		2/10/2017 3:04:41 PM

Acid Add. 3.000%
Mean Area 48.63

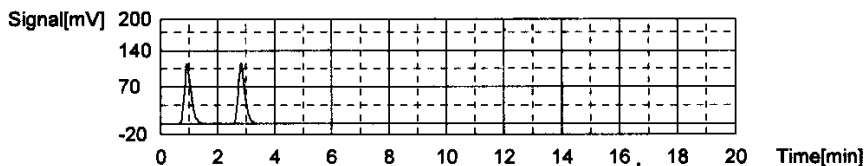


Conc: 5.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	189.0	500uL	1	*****		2/10/2017 3:12:24 PM
2	190.1	500uL	1	*****		2/10/2017 3:16:55 PM

dcu
3/23/17

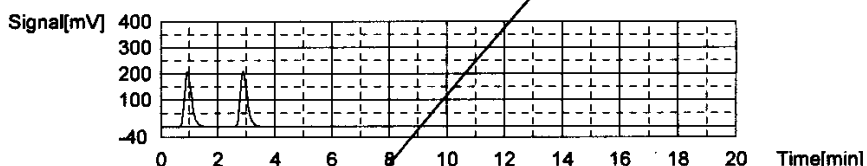
Acid Add. 3.000%
Mean Area 189.6



Conc: 10.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	360.6	500uL	1	*****		2/10/2017 3:24:47 PM
2	362.2	500uL	1	*****		2/10/2017 3:29:24 PM

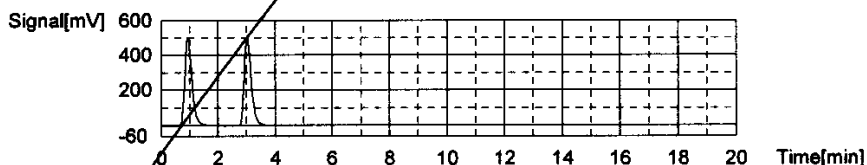
Acid Add. 3.000%
Mean Area 361.4



Conc: 25.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	859.3	500uL	1	*****		2/10/2017 3:37:23 PM
2	856.9	500uL	1	*****		2/10/2017 3:42:16 PM

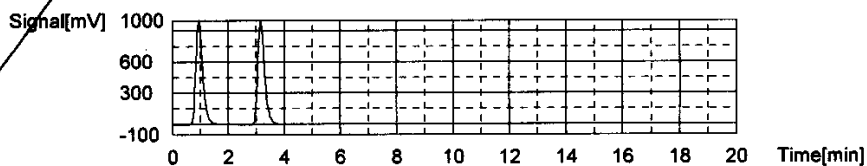
Acid Add. 3.000%
Mean Area 858.1



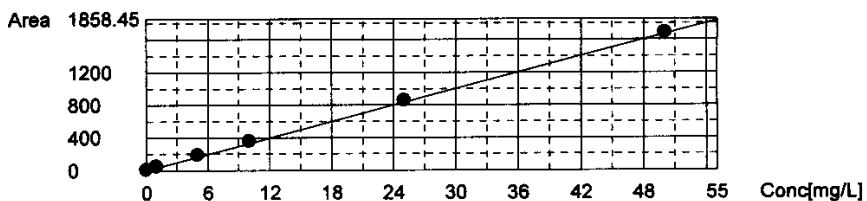
Conc: 50.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	1690	500uL	1	*****		2/10/2017 3:50:31 PM
2	1689	500uL	1	*****		2/10/2017 3:55:41 PM

Acid Add. 3.000%
Mean Area 1690



Slope: 33.49
Intercept: 0.000
 r^2 : 0.999919
Zero Shift: Yes



Sample

dcm

See following pages for curve, slope, intercept
and zero shift unchecked

TOC-V Cal Curve Information
TICCURVE-02-10-2017.2017_02_10_14_45_10.cal

Date of Creation 2:10:17 PM 2/10/2017
User
System TOCVW ASI

Cal. Curve

Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed
Comment:

Type	Anal.
Standard	IC

Conc: 0.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	10.59	500uL	1	*****		2/10/2017 2:49:09 PM
2	10.43	500uL	1	*****		2/10/2017 2:53:06 PM

Acid Add. 3.000%
Mean Area 10.51
SD Area 0.1131
CV Area 1.08%
Vial 0

Conc: 1.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	48.13	500uL	1	*****		2/10/2017 3:00:24 PM
2	49.13	500uL	1	*****		2/10/2017 3:04:41 PM

Acid Add. 3.000%
Mean Area 48.63
SD Area 0.7071
CV Area 1.45%
Vial 1

Conc: 5.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	189.0	500uL	1	*****		2/10/2017 3:12:24 PM
2	190.1	500uL	1	*****		2/10/2017 3:16:55 PM

Acid Add. 3.000%
Mean Area 189.6
SD Area 0.7778
CV Area 0.41%
Vial 2

Conc: 10.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	360.6	500uL	1	*****		2/10/2017 3:24:47 PM
2	362.2	500uL	1	*****		2/10/2017 3:29:24 PM

Acid Add. 3.000%
Mean Area 361.4
SD Area 1.131
CV Area 0.31%
Vial 3

Conc: 25.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	859.3	500uL	1	*****		2/10/2017 3:37:23 PM
2	856.9	500uL	1	*****		2/10/2017 3:42:16 PM

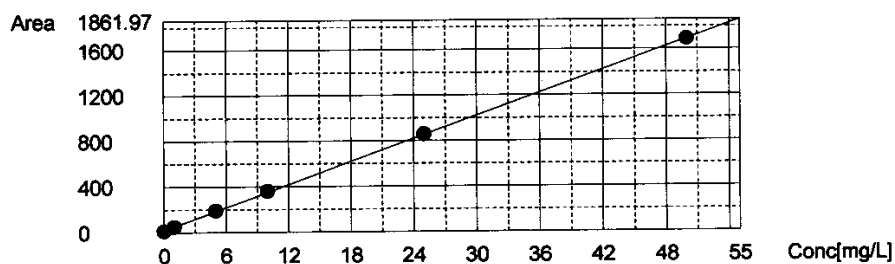
Acid Add. 3.000%
Mean Area 858.1
SD Area 1.697
CV Area 0.20%
Vial 4

Conc: 50.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	1690	500uL	1	*****		2/10/2017 3:50:31 PM
2	1689	500uL	1	*****		2/10/2017 3:55:41 PM

Acid Add. 3.000%
Mean Area 1690
SD Area 0.7071
CV Area 0.04%
Vial 5

Slope: 33.49
Intercept 18.41
r² 0.999919
Zero Shift No



Sample Name: TIC CURVE
 Sample ID: Untitled
 Origin: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
 Status: Completed
 Chk. Result:

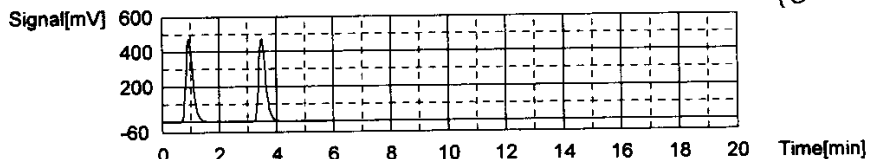
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:24.27mg/L

1. Det

Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	810.5	24.20mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	2/10/2017 4:08:15 PM
2	814.6	24.33mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	2/10/2017 4:12:07 PM

Mean Area 812.5
 Mean Conc. 24.27mg/L



Sample

Sample Name: Untitled
 Sample ID: TCCURVE-02-10-2017.2017_02_10_14_14_25.cal
 Origin: Completed
 Status: Completed
 Chk. Result:

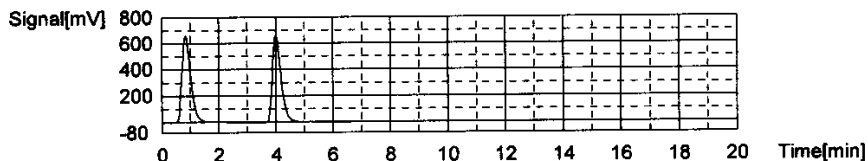
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1406	0.000mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_14_14	2/10/2017 4:25:42 PM
2	1411	0.000mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_14_14	2/10/2017 4:31:41 PM

Mean Area 1409
 Mean Conc. 0.000mg/L



Sample

Sample Name: TOC/TIC
 Sample ID: Untitled
 Origin: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
 Status: Completed
 Chk. Result:

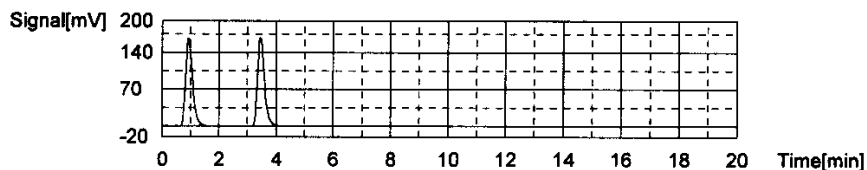
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

1. Det

Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	286.8	8.565mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	12/10/2017 4:37:09 PM
2	287.2	8.577mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	12/10/2017 4:42:05 PM

Mean Area 287.0
Mean Conc. 8.571mg/L



Sample

Sample Name: TOC/TIC
Sample ID: Untitled
Origin: TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status: Completed
Chk. Result

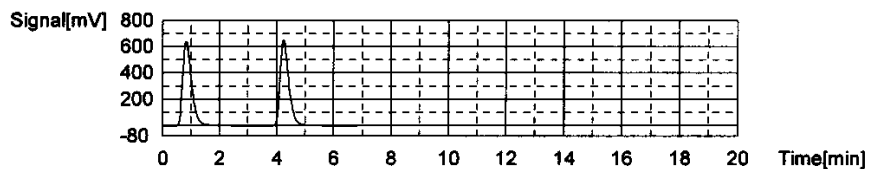
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1378	32.16mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_52	12/10/2017 4:55:07 PM
2	1373	32.04mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_52	12/10/2017 5:01:02 PM

