LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

Volume 16

2018

Bate Stamp Numbers
00858613 - 00860459

Prepared for

Department of the Army
Longhorn Army Ammunition Plant

1976 – 2018

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD – CHRONOLOGICAL INDEX

VOLUME 16

2018

A. Title: Report (cont'd) – Quarterly Evaluation Report, 2nd Quarter (April-July) 2017, Groundwater Treatment Plant, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): AECOM Technical Services
Recipient: U.S. Army Corps of Engineers
Date: September 2017
Bate Stamp: 00858613 – 00858846

B. Title: Report – Quarterly Evaluation Report, 3rd Quarter (July-September) 2017, Groundwater Treatment Plant, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): AECOM Technical Services
Recipient: U.S. Army Corps of Engineers
Date: November 2017
Bate Stamp: 00858847 – 00860459

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L17061531
Instrument ID: HPMS6
Workgroup (AAB#): WG619886

CCV Number: WG619885-02
CAL ID: HPMS6-19-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG619885-02	NA	NA	18.15	15.12	11.24
Upper Limit	NA	NA	18.65	15.62	11.74
Lower Limit	NA	NA	17.65	14.62	10.74
L17061531-01	1.00	01	18.15	15.12	11.25
L17061531-02	1.00	01	18.15	15.12	11.24
WG619886-01	1.00	01	18.15	15.12	11.25
WG619886-02	1.00	01	18.15	15.12	11.24
WG619886-03	1.00	01	18.15	15.12	11.24

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

Underline = Response outside limits

INTERNAL_STD_RT - Modified 03/06/2008
PDF File ID: 5361519
Report generated 06/30/2017 13:15

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17061531
Instrument ID: HPMS11
Workgroup (AAB#): WG620295

ICAL CCV Number: WG618216-08
CAL ID: HPMS11-20-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG618216-08	NA	NA	16.94	14.12	10.49
Upper Limit	NA	NA	17.44	14.62	10.99
Lower Limit	NA	NA	16.44	13.62	9.99
L17061531-01	1.00	02	16.94	14.12	10.49
L17061531-02	1.00	02	16.94	14.12	10.49
WG620295-01	1.00	01	16.94	14.12	10.49
WG620295-02	1.00	01	16.94	14.12	10.48

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

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5361485
Report generated: 07/05/2017 10:11

2.2 General Chromatography Data

2.2.1 LC/MS Data (6850)

2.2.1.1 Summary Data

Microbac

Lab Report #: L17061531
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17061531-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6452	**Prep Method:**	6850	**Prep Date:**	06/30/2017 10:22
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG620000	**Analyst:**	WTD	**Run Date:**	06/30/2017 12:16
Collect Date:	06/28/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40116
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.13		0.400	0.200	0.100

2.2.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

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

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

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Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: NA

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40075	WG619865-01 CCB	1	1		06/29/17 13:13
2	1LM.LM40076	WG619865-02 STD (0.1 ug/L)	1	1	STD80232	06/29/17 13:32
3	1LM.LM40077	WG619865-03 STD (0.2 ug/L)	1	1	STD80232	06/29/17 13:51
4	1LM.LM40078	WG619865-04 STD (0.5 ug/L)	1	1	STD80232	06/29/17 14:10
5	1LM.LM40079	WG619865-05 STD (1.0 ug/L)	1	1	STD80232	06/29/17 14:29
6	1LM.LM40080	WG619865-06 STD (2.0 ug/L)	1	1	STD80232	06/29/17 14:48
7	1LM.LM40081	WG619865-07 STD (5.0 ug/L)	1	1	STD80232	06/29/17 15:07
8	1LM.LM40082	WG619865-08 STD (10 ug/L)	1	1	STD80232	06/29/17 15:26
9	1LM.LM40083	WG619865-09 SSCV (1.0 ug/L)	1	1	STD80234	06/29/17 15:45
10	1LM.LM40084	WG619609-01 CCB	1	1		06/29/17 16:04
11	1LM.LM40085	WG619609-02 CCV (1.0ug/L)	1	1	STD80232	06/29/17 16:23
12	1LM.LM40086	WG619615-05 MRL (0.2ug/L)	1	1	STD80232	06/29/17 16:42
13	1LM.LM40087	WG619615-01 MCT (0.2ug/L)	1	1	STD80234	06/29/17 17:01
14	1LM.LM40088	WG619615-02 BLANK	1	1		06/29/17 17:20
15	1LM.LM40089	WG619615-03 LCS (0.2ug/L)	1	1	STD80234	06/29/17 17:39
16	1LM.LM40090	WG619615-04 LCS2 (0.2ug/L)	1	1	STD80234	06/29/17 17:57
17	1LM.LM40091	L17061390-01 10,000X	1	10000	STD80234	06/29/17 18:16
18	1LM.LM40092	L17061390-02	1	1	STD80234	06/29/17 18:35
19	1LM.LM40093	L17061390-03 100X	1	100	STD80234	06/29/17 18:54
20	1LM.LM40094	L17061390-04	1	1	STD80234	06/29/17 19:13
21	1LM.LM40095	L17061390-05 10X	1	10		06/29/17 19:32
22	1LM.LM40096	L17061390-06	1	1		06/29/17 19:51
23	1LM.LM40097	WG619609-03 CCV (1.0ug/L)	1	1	STD80232	06/29/17 20:10
24	1LM.LM40098	WG619615-06 MRL (0.2ug/L)	1	1	STD80232	06/29/17 20:29
25	1LM.LM40099	WG619609-04 CCB	1	1		06/29/17 20:48
26	1LM.LM40100	L17061390-07	1	1		06/29/17 21:07
27	1LM.LM40101	L17061390-09 100,000X	1	100000		06/29/17 21:26
28	1LM.LM40102	L17061390-10	1	1		06/29/17 21:45
29	1LM.LM40103	L17061390-12	1	1		06/29/17 22:04
30	1LM.LM40104	L17061390-13	1	1		06/29/17 22:23
31	1LM.LM40105	L17061390-15	1	1		06/29/17 22:42
32	1LM.LM40106	L17061390-16 2X	1	2		06/29/17 23:01
33	1LM.LM40107	WG619609-05 CCV (1.0ug/L)	1	1	STD80232	06/29/17 23:20