Mean Area 1376
Mean Conc. 32.10mg/L



Total Organic Carbon

MAKE DAILY

CCV (TOC): Std 79381
(5/200)(1000) = 25mg/LLCS (TOC): Std 80787
(5/200)(1000) = 25mg/LCCV (TIC): Std 23359
(5/200)(1000) = 25mg/LMS (TOC): Std 80787
.460003/40=10Calibration Curve Date: 2/10/17Reagent: 4098341661☒ SM5310-C : Matrix 2 WG 627108☐ EPA 415.1/9060A(mod): Matrix 1 WGSOP: K 4151 Rev. 18☐ SW846 9060A (4 rep) WG

Instrument: Shimadza TOC-VWP/ASI

☒ drain reservoir filled
☒ ASI water bottle full
☒ dilution water bottle full☒ DAILY CHECK
☒ 3rd bottle full
☒ sufficient gas
☒ sufficient persulfate☒ sufficient acid
☒ waste container

Position	Sample ID	Dilution
1	TIC	
2	TOC/TIC	
3	CCV	
4	BLK	
5	LCS	
6	LCS DVP ep 8/24/17	
7	08-1200-07	4/100
8	08-1200-07	1/250
9	08-1212-02	1/5
10	-08	1/100
11	-11	
12	-17	
13	08-1221-01	
14	CCV	
15	CCB	
16	08-1221-02	
17	DVP 1221-02	
18	MS 1221-02	
19	CCV 1200-07 1/100	
20	CCB CCV	
21	CCB ep 8/24/17	
22	TOC CCV TIC	
23	CCV CCB	
24	CCB	
25	CCV	

TOC/TIC

1272-01

1272-03

Position	Sample ID	Dilution
26	CCB	
27	1200-07	1/20
28	1200-07	1/50
29	CCV TIC	
30	CCB CCV 8/25/17	
31	CCB	
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		

Position	Sample ID	Dilution
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		

Analyst: Eden TuckDate/Time: 8/24/17 1420

DCN#127866



	Analysis	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:1.224mg/L TC:27.86mg/L IC:26.63mg/L	Complete	8/24/2017 2:31:21 PM	1
2	TOC		TOC:29.02mg/L TC:36.93mg/L IC:7.913mg/L	Complete	8/24/2017 2:44:24 PM	2
3	TOC	CCV	!!Error!! TOC:28.23mg/L TC:27.95mg/L IC:-0.2812mg/L	Complete	8/24/2017 2:56:42 PM	3
4	TOC	WG627108-01 BLK	!!Error!! TOC:0.06011mg/L TC:-0.1712mg/L IC:-0.2313mg/L	Complete	8/24/2017 3:13:25 PM	0
5	TOC	WG627108-02 LCS	!!Error!! TOC:27.69mg/L TC:27.39mg/L IC:-0.3052mg/L	Complete	8/24/2017 3:29:31 PM	5
6	TOC	WG627108-03 LCSDUP	!!Error!! TOC:27.22mg/L TC:26.91mg/L IC:-0.3096mg/L	Complete	8/24/2017 3:41:52 PM	6
7	TOC		TOC:28.83mg/L TC:36.88mg/L IC:8.051mg/L	Complete	8/24/2017 3:54:35 PM	7
8	TOC		TOC:0.9717mg/L TC:1.695mg/L IC:0.7232mg/L	Complete	8/24/2017 4:18:29 PM	8
9	TOC	L17081212-02 (5)	TOC:2.766mg/L TC:12.95mg/L IC:10.18mg/L	Complete	8/24/2017 4:40:12 PM	9
10	TOC	L17081212-08 (100)	TOC:6.531mg/L TC:30.74mg/L IC:24.21mg/L	Complete	8/24/2017 5:04:16 PM	10
11	TOC	L17081212-11	TOC:4.033mg/L TC:42.42mg/L IC:38.39mg/L	Complete	8/24/2017 5:28:25 PM	11
12	TOC	L17081212-17	TOC:4.473mg/L TC:47.88mg/L IC:43.41mg/L	Complete	8/24/2017 5:53:17 PM	12
13	TOC	L17081221-01	TOC:6.489mg/L TC:30.95mg/L IC:24.47mg/L	Complete	8/24/2017 6:15:33 PM	13
14	TOC	CCV	!!Error!! TOC:27.49mg/L TC:27.34mg/L IC:-0.1468mg/L	Complete	8/24/2017 6:27:54 PM	14
15	TOC	CCB	!!Error!! TOC:0.05190mg/L TC:-0.1728mg/L IC:-0.2247mg/L	Complete	8/24/2017 6:36:58 PM	0
16	TOC	L17081221-02	TOC:7.227mg/L TC:29.55mg/L IC:22.32mg/L	Complete	8/24/2017 6:59:46 PM	16
17	TOC	WG627108-05 DUP	TOC:7.478mg/L TC:27.84mg/L IC:20.36mg/L	Complete	8/24/2017 7:22:51 PM	17
18	TOC	WG627108-06 MS	TOC:18.63mg/L TC:36.84mg/L IC:18.21mg/L	Complete	8/24/2017 7:45:52 PM	18
19	TOC		TOC:2.677mg/L TC:5.574mg/L IC:2.898mg/L	Complete	8/24/2017 8:07:00 PM	19
20	TOC	L17081272-01	TOC:2.660mg/L TC:6.164mg/L IC:3.504mg/L	Complete	8/24/2017 8:28:12 PM	20
21	TOC	L17081272-03	TOC:2.698mg/L TC:5.333mg/L IC:2.635mg/L	Complete	8/24/2017 8:49:16 PM	21
22	TOC	TOC/TIC	TOC:27.58mg/L TC:32.42mg/L IC:4.843mg/L	Complete	8/24/2017 9:01:57 PM	22
23	TOC	CCV	!!Error!! TOC:27.35mg/L TC:27.10mg/L IC:-0.2456mg/L	Complete	8/24/2017 9:14:18 PM	23
24	TOC	CCB	!!Error!! TOC:0.06680mg/L TC:-0.1657mg/L IC:-0.2325mg/L	Complete	8/24/2017 9:23:22 PM	0
25	TOC	CCV	!!Error!! TOC:27.24mg/L TC:26.91mg/L IC:-0.3273mg/L	Complete	8/25/2017 8:33:31 AM	25
26	TOC	CCB	!!Error!! TOC:0.06485mg/L TC:-0.1530mg/L IC:-0.2178mg/L	Complete	8/25/2017 8:42:38 AM	0
27	TOC	L17081200-07 (20)	TOC:11.38mg/L TC:21.93mg/L IC:10.54mg/L	Complete	8/25/2017 9:06:30 AM	27
28	TOC		TOC:4.646mg/L TC:8.854mg/L IC:4.207mg/L	Complete	8/25/2017 9:29:57 AM	28
29	TOC		TOC:28.99mg/L TC:38.21mg/L IC:9.218mg/L	Complete	8/25/2017 9:51:43 AM	29
30	TOC	CCV	!!Error!! TOC:26.59mg/L TC:26.32mg/L IC:-0.2702mg/L	Complete	8/25/2017 10:03:57 AM	30
31	TOC	CCB	!!Error!! TOC:0.1727mg/L TC:-0.04808mg/L IC:-0.2208mg/L	Complete	8/25/2017 10:13:10 AM	0

8/25/2017 4:21:34 PM

1/1

Instr. Information

System TOCVW ASI
Detector Wet Chemical

Sample

Sample Name: TIC
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

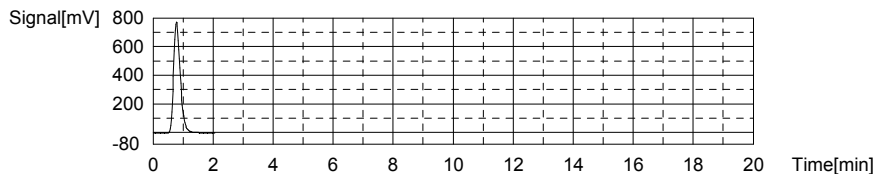
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.224mg/L TC:27.86mg/L IC:26.63mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1196	27.86mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 2:25:46 PM

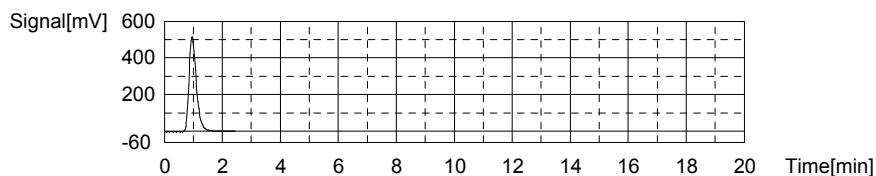
Mean Area 1196
Mean Conc. 27.86mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	910.3	26.63mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 2:31:21 PM

Mean Area 910.3
Mean Conc. 26.63mg/L



Sample

Sample Name: <Untitled>
Sample ID: TOC-02-10-2017.met
Origin: Completed
Status: Completed
Chk. Result

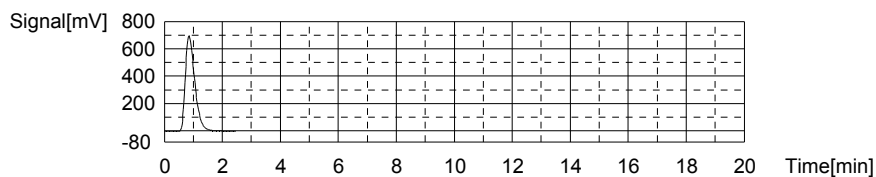
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:29.02mg/L TC:36.93mg/L IC:7.913mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1580	36.93mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 2:39:22 PM

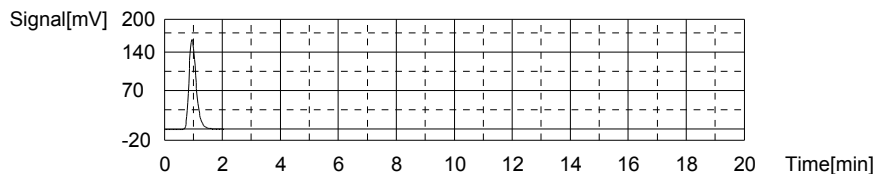
Mean Area 1580
Mean Conc. 36.93mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	283.4	7.913mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 2:44:24 PM

Mean Area 283.4
Mean Conc. 7.913mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

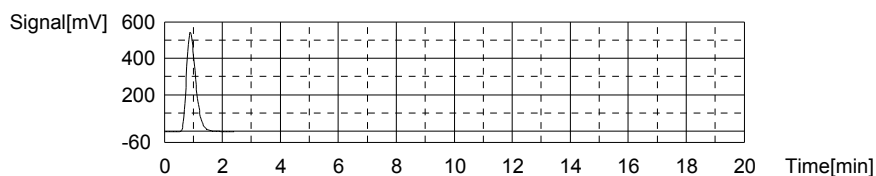
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:28.23mg/L TC:27.95mg/L IC:-0.2812mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1200	27.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 2:52:14 PM

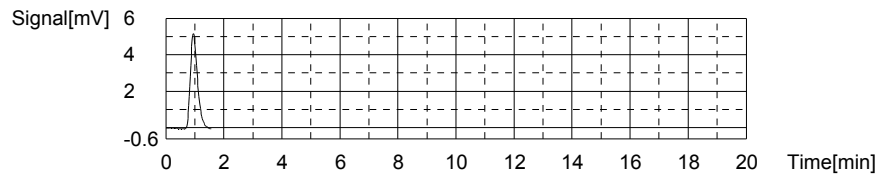
Mean Area 1200
Mean Conc. 27.95mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.999	-0.2812mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 2:56:42 PM

Mean Area 8.999
Mean Conc. -0.2812mg/L



Sample

Sample Name: WG627108-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

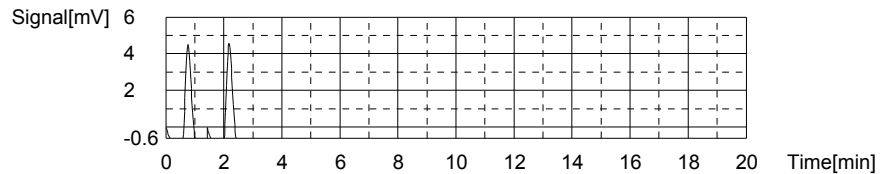
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.06011mg/L TC:-0.1712mg/L IC:-0.2313mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.528	-0.1734mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 3:01:46 PM
2	9.713	-0.1690mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 3:05:18 PM

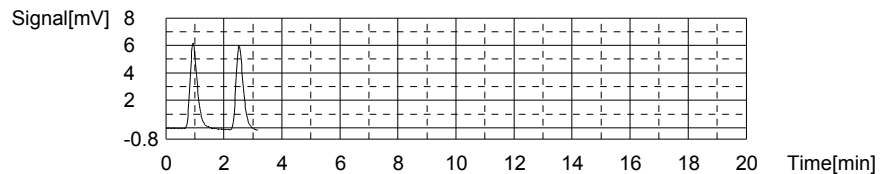
Mean Area 9.620
Mean Conc. -0.1712mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.76	-0.2286mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 3:09:23 PM
2	10.58	-0.2340mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 3:13:25 PM

Mean Area 10.67
Mean Conc. -0.2313mg/L



Sample

Sample Name: WG627108-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

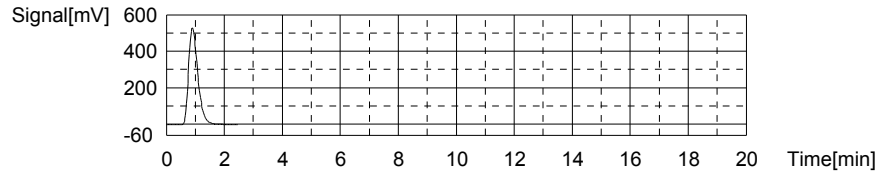
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.69mg/L TC:27.39mg/L IC:-0.3052mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1176	27.39mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 3:25:03 PM

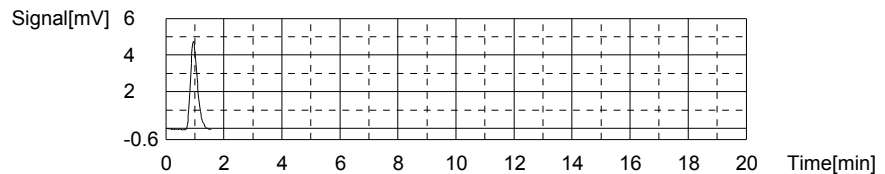
Mean Area 1176
Mean Conc. 27.39mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.195	-0.3052mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 3:29:31 PM

Mean Area 8.195
Mean Conc. -0.3052mg/L



Sample

Sample Name: WG627108-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

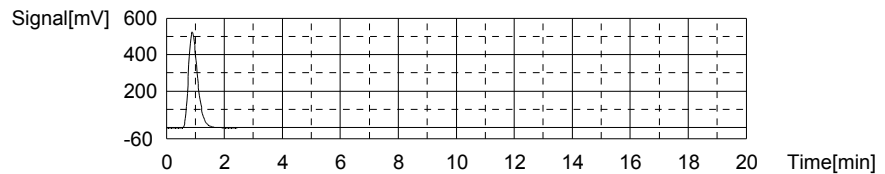
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.22mg/L TC:26.91mg/L IC:-0.3096mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1156	26.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 3:37:24 PM

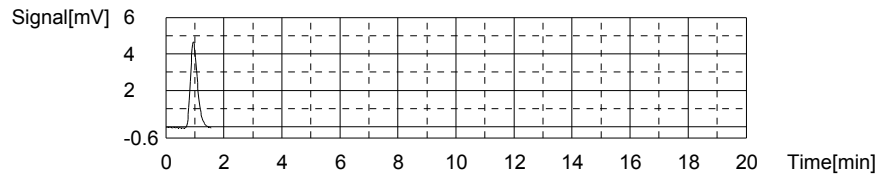
Mean Area 1156
Mean Conc. 26.91mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.047	-0.3096mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 3:41:52 PM

Mean Area 8.047
Mean Conc. -0.3096mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

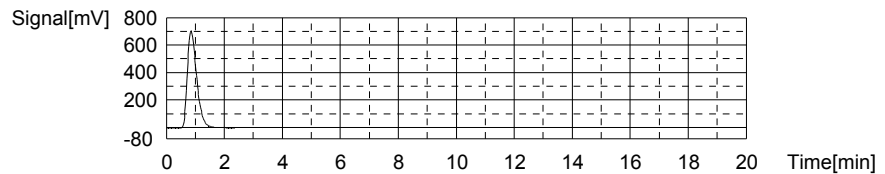
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:28.83mg/L TC:36.88mg/L IC:8.051mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1578	36.88mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 3:49:40 PM

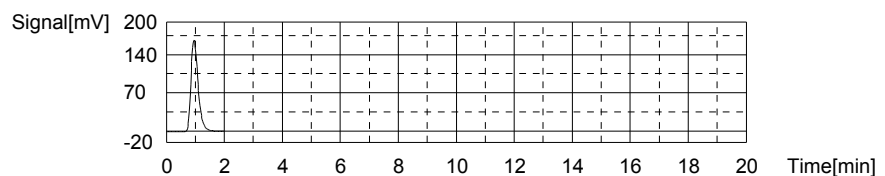
Mean Area 1578
Mean Conc. 36.88mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	288.0	8.051mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 3:54:35 PM

Mean Area 288.0
Mean Conc. 8.051mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

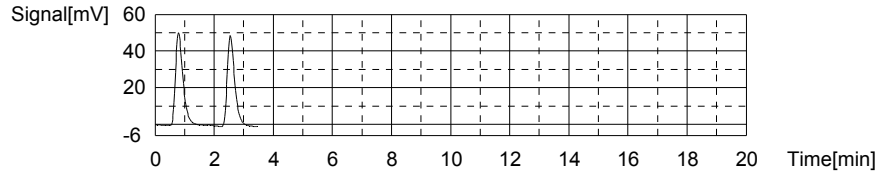
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.9717mg/L TC:1.695mg/L IC:0.7232mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	89.50	1.716mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 4:05:24 PM
2	87.70	1.674mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 4:09:23 PM

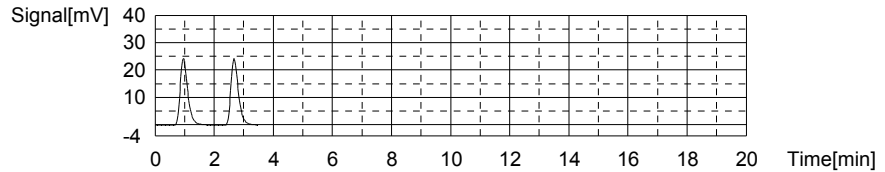
Mean Area 88.60
Mean Conc. 1.695mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	42.58	0.7217mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 4:14:02 PM
2	42.68	0.7247mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 4:18:29 PM

Mean Area 42.63
Mean Conc. 0.7232mg/L



Sample

Sample Name: L17081212-02 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

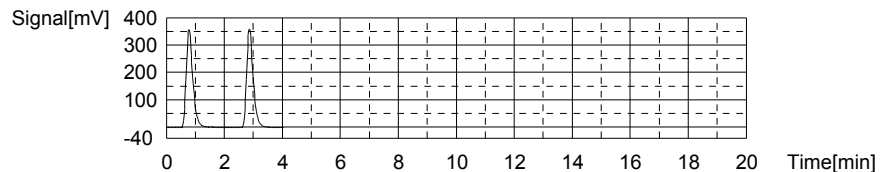
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.766mg/L TC:12.95mg/L IC:10.18mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	564.1	12.93mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 4:26:01 PM
2	565.8	12.97mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 4:30:15 PM