Page: 1 Approved: 30-JUN-17

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Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA

WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 NA

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM40108	WG619615-07 MRL (0.2ug/L)	1	1	STD80232	06/29/17 23:39
35	1LM.LM40109	WG619609-06 CCB	1	1		06/29/17 23:57

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L17061390-01 Analyzed at a dilution based on historical data.			
19				
	L17061390-03 Analyzed at a dilution based on historical data.			
21				
	L17061390-05 Analyzed at a dilution based on historical data.			
27				
	L17061390-09 Analyzed at a dilution based on historical data.			
32				
	L17061390-16 Analyzed at a dilution based on historical data.			

Page: 2 Approved: 30-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 063017_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: L17061531

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (06/29/2017)

CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40110	WG619998-01 CCB	1	1		06/30/17 10:22
2	1LM.LM40111	WG619998-02 CCV (1.0ug/L)	1	1	STD80232	06/30/17 10:41
3	1LM.LM40112	WG620000-07 MRL (0.2ug/L)	1	1	STD80232	06/30/17 11:00
4	1LM.LM40113	WG620000-01 MCT (0.2ug/L)	1	1	STD80234	06/30/17 11:19
5	1LM.LM40114	WG620000-02 BLANK	1	1		06/30/17 11:38
6	1LM.LM40115	WG620000-03 LCS (0.2ug/L)	1	1	STD80234	06/30/17 11:57
7	1LM.LM40116	L17061531-01	1	1	STD80234	06/30/17 12:16
8	1LM.LM40117	L17061531-01 MS	1	1	STD80234	06/30/17 12:35
9	1LM.LM40118	L17061531-01 MSD	1	1	STD80234	06/30/17 12:54
10	1LM.LM40119	WG619998-03 CCV (1.0ug/L)	1	1	STD80232	06/30/17 13:13
11	1LM.LM40120	WG620000-08 MRL (0.2ug/L)	1	1	STD80232	06/30/17 13:32
12	1LM.LM40121	WG619998-04 CCB	1	1		06/30/17 13:51

Comments

Seq.	Rerun	Dil.	Reason	Analytes
8				
	WG620000-05 Matrix spike recovery was below the lower control limit.			
9				
	WG620000-06 Matrix spike duplicate recovery was below the lower control limit.			

Page: 1 Approved: 30-JUN-17

Microbac Laboratories Inc.

Data Checklist

Date: 29-JUN-2017
Analyst: WTD
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83086
Analytical Workgroups: L17061390

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	X
Check for completeness	X
Primary Reviewer	WTD
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:

Secondary Reviewer:
30-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-30-2017 12:54:25

Microbac Laboratories Inc.

Data Checklist

Date: 30-JUN-2017
Analyst: WTD
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83100
Analytical Workgroups: L17061531

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	
Check for completeness	X
Primary Reviewer	WTD
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:
30-JUN-2017

Secondary Reviewer:
05-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-05-2017 09:17:51

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG620000

Login Number: L17061531

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
LH18/24-SP650-6452	01	06/28/17					06/30/2017	1.8	28		06/30/17	.1	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5361619
Report generated 07/05/2017 09:20

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 5362999
Report generated: 07/03/2017 09:49

METHOD BLANK SUMMARY

Login Number:	L17061531	**Work Group:**	WG620000
Blank File ID:	1LM.LM40114	**Blank Sample ID:**	WG620000-02
Prep Date:	06/30/17 10:22	**Instrument ID:**	LCMS1
Analyzed Date:	06/30/17 11:38	**Method:**	6850
Analyst:	WTD		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG620000-07	1LM.LM40112	06/30/17 11:00	01
MCT	WG620000-01	1LM.LM40113	06/30/17 11:19	01
LCS	WG620000-03	1LM.LM40115	06/30/17 11:57	01
LH18/24-SP650-6452	L17061531-01	1LM.LM40116	06/30/17 12:16	01
QCMRL	WG620000-08	1LM.LM40120	06/30/17 13:32	01

Report Name: BLANK_SUMMARY
PDF File ID: 5361620
Report generated 07/05/2017 09:20

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17061531 Prep Date: 06/30/17 10:22 Sample ID: WG620000-02
Instrument ID: LCMS1 Run Date: 06/30/17 11:38 Prep Method: 6850
File ID: 1LM.LM40114 Analyst: WTD Method: 6850
Workgroup (AAB#): WG620000 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5361621
05-JUL-2017 09:20