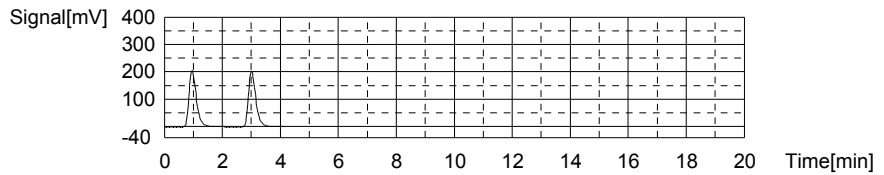
Mean Area 565.0
Mean Conc. 12.95mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	362.1	10.26mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	18/24/2017 4:35:20 PM
2	356.7	10.10mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	18/24/2017 4:40:12 PM

Mean Area 359.4
Mean Conc. 10.18mg/L



Sample

Sample Name: L17081212-08 (100)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

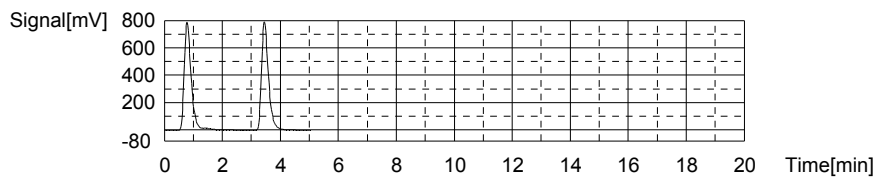
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.531mg/L TC:30.74mg/L IC:24.21mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1321	30.81mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	18/24/2017 4:48:19 PM
2	1315	30.67mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	18/24/2017 4:53:51 PM

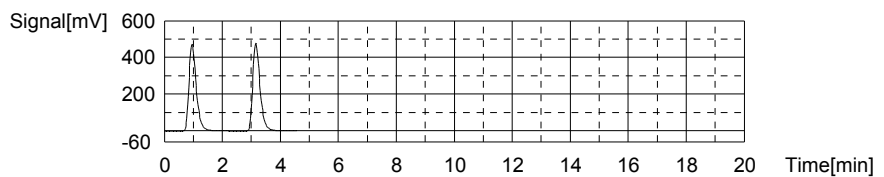
Mean Area 1318
Mean Conc. 30.74mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	822.7	24.02mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	18/24/2017 4:59:05 PM
2	835.5	24.40mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	18/24/2017 5:04:16 PM

Mean Area 829.1
Mean Conc. 24.21mg/L



Sample

Sample Name: L17081212-11
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

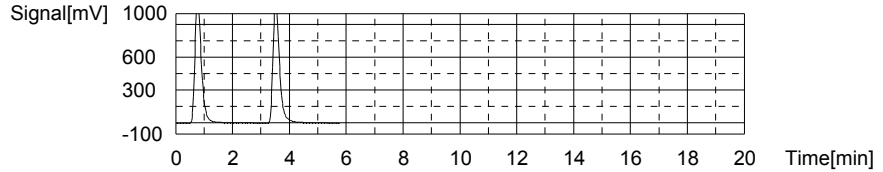
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.033mg/L TC:42.42mg/L IC:38.39mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1802	42.18mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 5:12:28 PM
2	1823	42.67mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 5:17:52 PM

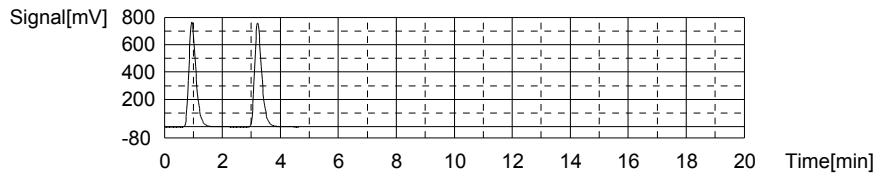
Mean Area 1813
Mean Conc. 42.42mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1307	38.48mg/L	500uL	1		TICURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 5:23:11 PM
2	1301	38.30mg/L	500uL	1		TICURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 5:28:25 PM

Mean Area 1304
Mean Conc. 38.39mg/L



Sample

Sample Name: L17081212-17
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

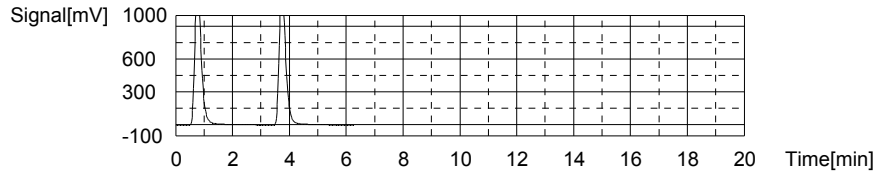
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.473mg/L TC:47.88mg/L IC:43.41mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2045	47.92mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 5:36:50 PM
2	2042	47.85mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 5:42:24 PM

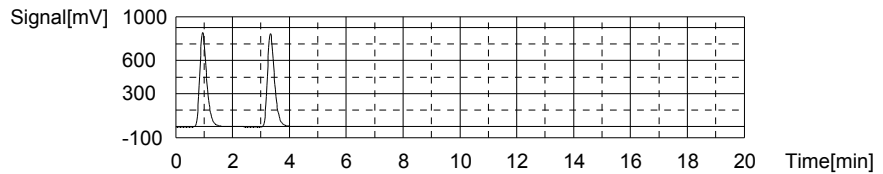
Mean Area 2044
Mean Conc. 47.88mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1477	43.56mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	18/24/2017 5:47:56 PM
2	1467	43.26mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	18/24/2017 5:53:17 PM

Mean Area 1472
Mean Conc. 43.41mg/L



Sample

Sample Name: L17081221-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

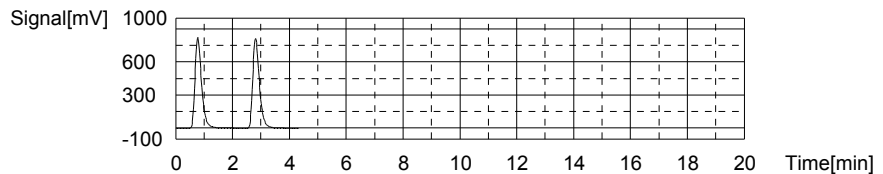
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.489mg/L TC:30.95mg/L IC:24.47mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1327	30.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	18/24/2017 6:00:46 PM
2	1327	30.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	18/24/2017 6:05:20 PM

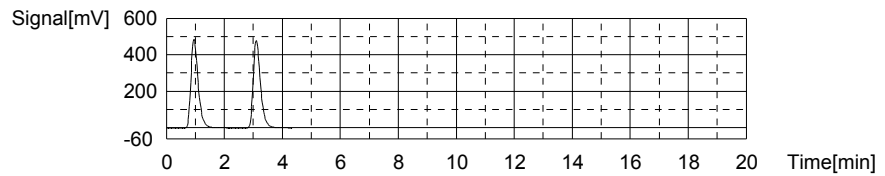
Mean Area 1327
Mean Conc. 30.95mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	842.8	24.62mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	18/24/2017 6:10:34 PM
2	832.5	24.31mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	18/24/2017 6:15:33 PM

Mean Area 837.7
Mean Conc. 24.47mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

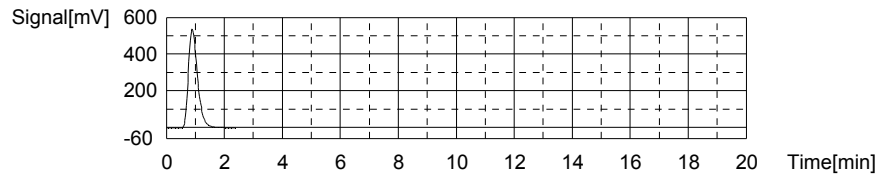
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.49mg/L TC:27.34mg/L IC:-0.1468mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1174	27.34mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 6:23:23 PM

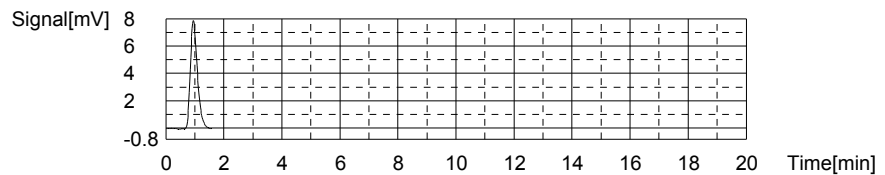
Mean Area 1174
Mean Conc. 27.34mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	13.50	-0.1468mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 6:27:54 PM

Mean Area 13.50
Mean Conc. -0.1468mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

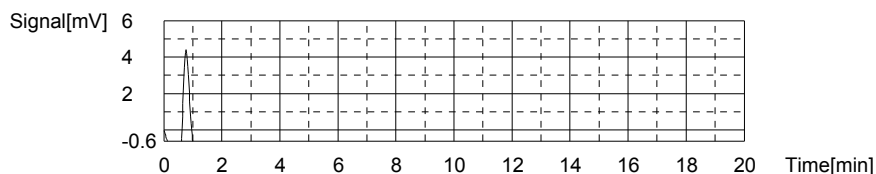
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.05190mg/L TC:-0.1728mg/L IC:-0.2247mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.551	-0.1728mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 6:32:56 PM

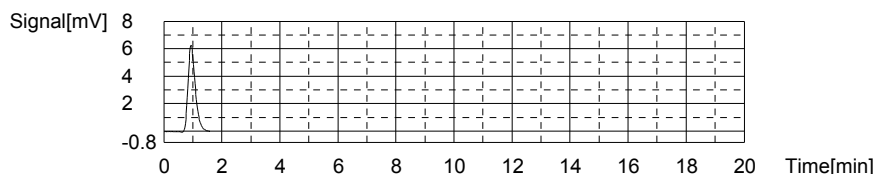
Mean Area 9.551
Mean Conc. -0.1728mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.89	-0.2247mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 6:36:58 PM

Mean Area 10.89
Mean Conc. -0.2247mg/L



Sample

Sample Name: L17081221-02
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

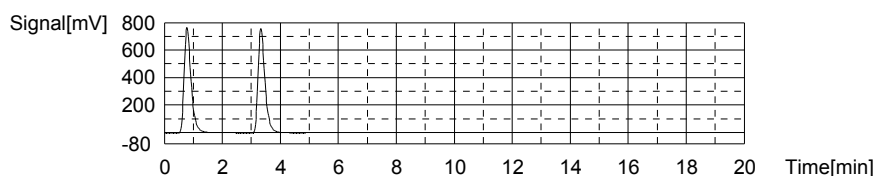
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:7.227mg/L TC:29.55mg/L IC:22.32mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1273	29.68mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 6:44:58 PM
2	1262	29.42mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 6:49:44 PM

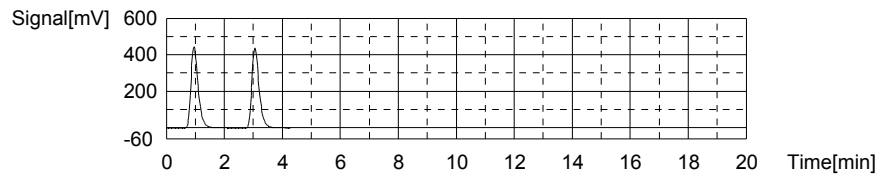
Mean Area 1268
Mean Conc. 29.55mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	767.8	22.38mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 6:54:49 PM
2	763.9	22.26mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 6:59:46 PM

Mean Area 765.9
Mean Conc. 22.32mg/L



Sample

Sample Name: WG627108-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

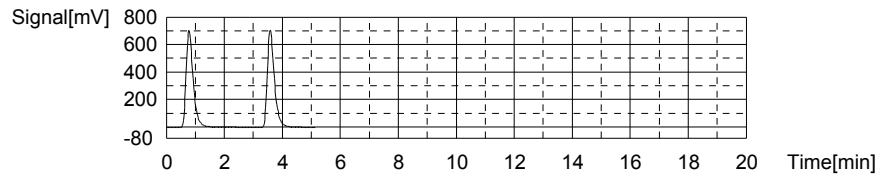
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:7.478mg/L TC:27.84mg/L IC:20.36mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1191	27.74mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 7:08:01 PM
2	1199	27.93mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 7:12:38 PM

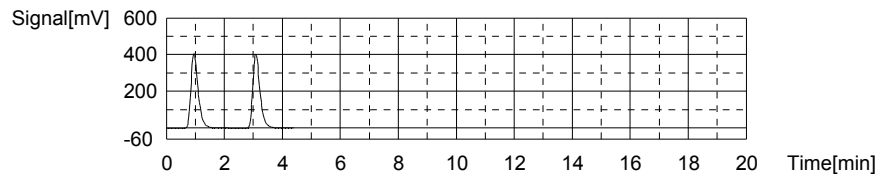
Mean Area 1195
Mean Conc. 27.84mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	705.2	20.51mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 7:17:49 PM
2	695.0	20.21mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 7:22:51 PM

Mean Area 700.1
Mean Conc. 20.36mg/L



Sample

Sample Name: WG627108-06 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

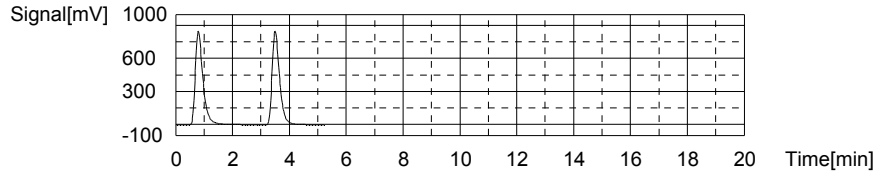
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:18.63mg/L TC:36.84mg/L IC:18.21mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1595	37.29mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 7:31:00 PM
2	1557	36.39mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 7:35:48 PM

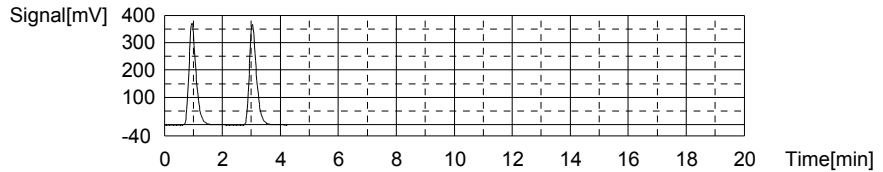
Mean Area 1576
Mean Conc. 36.84mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	632.7	18.34mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 7:40:57 PM
2	623.4	18.07mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 7:45:52 PM

Mean Area 628.0
Mean Conc. 18.21mg/L



Sample

Sample Name:

Sample ID:

Origin:

Status

Chk. Result

<Untitled>
TOC-02-10-2017A.met
Completed

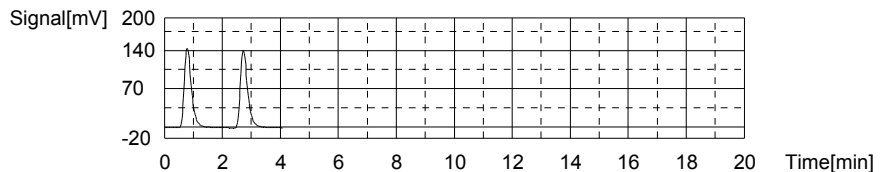
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.677mg/L TC:5.574mg/L IC:2.898mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	251.5	5.544mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 7:53:14 PM
2	254.1	5.605mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 7:57:39 PM

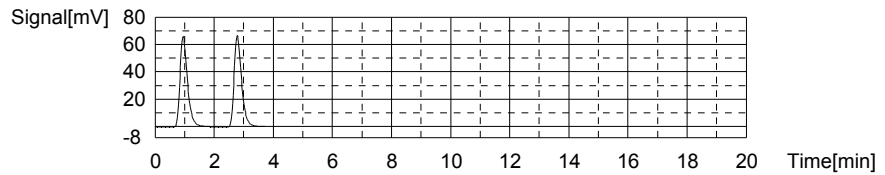
Mean Area 252.8
Mean Conc. 5.574mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	114.9	2.881mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/24/2017 8:02:26 PM
2	116.0	2.914mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/24/2017 8:07:00 PM

Mean Area 115.5
Mean Conc. 2.898mg/L



Sample

Sample Name: L17081272-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result

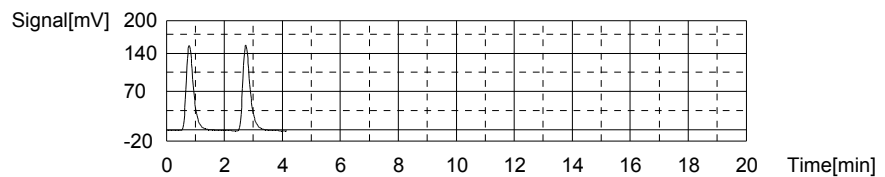
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.660mg/L TC:6.164mg/L IC:3.504mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	272.8	6.047mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 8:14:24 PM
2	282.7	6.281mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 8:18:55 PM

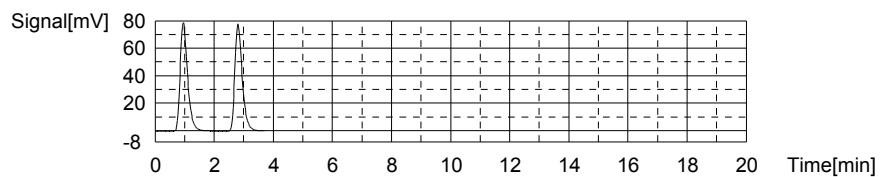
Mean Area 277.8
Mean Conc. 6.164mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	136.9	3.538mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/24/2017 8:23:41 PM
2	134.6	3.470mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/24/2017 8:28:12 PM

Mean Area 135.8
Mean Conc. 3.504mg/L



Sample

Sample Name: L17081272-03
 Sample ID: <Untitled>
 Origin: TOC-02-10-2017A.met
 Status: Completed
 Chk. Result

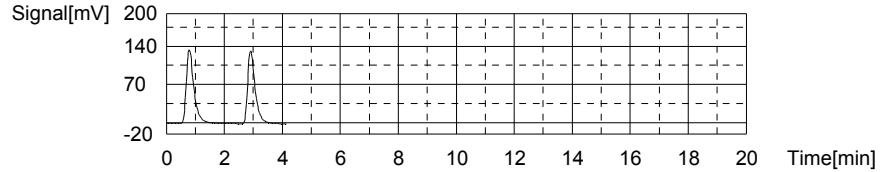
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.698mg/L TC:5.333mg/L IC:2.635mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	245.4	5.399mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 8:35:46 PM
2	239.8	5.267mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 8:40:04 PM

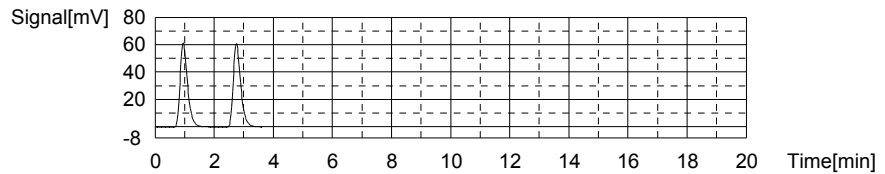
Mean Area 242.6
 Mean Conc. 5.333mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	106.9	2.642mg/L	500uL	1		TICURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 8:44:46 PM
2	106.4	2.628mg/L	500uL	1		TICURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 8:49:16 PM

Mean Area 106.7
 Mean Conc. 2.635mg/L



Sample

Sample Name: TOC/TIC
 Sample ID: <Untitled>
 Origin: TOC-02-10-2017A.met
 Status: Completed
 Chk. Result

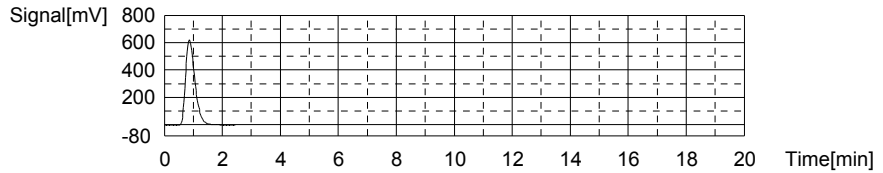
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:27.58mg/L TC:32.42mg/L IC:4.843mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1389	32.42mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 8:57:08 PM