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17061531 Run Date: 06/30/2017 Sample ID: WG620000-03
Instrument ID: LCMS1 Run Time: 11:57 Prep Method: 6850
File ID: 1LM.LM40115 Analyst: WTD Method: 6850
Workgroup (AAB#): WG620000 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD80234 Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.211	106	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5361622
Report generated: 07/05/2017 09:20

Loginnum:L17061531 Cal ID:LCMS1- Worknum:WG620000
Instrument ID:LCMS1 Contract #: Method:6850
Parent ID:WG620000-04 File ID:1LM.LM40116 Dil:1 Matrix:WATER
Sample ID:WG620000-05 MS File ID:1LM.LM40117 Dil:1 Units:ug/L
Sample ID:WG620000-06 MSD File ID:1LM.LM40118 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	1.13	0.200	1.26	65.0	0.200	1.27	70.0	0.791	80 - 120	15	*

* 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: 5361623
Report generated 07/05/2017 09:20

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17061531
Analytical Method: 6850
ICAL Workgroup: WG619865

Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.454	6.38	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5361625
Report generated 07/05/2017 09:20

Login Number: L17061531
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-02			WG619865-03			WG619865-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	20800.0000	1.476	0.200	44600.0000	1.521	0.500	102000.000	1.433

INT_CAL - Modified 03/06/2008
PDF File ID: 5361625
Report generated 07/05/2017 09:20

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17061531
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-05			WG619865-06			WG619865-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	214000.000	1.464	2.00	408000.000	1.442	5.00	981000.000	1.437

INT_CAL - Modified 03/06/2008
PDF File ID: 5361625
Report generated 07/05/2017 09:20

Login Number: L17061531
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-08		
	CONC	RESP	RF
Perchlorate	10.0	1820000.00	1.407

INT_CAL - Modified 03/06/2008
PDF File ID: 5361625
Report generated 07/05/2017 09:20

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17061531 Run Date: 06/29/2017 Sample ID: WG619865-09
Instrument ID: LCMS1 Run Time: 15:45 Method: 6850
File ID: 1LM.LM40083 Analyst: WTD QC Key: DOD4
ICal Workgroup: WG619865 Cal ID: LCMS1 - 29-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.980	ug/L	1.40	2.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5361626
Report generated 07/05/2017 09:20

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17061531	Run Date:	06/30/2017	Sample ID:	WG619998-01
Instrument ID:	LCMS1	Run Time:	10:22	Method:	6850
File ID:	1LM.LM40110	Analyst:	WTD	Units:	ug/L
Workgroup (AAB#):	WG620000	Cal ID:	LCMS1 - 29-JUN-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5361629
Report generated 07/05/2017 09:20

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17061531	Run Date:	06/30/2017	Sample ID:	WG619998-04
Instrument ID:	LCMS1	Run Time:	13:51	Method:	6850
File ID:	1LM.LM40121	Analyst:	WTD	Units:	ug/L
Workgroup (AAB#):	WG620000	Cal ID:	LCMS1 - 29-JUN-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5361629
Report generated 07/05/2017 09:20

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17061531 Run Date: 06/30/2017 Sample ID: WG619998-02

Instrument ID: LCMS1 Run Time: 10:41 Method: 6850

File ID: 1LM.LM40111 Analyst: WTD QC Key: DOD4

Workgroup (AAB#): WG620000 Cal ID: LCMS1 - 29-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.03	ug/L	1.48	3.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5361628

Report generated 07/05/2017 09:20

Login Number: L17061531 Run Date: 06/30/2017 Sample ID: WG619998-03
Instrument ID: LCMS1 Run Time: 13:13 Method: 6850
File ID: 1LM.LM40119 Analyst: WTD QC Key: DOD4
Workgroup (AAB#): WG620000 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.46	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5361628
Report generated 07/05/2017 09:20

Login Number: L17061531 Run Date: 06/30/2017 Sample ID: WG620000-07
Instrument ID: LCMS1 Run Time: 11:00 Prep Method: 6850
File ID: 1LM.LM40112 Analyst: WTD Method: 6850
Workgroup (AAB#): WG620000 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.196	98.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5361624
Report generated 07/05/2017 09:20

Login Number: L17061531 Run Date: 06/30/2017 Sample ID: WG620000-08
Instrument ID: LCMS1 Run Time: 13:32 Prep Method: 6850
File ID: 1LM.LM40120 Analyst: WTD Method: 6850
Workgroup (AAB#): WG620000 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.201	101	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5361624
Report generated 07/05/2017 09:20

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L17061531
Instrument ID: LCMS1
Workgroup (AAB#): WG620000

ICAL CCV Number: WG619865-05
CAL ID: LCMS1-29-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG619865	NA	NA	703000
Upper Limit	NA	NA	1054500
Lower Limit	NA	NA	351500
L17061531-01	1.00	01	680000
WG620000-02	1.00	01	734000
WG620000-03	1.00	01	718000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5361630
Report generated 07/05/2017 09:20

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**	6850	**Samplenum:**	L17061531-01
Instrument:	LCMS1	**Prep Date:**	06/30/2017 10:22	**File ID:**	1LM.LM40116
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 12:16	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	219000	72600	3.02	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619865-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40076
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/29/2017 13:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	20800	6780	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619865-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40077
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/29/2017 13:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44600	13700	3.26	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619865-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40078
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/29/2017 14:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	102000	31100	3.28	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619865-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40079
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/29/2017 14:29	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	65900	3.25	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619865-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40080
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/29/2017 14:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	408000	126000	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619865-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40081
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/29/2017 15:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	981000	306000	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619865-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40082
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/29/2017 15:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1820000	577000	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619865-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40083
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/29/2017 15:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	200000	61800	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619998-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40110
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 10:22	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619998-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40111
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 10:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	211000	64300	3.28	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619998-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40119
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 13:13	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	213000	66800	3.19	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**		**Samplenum:**	WG619998-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40121
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 13:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**	6850	**Samplenum:**	WG620000-01
Instrument:	LCMS1	**Prep Date:**	06/30/2017 10:22	**File ID:**	1LM.LM40113
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 11:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	46500	14900	3.12	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**	6850	**Samplenum:**	WG620000-02
Instrument:	LCMS1	**Prep Date:**	06/30/2017 10:22	**File ID:**	1LM.LM40114
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 11:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**	6850	**Samplenum:**	WG620000-03
Instrument:	LCMS1	**Prep Date:**	06/30/2017 10:22	**File ID:**	1LM.LM40115
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 11:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44900	13700	3.28	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**	6850	**Samplenum:**	WG620000-05
Instrument:	LCMS1	**Prep Date:**	06/30/2017 10:22	**File ID:**	1LM.LM40117
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 12:35	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	263000	84300	3.12	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**	6850	**Samplenum:**	WG620000-06
Instrument:	LCMS1	**Prep Date:**	06/30/2017 10:22	**File ID:**	1LM.LM40118
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 12:54	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	261000	84800	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**	6850	**Samplenum:**	WG620000-07
Instrument:	LCMS1	**Prep Date:**	06/30/2017 10:22	**File ID:**	1LM.LM40112
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 11:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	43000	13900	3.09	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17061531	**Prep Method:**	6850	**Samplenum:**	WG620000-08
Instrument:	LCMS1	**Prep Date:**	06/30/2017 10:22	**File ID:**	1LM.LM40120
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG620000	**Analysis Date:**	06/30/2017 13:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	45800	14800	3.09	2.3	3.8	

2.3 General Chemistry Data

2.3.1 Method 9056

2.3.1.1 Summary Data

Microbac

Lab Report #: L17061531
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17061531-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP650-6452	**Prep Method:**	9056	**Prep Date:**	07/07/2017 17:00
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG620930	**Analyst:**	JWR	**Run Date:**	07/07/2017 19:41
Collect Date:	06/28/2017 15:00	**Dilution:**	5	**File ID:**	I2_070717-07
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	22.8		10.0	5.00	2.50

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17061531
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17061531-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP650-6452	**Prep Method:**	9056	**Prep Date:**	07/07/2017 17:00
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG620930	**Analyst:**	JWR	**Run Date:**	07/07/2017 20:00
Collect Date:	06/28/2017 15:00	**Dilution:**	50	**File ID:**	I2_070717-08
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	533		20.0	10.0	5.00

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L17061531
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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 unkown samples.
Amount(ppm) = [(slope)(area count of unknown) + y-intercept](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

Page: 1 Approved: 12-APR-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC2 Dataset: 070717 IC2.SEQ

Analyst1: JWR Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254

Eluent ID#: RGT40650

Workgroups: Column 1 ID: AG14A 4MM Column 2 ID: AS14A 4MM

Analytical WG620930 (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 = 1770psi

Samples L17061531-01, L17070032-01, L17070104-01 and L17070105-01 were analyzed at dilutions only due to their pre-run screen results for chloride, which were greater than 200ppm.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I2_070717-01	ELUENT	1	1		07/07/17 17:45
2	I2_070717-02	DI WATER	1	1		07/07/17 18:05
3	I2_070717-03	WG620931-01 ANION CCV	1	1	STD81395	07/07/17 18:24
4	I2_070717-04	WG620931-02 ANION CCB	1	1		07/07/17 18:43
5	I2_070717-05	WG620930-01 ANION BLANK	1	1		07/07/17 19:02
6	I2_070717-06	WG620930-02 ANION LCS	1	1	STD81396	07/07/17 19:22
7	I2_070717-07	L17061531-01 (CL,SO4) 5x	1	5		07/07/17 19:41
8	I2_070717-08	L17061531-01 RR (CL) 50x	1	50		07/07/17 20:00
9	I2_070717-09	L17070032-01 (CL,Br,SO4) 10x	2	10		07/07/17 20:19
10	I2_070717-10	L17070032-01 RR (CL) 100x	2	100		07/07/17 20:39
11	I2_070717-11	L17070103-01 (CL,SO4)	1	1		07/07/17 20:58
12	I2_070717-12	L17070103-01 RR (CL) 4x	1	4		07/07/17 21:17
13	I2_070717-13	L17070103-02 (CL,SO4)	1	1		07/07/17 21:36
14	I2_070717-14	L17070103-02 RR (CL) 10x	1	10		07/07/17 21:56
15	I2_070717-15	WG620931-03 ANION CCV	1	1	STD81395	07/07/17 22:15
16	I2_070717-16	WG620931-04 ANION CCB	1	1		07/07/17 22:34
17	I2_070717-17	L17070103-03 (CL,SO4) REF	1	1		07/07/17 22:53
18	I2_070717-18	WG620930-04 DUP 0103-03	1	1		07/07/17 23:13
19	I2_070717-19	WG620930-05 MS 0103-03	1	1	STD81396	07/07/17 23:32
20	I2_070717-20	WG620930-06 MSD 0103-03	1	1	STD81396	07/07/17 23:51
21	I2_070717-21	L17070103-04 (CL,SO4)	1	1		07/08/17 00:10
22	I2_070717-22	L17070104-01 (CL,SO4) 20x	1	20		07/08/17 00:29
23	I2_070717-23	L17070104-01 RR (CL) 200x	1	200		07/08/17 00:49
24	I2_070717-24	L17070105-01 (CL,SO4) 5x	1	5		07/08/17 01:08
25	I2_070717-25	L17070105-01 RR (CL) 50x	1	50		07/08/17 01:27
26	I2_070717-26	WG620931-05 ANION CCV	1	1	STD81395	07/08/17 01:46
27	I2_070717-27	WG620931-06 ANION CCB	1	1		07/08/17 02:06
28	I2_070717-28	END	1	1		07/08/17 02:25