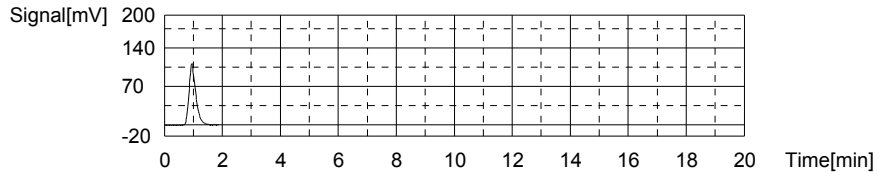
Mean Area 1389
Mean Conc. 32.42mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	180.6	4.843mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/24/2017 9:01:57 PM

Mean Area 180.6
Mean Conc. 4.843mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result:

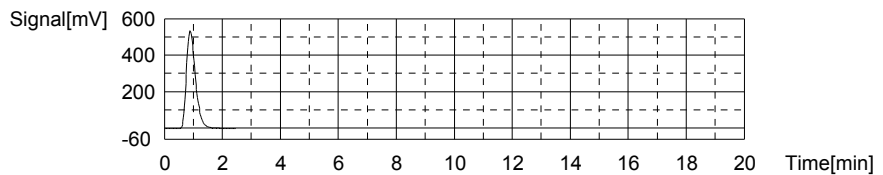
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.35mg/L TC:27.10mg/L IC:-0.2456mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1164	27.10mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 9:09:51 PM

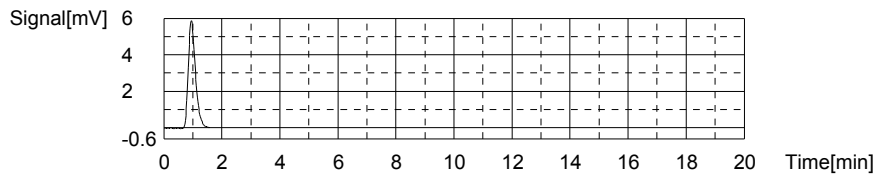
Mean Area 1164
Mean Conc. 27.10mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.19	-0.2456mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/24/2017 9:14:18 PM

Mean Area 10.19
Mean Conc. -0.2456mg/L



Sample

Sample Name: CCB
 Sample ID: <Untitled>
 Origin: TOC-02-10-2017.met
 Status: Completed
 Chk. Result:

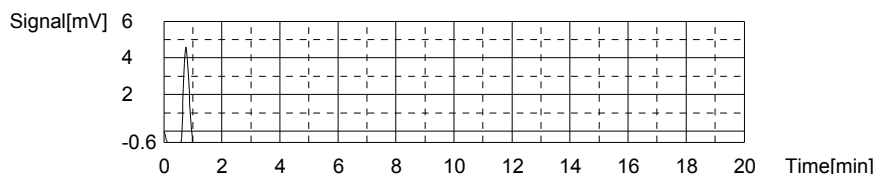
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.06680mg/L TC:-0.1657mg/L IC:-0.2325mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.853	-0.1657mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/24/2017 9:19:22 PM

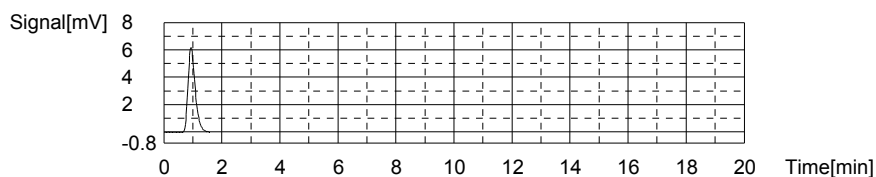
Mean Area 9.853
 Mean Conc. -0.1657mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.63	-0.2325mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/24/2017 9:23:22 PM

Mean Area 10.63
 Mean Conc. -0.2325mg/L



Sample

Sample Name: CCV
 Sample ID: <Untitled>
 Origin: TOC-02-10-2017.met
 Status: Completed
 Chk. Result:

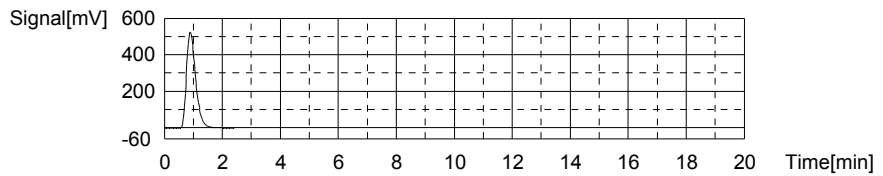
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.24mg/L TC:26.91mg/L IC:-0.3273mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1156	26.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 8:29:03 AM

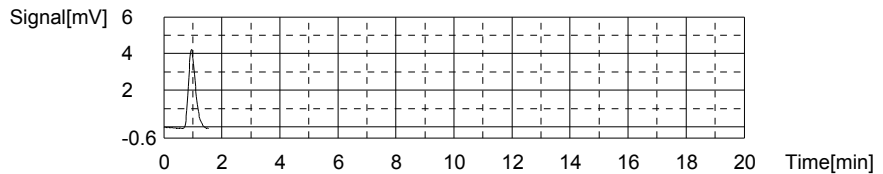
Mean Area 1156
Mean Conc. 26.91mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.454	-0.3273mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/25/2017 8:33:31 AM

Mean Area 7.454
Mean Conc. -0.3273mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result:

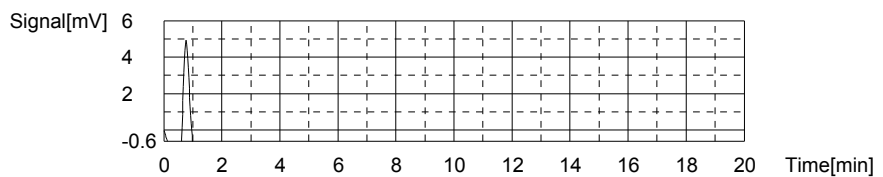
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.06485mg/L TC:-0.1530mg/L IC:-0.2178mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.39	-0.1530mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 8:38:34 AM

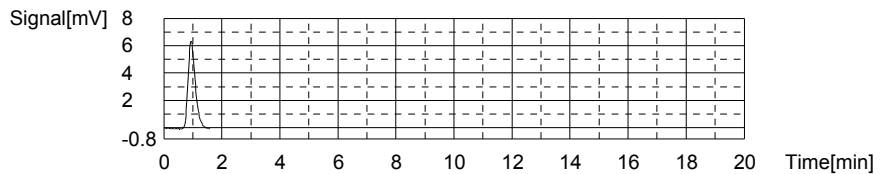
Mean Area 10.39
Mean Conc. -0.1530mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.12	-0.2178mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/25/2017 8:42:38 AM

Mean Area 11.12
Mean Conc. -0.2178mg/L



Sample

Sample Name: L17081200-07 (20)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status: Completed
Chk. Result:

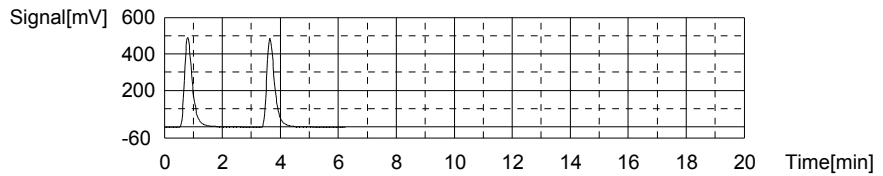
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:11.38mg/L TC:21.93mg/L IC:10.54mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	940.1	21.81mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 8:50:54 AM
2	949.6	22.04mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 8:56:45 AM

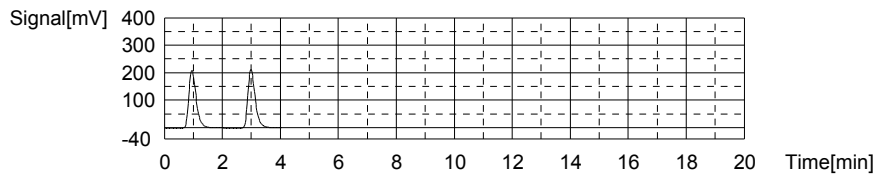
Mean Area 944.9
Mean Conc. 21.93mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	369.3	10.48mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/25/2017 9:01:45 AM
2	373.5	10.60mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/25/2017 9:06:30 AM

Mean Area 371.4
Mean Conc. 10.54mg/L



Sample

Sample Name: <Untitled>
Sample ID: TOC-02-10-2017A.met
Origin: Completed
Status: Completed
Chk. Result:

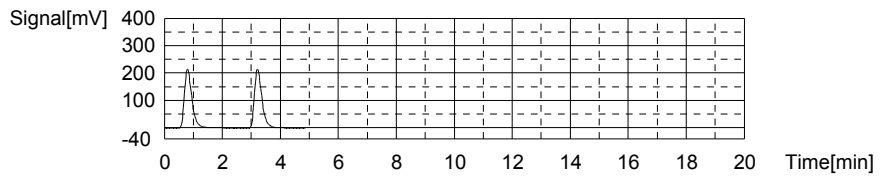
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.646mg/L TC:8.854mg/L IC:4.207mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	390.1	8.818mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 9:15:38 AM
2	393.1	8.889mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 9:20:33 AM

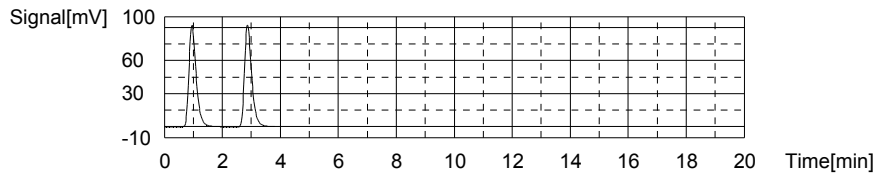
Mean Area 391.6
Mean Conc. 8.854mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	159.1	4.201mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/25/2017 9:25:22 AM
2	159.5	4.213mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/25/2017 9:29:57 AM