Comments

Seq.	Rerun	Dil.	Reason	Analytes
7	X	50	Over Calibration Range	chloride
	L17061531-01 (CL,SO4) 5x			

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC2 Dataset: 070717 IC2.SEQ

Analyst1: JWR Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254

Eluent ID#: RGT40650

Workgroups: Column 1 ID: AG14A 4MM Column 2 ID: AS14A 4MM

Analytical WG620930 (waters)

Internal STD: NA Surrogate STD: NA STD77046 (04-11-2017)

CCV STD: STD81395 LCS STD: STD81396 STD81396

Comments

Seq.	Rerun	Dil.	Reason	Analytes
9	X	100	Over Calibration Range	chloride
	L17070032-01 (CL,Br,SO4) 10x			
11	X	4	Over Calibration Range	chloride
	L17070103-01 (CL,SO4)			
13	X	10	Over Calibration Range	chloride
	L17070103-02 (CL,SO4)			
22	X	200	Over Calibration Range	chloride
	L17070104-01 (CL,SO4) 20x			
24	X	50	Over Calibration Range	chloride
	L17070105-01 (CL,SO4) 5x			

Page: 2 Approved: 11-JUL-17

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: 07-JUL-2017
Analyst: JWR
Analyst: NA
Method: 300/9056
Instrument: IC2
Curve Workgroup: NA
Runlog ID: 83238
Analytical Workgroups: L17061531 L17070032, 0103, 0104, 0105

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)	1770PSI
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	JWR
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	MES

Primary Reviewer:
10-JUL-2017
John Richards

Secondary Reviewer:
11-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-11-2017 08:58:43

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 9056 **AAB#:** WG620930

Login Number: L17061531

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
LH18/24-SP650-6452	01	06/28/17					07/07/2017	9.1	2	*	07/07/17	9.2	2	*
LH18/24-SP650-6452	01	06/28/17					07/07/2017	9.1	2	*	07/07/17	9.2	2	*

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5376395
Report generated 07/11/2017 09:08

METHOD BLANK SUMMARY

Login Number: L17061531
Work Group: WG620930
Blank File ID: I2_070717-05
Blank Sample ID: WG620930-01
Prep Date: 07/07/17 17:00
Instrument ID: IC2
Analyzed Date: 07/07/17 19:02
Method: 9056
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG620930-02	I2_070717-06	07/07/17 19:22	01
LH18/24-SP650-6452	L17061531-01	I2_070717-07	07/07/17 19:41	DL01
LH18/24-SP650-6452	L17061531-01	I2_070717-08	07/07/17 20:00	DL02
DUP	WG620930-04	I2_070717-18	07/07/17 23:13	01

Report Name: BLANK_SUMMARY
PDF File ID: 5376396
Report generated 07/11/2017 09:08

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17061531 Prep Date: 07/07/17 17:00 Sample ID: WG620930-01
Instrument ID: IC2 Run Date: 07/07/17 19:02 Prep Method: 9056
File ID: I2_070717-05 Analyst: JWR Method: 9056
Workgroup (AAB#): WG620930 Matrix: Water Units: mg/L
Contract #: Cal ID: IC2-11-APR-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Chloride	0.100	0.400	0.100	1	U
Sulfate	0.500	2.00	0.500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5376397
11-JUL-2017 09:08

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17061531 Run Date: 07/07/2017 Sample ID: WG620930-02
Instrument ID: IC2 Run Time: 19:22 Prep Method: 9056
File ID: I2_070717-06 Analyst: JWR Method: 9056
Workgroup (AAB#): WG620930 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD81396 Cal ID: IC2-11-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Chloride	8.00	8.12	102	90 - 110	
Sulfate	40.0	41.4	104	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5376398
Report generated: 07/11/2017 09:08

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17061531
Analytical Method: 9056
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
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5376664
Report generated 07/11/2017 09:08

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17061531
Analytical Method: 9056
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	5.128	1.00	0.194000000	5.155	4.00	0.805000000	4.969
Sulfate	1.00	0.136000000	7.353	5.00	0.730000000	6.849	20.0	3.09600000	6.460

INT_CAL - Modified 03/06/2008
PDF File ID: 5376664
Report generated 07/11/2017 09:08

Login Number: L17061531
Analytical Method: 9056
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: 5376664
Report generated 07/11/2017 09:08

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17061531 Run Date: 04/11/2017 Sample ID: WG609755-07
Instrument ID: IC2 Run Time: 18:50 Method: 9056
File ID: I2_041117-09 Analyst: CAS QC Key: DOD4
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: 5376666
Report generated 07/11/2017 09:08

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17061531 | Run Date: 07/07/2017 | Sample ID: WG620931-02
Instrument ID: IC2 | Run Time: 18:43 | Method: 9056
File ID: I2_070717-04 | Analyst: JWR | Units: mg/L
Workgroup (AAB#): WG620930 | Cal ID: IC2 - 11-APR-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.400	0.100	U
Sulfate	0.500	2.00	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: 5376400
Report generated 07/11/2017 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17061531 Run Date: 07/07/2017 Sample ID: WG620931-04
Instrument ID: IC2 Run Time: 22:34 Method: 9056
File ID: I2_070717-16 Analyst: JWR Units: mg/L
Workgroup (AAB#): WG620930 Cal ID: IC2 - 11-APR-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.400	0.100	U
Sulfate	0.500	2.00	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: 5376400
Report generated 07/11/2017 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17061531 Run Date: 07/07/2017 Sample ID: WG620931-01
Instrument ID: IC2 Run Time: 18:24 Method: 9056
File ID: I2_070717-03 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG620930 Cal ID: IC2 - 11-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.09	mg/L	4.69	1.10	10	
Sulfate		40.0	41.0	mg/L	5.96	2.49	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5376399
Report generated 07/11/2017 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17061531 Run Date: 07/07/2017 Sample ID: WG620931-03

Instrument ID: IC2 Run Time: 22:15 Method: 9056

File ID: I2_070717-15 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG620930 Cal ID: IC2 - 11-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.10	mg/L	4.69	1.30	10	
Sulfate		40.0	41.0	mg/L	5.95	2.61	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5376399

Report generated 07/11/2017 09:08

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
July 11, 2017

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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	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

Microbac Laboratories Inc.
List of Valid Qualifiers
July 11, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
July 11, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

AECOM

Chain of Custody Record

COC Number:

Laboratory:	Microbac POC: Stephanie Mossburg	Project Manager: [redacted] ELSPETH SHARP	Mail to: Linda Raabe
Address:	158 Starlite Drive	Phone/Fax Number: 210-296-2000	112 East Pecan STE. 400
	Marietta, OH 45750	Sampler (print): Scott Beesinger	San Antonio, TX 78205
Phone:	1-800-373-4071		210-296-2000
Client:	AECOM	Signature: Scott Beesinger	Fed Ex Airbill No:
Address:	112 East Pecan Ste. 400		
	San Antonio, TX 78205		Program:
Turn Around Time:	STANDARD	pH:	
Project Name/Location:	Longhorn		
Project Number:	60256135, GWTPTHRUMAR16		

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp*	Grab	Matrix	Number of Containers	VOC	Chloride Sulfate	Perchlorate	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
GWTP Bi-Weekly	LH18/24-SP650-6452			6/28/17	1500		X	W	5	X	X	X					
	TRIP BLANK			6/28/17			X	W	2	X							

ERPIMS REQUIRED FIELDS

Comments: STANDARD TAT

Relinquished by: (Signature)	Scott Beesinger	Date 6/28/17	Time 1545	Received by: (S	Relinquished by: (Signature)
Relinquished by: (Signature)		Date	Time	Received for La (Signature)	Remarks:

Microbac OVD
Received: 06/29/2017 09:39
By: CARA STRICKLER 221000102701

•Homogenize all composite samples prior to analysis

Distribution: White to Laboratory, Canary to Project Manager, Pink QA/QC Manager

MICROBAC

COOLER TEMP >6° C LOG

Cooler ID 2701

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

CWD 6/29/17

pH Exceptions

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

CWD 6/29/17

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

CWD 6/29/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17061531
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 10-JUL-2017

Samplenum	Container ID	Products
L17061531-01	928874	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		29-JUN-2017 15:15	BRG		

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		29-JUN-2017 15:15	BRG		

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		29-JUN-2017 15:15	BRG		

Samplenum	Container ID	Products
L17061531-01	928875	PCT-S 826-SPE 9056

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	29-JUN-2017 15:15	BRG		
2	ANALYZ	V1	ORG4	29-JUN-2017 18:35	JDS	BRG	

Samplenum	Container ID	Products
L17061531-01	928876	PCT-S 6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	29-JUN-2017 15:15	BRG		
2	ANALYZ	W1	SEM	30-JUN-2017 09:51	WTD	CLS	
3	STORE	SEM	A1	30-JUN-2017 13:52	CLS	WTD	

Samplenum	Container ID	Products
L17061531-02	928946	SPECIA 826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	29-JUN-2017 15:25	BRG		
2	ANALYZ	V1	ORG4	29-JUN-2017 18:35	JDS	BRG	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	29-JUN-2017 15:25	BRG		
2	ANALYZ	V1	ORG4	29-JUN-2017 18:35	JDS	BRG	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

APPENDIX F: Air Monitoring Data – 2nd Quarter 2017

Attachment A

Air Monitoring Calculations

Longhorn Army Ammunition Plant
Groundwater Treatment Plant
Ambient Air Data - June 5, 2017