Mean Area 159.3
Mean Conc. 4.207mg/L



Sample

Sample Name:

Sample ID:

Origin:

Status

Chk. Result

<Untitled>
TOC-02-10-2017.met
Completed

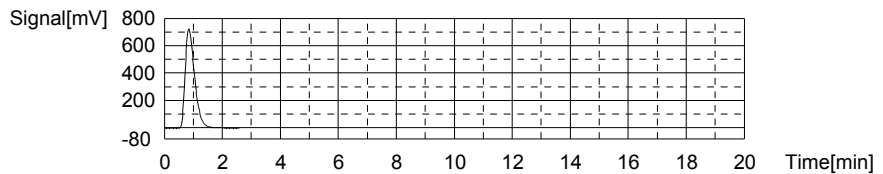
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:28.99mg/L TC:38.21mg/L IC:9.218mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1634	38.21mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 9:46:50 AM

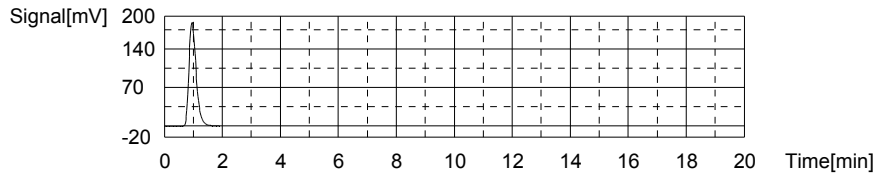
Mean Area 1634
Mean Conc. 38.21mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	327.1	9.218mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45	8/25/2017 9:51:43 AM

Mean Area 327.1
Mean Conc. 9.218mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

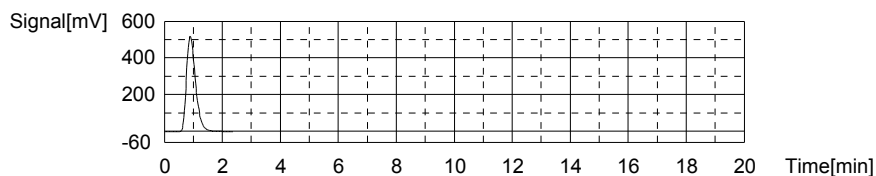
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.59mg/L TC:26.32mg/L IC:-0.2702mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1131	26.32mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 9:59:32 AM

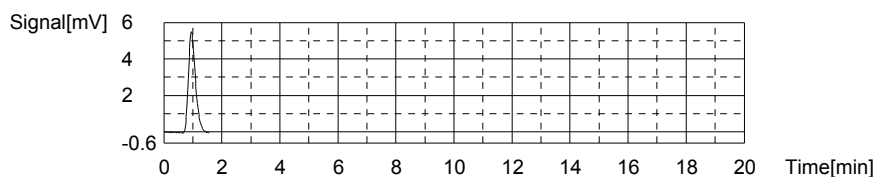
Mean Area 1131
Mean Conc. 26.32mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.368	-0.2702mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_18	8/25/2017 10:03:57 AM

Mean Area 9.368
Mean Conc. -0.2702mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status: Completed
Chk. Result

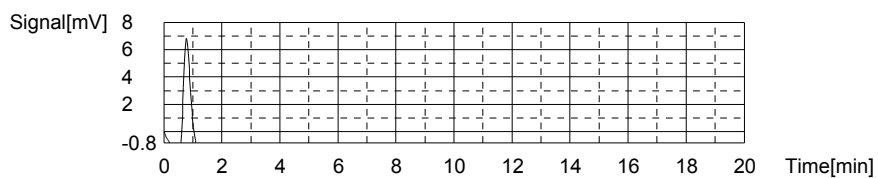
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1727mg/L TC:-0.04808mg/L IC:-0.2208mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	14.83	-0.04808mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_58	8/25/2017 10:09:08 AM

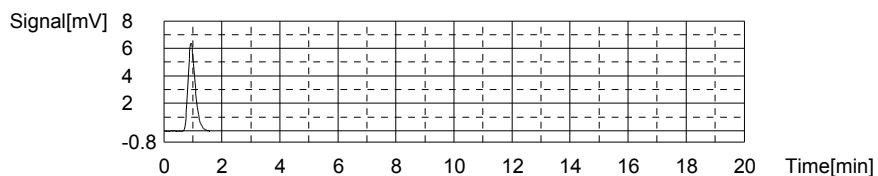
Mean Area 14.83
Mean Conc. -0.04808mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.02	-0.2208mg/L	500uL	1		TICCURVE-02-10-2017.2017 02 10 14 45 18	8/25/2017 10:13:10 AM

Mean Area 11.02
Mean Conc. -0.2208mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
September 7, 2017

001 - BIO-CHEM TESTING WVDEP 220	002 - REIC Consultants, Inc. WVDEP 060
003 - Sturm Environmental	004 - MICROBAC PITTSBURGH
005 - ES LABORATORIES	006 - ALCOSAN LABORATORIES
007 - ALS LABORATORIES	008 - BENCHMARK LABORATORIES
010 - MICROBAC CHICAGOLAND	AC - AMBER R. CARMICHAEL
ADC - ANTHONY D. CANTER	ADG - APRIL D. GREENE
ALS - ADRIANE L. STEED	AWE - ANDREW W. ESSIG
AZH - AFTER HOURS	BJO - BRIAN J. OGDEN
BLG - BRENDA L. GREENWALT	BLR - BRANDON L. RICHARDS
BNB - Brandi N. Bentley	BRG - BRENDA R. GREGORY
CAS - Craig A. Smith	CEB - CHAD E. BARNES
CLC - CHRYS L. CRAWFORD	CLS - CARA L. STRICKLER
CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
CV - Carl Volkman	DAK - DEAN A. KETELSEN
DCM - DAVID C. MERCKLE	DEV - DAVID E. VANDENBERG
DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DSM - DAVID S. MOSSOR
DTG - DOMINIC T. GEHRET	ECL - ERIC C. LAWSON
EPT - ETHAN P. TIDD	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HRF - HEATHER R. FAIRCHILD
JDH - JUSTIN D. HESSON	JDS - JARED D. SMITH
JKP - JACQUELINE K. PARSONS	JLD - JESSICA L. DELONG
JST - JOSHUA S. TAYLOR	JTP - JOSHUA T. PEMBERTON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES
JYH - JI Y. HU	KAK - KATHY A. KIRBY
KDD - Katelyn D. Daley	KEB - KATIE E. BARNES
KHR - KIM H. RHODES	KKB - KERRI K. BUCK
KRA - KATHY R. ALBERTSON	KRP - KATHY R. PARSONS
LJH - Lacey J. Hendershot	LLS - LARRY L. STEPHENS
LSB - LESLIE S. BUCINA	LSJ - LAURA S. JONES
MAP - MARLA A. PORTER	MBK - MORGAN B. KNOWLTON
MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	OJE - OMOYEMWEN J. ENGLISH
PDM - PIERCE D. MORRIS	PIT - MICROBAC WARRENDALE
REK - BOB E. KYER	RLB - BOB BUCHANAN
RNP - RICK N. PETTY	SAV - SARAH A. VANDENBERG
SCA - SUEELLEN C. ADAMS	SCB - SARAH C. BOGOLIN
SCJ - SUE ELLEN C. JOHNSON	SDC - SHALYN D. CONLEY
TB - TODD BOYLE	TMB - TIFFANY M. BAILEY
TMM - TAMMY M. MORRIS	VC - VICKI COLLIER
WTD - WADE T. DELONG	XXX - UNAVAILABLE OR SUBCONTRACT
ZTB - ZACH T. BARNES	

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	Analyte detected in the method blank
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to interference.
E	Semiquantitative result (out of calibration range)
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
FP1	Did not ignite.
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for requ
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration.
J	The analyte was positively identified, but the quantitation was below the RL.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value; the analyte concentration was less than the RL/LOQ.
J,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	Analyte detected in both the method blank and sample above the MDL.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL)
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Not detected at or above adjusted sample detection limit.



UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below



LABORATORY: Microbat, 158 Starlite Dr., Marietta, OH 45750, 740.373.4071

LABORATORY CONTACT: Michelle Taylor

CH2M COC (YYMMDD-##):

[illegible]

Received: 08/23/2017 10:41
By: CARA STRICKLER

Anna Sticker



COOLER TEMP >6° C LOG

Cooler ID 4998[illegible]

pH	Exceptions
----	------------

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6
PH Lot # <u>110601554</u> <i>0910 8/23/17</i> PRESERVATIVE EXCEPTIONS ☒ NONE ☐ AS NOTED <i>0910 8/23/17</i>						

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-01	953680	PCT-S 8260C

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:14	CLS	AWE	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		23-AUG-2017 13:06	CLS		

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-02	953681	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
Comments:Products cancelled.							
3	STORE	ORG4	A2	06-SEP-2017 07:14	CLS	AWE	

Comments:Products cancelled.

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
Comments:Products cancelled.							
3	STORE	ORG4	A2	06-SEP-2017 07:14	CLS	AWE	

Comments:Products cancelled.

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
Comments:Products cancelled.							
3	STORE	ORG4	A2	06-SEP-2017 07:14	CLS	AWE	

Comments:Products cancelled.

A1 - Sample Archive (COLD)
 A2 - Sample Archive (AMBIENT)
 F1 - Volatiles Freezer in Login
 V1 - Volatiles Refrigerator in Login
 W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

Samplenum **Container ID** **Products**
L17081212-02 953682 PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	STORE	W1	A2	06-SEP-2017 10:47	BRG	CAS	

Comments: Products cancelled.