Pollutant	CAS	Short Term ESL March 2012 µg/m³	AMCVs (ST Health) µg/m³	GWTP Ambient Air Concentrations (1) µg/m³		Status (3)	Downwind Ambient Air Concentrations (2) µg/m³		Status (3)
1,1-Dichloroethane	75-34-3	4000	4047	0.77	U	PASS	0.81	U	PASS
1,1-Dichloroethene	75-35-4	210	714	0.77	U	PASS	0.81	U	PASS
1,2-Dichloroethane	107-06-2	160	162	0.77	U	PASS	0.81	U	PASS
Acetone	67-64-1	5900	NA	**8.9**		PASS	**16**		PASS
Benzene	71-43-2	170	575	0.77	U	PASS	0.81	U	PASS
Carbon disulfide	75-15-0	30	NA	7.7	U	PASS	8.1	U	PASS
Chloroform	67-66-3	100	98	0.77	U	PASS	0.81	U	PASS
cis-1,2-Dichloroethene	540-59-0	7900	NA	**7.3**		PASS	0.81	U	PASS
Methylene chloride	75-09-2	3600	12158	**4.0**		PASS	0.81	U	PASS
Tetrachloroethene	127-18-4	2000	6782	0.77	U	PASS	**3.4**		PASS
trans-1,2-Dichloroethene	540-59-0	7900	NA	0.77	U	PASS	0.81	U	PASS
Trichloroethene	79-01-6	540	537	**22.0**		PASS	0.81	U	PASS
Vinyl chloride	75-01-4	20000	66460	0.77	U	PASS	0.81	U	PASS
n-Hexane	110-54-3	5300	6336	**1.0**		PASS	**2.3**		PASS
Styrene	100-42-5	110	21725	0.77	U	PASS	0.81	U	PASS
Toluene	108-88-3	640	15074	**1.5**		PASS	**3.4**		PASS
Ethylbenzene	100-41-4	740	86844	0.77	U	PASS	0.81	U	PASS
m,p-Xylenes	179601-23-1	180	7382	1.5	U	PASS	**1.9**		PASS
o-Xylene	95-47-6	1600	7382	0.77	U	PASS	0.81	U	PASS
1,3-Dichlorobenzene	541-73-1	720	NA	0.77	U	PASS	0.81	U	PASS
Propene (C3 H6)	115-07-1	Asphyxiant	Asphyxiant	0.77	U	NA	0.81	U	NA
Dichlorodifluoromethane (CCl2F2)	75-71-8	50000	49452	**2.2**		PASS	**4.7**		PASS
Ethanol	64-17-5	18800	NA	7.7	U	PASS	**11**		PASS
Trichlorofluoromethane (CCl3F)	75-69-4	28000	56184	**1.2**		PASS	**2.6**		PASS
Trichlorotrifluoroethane (C2Cl3F3)	76-13-1	38000	NA	**45**		PASS	**2.7**		PASS
alpha-Pinene	80-56-8	60	3499	**0.82**		PASS	**1.5**		PASS
d-Limonene	5989-27-5	1100	NA	0.77	U	PASS	0.81	U	PASS

(1) Sample collected over an 8-hour period on June 5, 2017 between 8 AM and 4 PM

(2) Sample collected over a 24-hour period beginning on June 5, 2017 at 8 AM and ending on June 6, 2017 at 8 AM

(3) Status based on comparison of air sample result to Air Monitoring Comparison Values (AMCVs). When there is no AMCV value for a chemical, the air sample concentration is compared to the short-term ESL.

Longhorn Army Ammunition Plant
Groundwater Treatment Plant
Emission Stack Air Data - June 5, 2017