Samplenum **Container ID** **Products**
L17081212-02 953683 PCT-S ALK N03

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:23	DLP	CLS	
3	STORE	WET	A2	30-AUG-2017 10:29	CLS	TB	

Samplenum **Container ID** **Products**
L17081212-02 953684 PCT-S P04

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:10	DLP	CLS	
3	STORE	WET	A2	24-AUG-2017 13:36	CLS	DLP	

Samplenum **Container ID** **Products**
L17081212-02 953685 PCT-S TDS

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 15:05	ADG	CLS	
3	STORE	DIG	A2	25-AUG-2017 10:27	CLS	ADG	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

Samplenum **Container ID** **Products**
L17081212-02 953686 PCT-S NH3 NO3NO2 PHOS TKN TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	24-AUG-2017 10:13	TB	CLS	
3	STORE	WET	A2	06-SEP-2017 08:48	CLS	TMM	

Samplenum **Container ID** **Products**
L17081212-02 953687 PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	

Comments:Products cancelled.

3	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	
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Comments:Products cancelled.

Samplenum **Container ID** **Products**
L17081212-02 953688 PCT-S AL AS-MS CA CR-MS FE K MG MN NA SI SILIC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	DIG	23-AUG-2017 13:06	CLS		
2	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	
3	ANALYZ*	A2	METALS	29-AUG-2017 12:02	KHR	CLS	

**Sample extract/digestate/leachate*

Samplenum **Container ID** **Products**
L17081212-02 953689 PCT-S 300 8260C S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:23	EPT	CLS	
3	STORE	WET	A2	24-AUG-2017 10:59	CLS	EPT	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-03	953690	PCT-S AL-D AS-MSD CR-MS-D FE-D MN-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-04	953691	PCT-S 8260C

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	ORG4	23-AUG-2017 13:06	CLS		
2	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-04	953692	PCT-S AL AS-MS CA CR-MS FE K MG MN NA

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

A1 - Sample Archive (COLD)
 A2 - Sample Archive (AMBIENT)
 F1 - Volatiles Freezer in Login
 V1 - Volatiles Refrigerator in Login
 W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-05	953693	PCT-S FE-D MN-D AL-D AS-MSD CR-MS-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-06	953694	PCT-S 8260C

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-06	953695	PCT-S AL AS-MS CA CR-MS FE K MG MN NA

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

A1 - Sample Archive (COLD)
 A2 - Sample Archive (AMBIENT)
 F1 - Volatiles Freezer in Login
 V1 - Volatiles Refrigerator in Login
 W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-07	953696	PCT-S AL-D AS-MSD CR-MS-D FE-D MN-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-08	953697	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	STORE	W1	A2	06-SEP-2017 10:46	BRG	CAS	

Comments: Products cancelled.

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-08	953698	PCT-S ALK N03

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:23	DLP	CLS	
3	STORE	WET	A2	30-AUG-2017 10:29	CLS	TB	

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-08	953699	PCT-S P04

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:10	DLP	CLS	
3	STORE	WET	A2	24-AUG-2017 13:36	CLS	DLP	

A1 - Sample Archive (COLD)
 A2 - Sample Archive (AMBIENT)
 F1 - Volatiles Freezer in Login
 V1 - Volatiles Refrigerator in Login
 W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

Samplenum **Container ID** **Products**
L17081212-08 953700 PCT-S TDS

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 15:05	ADG	CLS	
3	STORE	DIG	A2	25-AUG-2017 10:27	CLS	ADG	

Samplenum **Container ID** **Products**
L17081212-08 953701 PCT-S NH3 NO3NO2 PHOS TKN TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	24-AUG-2017 10:13	TB	CLS	
3	STORE	WET	A2	06-SEP-2017 08:48	CLS	TMM	

Samplenum **Container ID** **Products**
L17081212-08 953702 PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	

Comments:Products cancelled.

3	STORE	DIG	A2	28-AUG-2017 10:09	CLS	VC	
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Comments:Products cancelled.

Samplenum **Container ID** **Products**
L17081212-08 953703 PCT-S AL AS-MS CA FE K MG MN NA SI SILICA-ICP

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	STORE	DIG	A2	25-AUG-2017 13:12	CLS	ERP	
4	ANALYZ*	DIG	METALS	28-AUG-2017 10:17	JYH	ERP	

***Sample extract/digestate/leachate**

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

Samplenum **Container ID** **Products**
L17081212-08 953704 PCT-S 300 S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:23	EPT	CLS	
3	STORE	WET	A2	24-AUG-2017 11:00	CLS	EPT	

Samplenum **Container ID** **Products**
L17081212-09 953705 PCT-S AL-D AS-MSD FE-D MN-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	STORE	DIG	A2	28-AUG-2017 10:09	CLS	VC	
4	ANALYZ*	DIG	METALS	28-AUG-2017 10:17	JYH	ERP	

**Sample extract/digestate/leachate*

Samplenum **Container ID** **Products**
L17081212-10 953706 PCT-S 8260C

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	23-AUG-2017 13:06	CLS		
2	ANALYZ	V1	ORG4	24-AUG-2017 07:11	AWE	CLS	
3	STORE	ORG4	A2	06-SEP-2017 07:13	CLS	AWE	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

Samplenum **Container ID** **Products**
L17081212-11 953707 PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	STORE	W1	A2	06-SEP-2017 10:46	BRG	CAS	

Comments: Products cancelled.

Samplenum **Container ID** **Products**
L17081212-11 953708 PCT-S ALK N03

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:23	DLP	CLS	
3	STORE	WET	A2	30-AUG-2017 10:29	CLS	TB	

Samplenum **Container ID** **Products**
L17081212-11 953709 PCT-S P04

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:10	DLP	CLS	
3	STORE	WET	A2	24-AUG-2017 13:36	CLS	DLP	

Samplenum **Container ID** **Products**
L17081212-11 953710 PCT-S TDS

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 15:05	ADG	CLS	
3	STORE	DIG	A2	25-AUG-2017 10:27	CLS	ADG	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

Samplenum **Container ID** **Products**
L17081212-11 953711 PCT-S NH3 NO3NO2 PHOS TKN TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	24-AUG-2017 10:13	TB	CLS	
3	STORE	WET	A2	06-SEP-2017 08:48	CLS	TMM	

Samplenum **Container ID** **Products**
L17081212-11 953712 PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	

Comments:Products cancelled.

3	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	
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Comments:Products cancelled.

Samplenum **Container ID** **Products**
L17081212-11 953713 PCT-S AL AS-MS CA FE K MG MN NA SI SILICA-ICP

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

Samplenum **Container ID** **Products**
L17081212-11 953714 PCT-S 300 S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:23	EPT	CLS	
3	STORE	WET	A2	24-AUG-2017 10:59	CLS	EPT	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-12	953715	PCT-S AL-D AS-MSD FE-D MN-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-13	953716	PCT-S AL AS-MS CA FE K MG MN NA

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-14	953717	PCT-S AL-D AS-MSD FE-D MN-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

A1 - Sample Archive (COLD)
 A2 - Sample Archive (AMBIENT)
 F1 - Volatiles Freezer in Login
 V1 - Volatiles Refrigerator in Login
 W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-15	953718	PCT-S AL AS-MS CA FE K MG MN NA

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-16	953719	PCT-S AL-D AS-MSD FE-D MN-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-17	953720	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	STORE	W1	A2	06-SEP-2017 10:46	BRG	CAS	

Comments:Products cancelled.

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-17	953721	PCT-S ALK N03

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:23	DLP	CLS	
3	STORE	WET	A2	30-AUG-2017 10:29	CLS	TB	

A1 - Sample Archive (COLD)
 A2 - Sample Archive (AMBIENT)
 F1 - Volatiles Freezer in Login
 V1 - Volatiles Refrigerator in Login
 W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

Samplenum **Container ID** **Products**
L17081212-17 953722 PCT-S P04

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:10	DLP	CLS	
3	STORE	WET	A2	24-AUG-2017 13:36	CLS	DLP	

Samplenum **Container ID** **Products**
L17081212-17 953723 PCT-S TDS

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 15:05	ADG	CLS	

Samplenum **Container ID** **Products**
L17081212-17 953724 PCT-S NH3 N03N02 PHOS TKN TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	24-AUG-2017 10:13	TB	CLS	
3	STORE	WET	A2	06-SEP-2017 08:48	CLS	TMM	

Samplenum **Container ID** **Products**
L17081212-17 953725 PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	

Comments:Products cancelled.

3	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	
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Comments:Products cancelled.

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212

Account: 2736

Project: 2736.061

Samples: 20

Due Date: 06-SEP-2017

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-17	953726	PCT-S AL AS-MS CA FE K MG MN NA SI SILICA-ICP

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-17	953727	PCT-S 300 S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	ANALYZ	W1	WET	23-AUG-2017 13:23	EPT	CLS	
3	STORE	WET	A2	24-AUG-2017 10:59	CLS	EPT	

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-18	953728	PCT-S AL-D AS-MSD FE-D MN-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-19	953729	PCT-S AL AS-MS CA FE K MG MN NA

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

**Sample extract/digestate/leachate*

A1 - Sample Archive (COLD)
 A2 - Sample Archive (AMBIENT)
 F1 - Volatiles Freezer in Login
 V1 - Volatiles Refrigerator in Login
 W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L17081212**Account:** 2736**Project:** 2736.061**Samples:** 20**Due Date:** 06-SEP-2017

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L17081212-20	953730	PCT-S AL-D AS-MSD FE-D MN-D

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	23-AUG-2017 13:06	CLS		
2	PREP	W1	DIG	23-AUG-2017 15:00	ERP	CLS	
3	ANALYZ*	DIG	METALS	24-AUG-2017 11:31	KKB	ERP	
4	PREP	DIG	A2	24-AUG-2017 12:32	CLS	ERP	

****Sample extract/digestate/leachate***

A1 - Sample Archive (COLD)
 A2 - Sample Archive (AMBIENT)
 F1 - Volatiles Freezer in Login
 V1 - Volatiles Refrigerator in Login
 W1 - Walkin Cooler in Login



NELAP Addendum - January 4, 2016

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVD NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO₃)
Propionaldehyde (HPLC-UV)

SOLID AND HAZARDOUS CHEMICALS

Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1
ASTM D3987-06

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVD MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVD HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

OVD HPLC12/HPLC/UV

Acetate
Formate

OVD RSK01/GC-FID

Acetylene
Propane

OVD K9305/ISE

Fluoroborate

SOLID AND HAZARDOUS CHEMICALS

OVD MSS01/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV01/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)