Pollutant	CAS	Measured Air Stripper Stack Concentrations (1)		Air Stripper Emission Rates (2)		Air Stripper Emission Rates(2a)		Allowable Annual Emission (3)	Status (4)	TLV (L)	TLV Reference	Compliance section	Distance Downwind to nearest off-site Receptor (D)	(K) value	Allowable Maximum Hourly Emission Limit at Nearest off-site Receptor [6][7] (E) = L/K	Status (8)
		µg/m^3		lb/hr		tpy		tpy		mg/m^3			ft		lb/hr	
1,1-Dichloroethane	75-34-3	210	U	1.72E-03	U	1.12E-03	U	5	PASS	405	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
1,1-Dichloroethene	75-35-4	**240**		3.93E-03		2.56E-03		5	PASS	20	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.4	PASS
1,2-Dichloroethane	107-06-2	**240**		3.93E-03		2.56E-03		5	PASS	40	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	2.9	PASS
Acetone	67-64-1	2100	U	1.72E-02	U	1.12E-02	U	5	PASS	590	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
Benzene	71-43-2	210	U	1.72E-03	U	1.12E-03	U	5	PASS	3	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	0.21	PASS
Carbon disulfide	75-15-0	2100	U	1.72E-02	U	1.12E-02	U	5	PASS	31	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	2.2	PASS
Chloroform	67-66-3	210	U	1.72E-03	U	1.12E-03	U	5	PASS	10	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	0.71	PASS
cis-1,2-Dichloroethene	540-59-0	**15,000**		2.46E-01		1.60E-01		5	PASS	793	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
Methylene chloride	75-09-2	**9,700**		1.59E-01		1.03E-01		5	PASS	26	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.9	PASS
Tetrachloroethene	127-18-4	210	U	1.72E-03	U	1.12E-03	U	5	PASS	33.5	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	2.4	PASS
trans-1,2-Dichloroethene	540-59-0	210	U	1.72E-03	U	1.12E-03	U	5	PASS	793	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
Trichloroethene	79-01-6	**29,000**		4.75E-01		3.09E-01		5	PASS	135	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	6.0	PASS
Vinyl chloride	75-01-4	**300**		4.92E-03		3.20E-03		5	PASS	2	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	0.14	PASS
n-Hexane	110-54-3	210	U	1.72E-03	U	1.12E-03	U	5	PASS	1800	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
Styrene	100-42-5	210	U	1.72E-03	U	1.12E-03	U	5	PASS	21	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.5	PASS
Toluene	108-88-3	210	U	1.72E-03	U	1.12E-03	U	5	PASS	188	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	6.0	PASS
Ethylbenzene	100-41-4	210	U	1.72E-03	U	1.12E-03	U	5	PASS	434	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
m,p-Xylenes	179601-23-1	420	U	3.44E-03	U	2.24E-03	U	5	PASS	434	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
o-Xylene	95-47-6	210	U	1.72E-03	U	1.12E-03	U	5	PASS	434	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
1,3-Dichlorobenzene	541-73-1	210	U	1.72E-03	U	1.12E-03	U	5	PASS	(5)	--	30 TAC 106.533(f)(1)(A)(i)	2000	14	1.0	PASS
Propene (C3 H6)	115-07-1	210	U	1.72E-03	U	1.12E-03	U	5	PASS	(5)	--	30 TAC 106.533(f)(1)(A)(i)	2000	14	6.0	PASS
Dichlorodifluoromethane (CCl2F2)	75-71-8	210	U	1.72E-03	U	1.12E-03	U	5	PASS	4950	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
Ethanol	64-17-5	2,100	U	1.72E-02	U	1.12E-02	U	5	PASS	1880	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
Trichlorofluoromethane (CCl3F)	75-69-4	210	U	1.72E-03	U	1.12E-03	U	5	PASS	5620	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
Trichlorotrifluoroethane (C2Cl3F3)	76-13-1	**19,000**		3.12E-01		2.02E-01		5	PASS	7670	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2000	14	1.0	PASS
alpha-Pinene	80-56-8	210	U	1.72E-03	U	1.12E-03	U	5	PASS	(5)	--	30 TAC 106.533(f)(1)(A)(i)	2000	14	1.0	PASS
d-Limonene	5989-27-5	210	U	1.72E-03	U	1.12E-03	U	5	PASS	(5)	--	30 TAC 106.533(f)(1)(A)(i)	2000	14	1.0	PASS
	TOTAL			1.287												

(1) Sample collected on June 5, 2017 at 2:00 PM
(2) Based on a blower flow rate of 4390 cfm. Note that plant operations is less than or equal to 25 hours per week. 1/2 of detection limit was used for estimating mass rate.
(2a) Based on operation of 25 hours per week, 52 weeks per year.
(3) Per 30TAC 106.533(f)(1)(B)
(4) Based on comparing the calculated air stripper stack sample emission rate in tons per year (tpy) to the allowable annual emission limit per chemical of 5 tpy.
(5) No TLVs for these chemicals
(6) The maximum hourly limit allowed by 30 TAC 106.262, per pollutant, is 6 lbs/hr per "Figure 1: 30 TAC 106.262(a)". The E value was overridden with 6 lb/hr when the calculated E was higher.
(7) The maximum hourly emission rate allowed by 30 TAC 106.261(a)(3) for chemicals with an limit value (L) greater than 200 mg/m^3 is 1 lb/hr.
(8) Based on comparing the calculated air stripper stack sample emission rate in pounds per hour (lb/hr) to the allowable maximum emission limit per chemical based on distance downwind to nearest off-site receptor.

Attachment B

PID Readings and Calibration Logs

Photoionization Detector Measurements During GWTP Operation 2nd Quarter 2017

Date	Time	Location	Air Flow Rate at Blower	Instrument ID	Person Collecting	PID Reading	Weather Conditions
4/4/2017	8:00	Outside GWTP Office	4500 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 57 degrees
4/4/2017	8:00	Downwind	4500 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 57 degrees
4/4/2017	8:00	Stripper	4500 ACFM	MiniRAE 3000	Scott Beesinger	Max. 16.0 ppm Steady State 7.3 ppm	Clear 57 degrees
4/4/2017	14:00	Outside GWTP Office	4375 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 85 degrees
4/4/2017	14:00	Downwind	4375 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 85 degrees
4/4/2017	14:00	Stripper	4375 ACFM	MiniRAE 3000	Kennie moore	Max. 14.6 ppm Steady State 6.7 ppm	Clear 85 degrees
4/11/2017	8:00	Outside GWTP Office	4455 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Rain 67 degrees
4/11/2017	8:00	Downwind	4455 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Rain 67 degrees
4/11/2017	8:00	Stripper	4455 ACFM	MiniRAE 3000	Scott Beesinger	Max. 15.5 ppm Steady State 6.8 ppm	Rain 67 degrees
4/11/2017	14:00	Outside GWTP Office	4320 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast 67 degrees
4/11/2017	14:00	Downwind	4320 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast 67 degrees
4/11/2017	14:00	Stripper	4320 ACFM	MiniRAE 3000	Kennie moore	Max. 16.9 ppm Steady State 7.6 ppm	Overcast 67 degrees
4/17/2017	8:00	Outside GWTP Office	4420 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 65 degrees
4/17/2017	8:00	Downwind	4420 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 65 degrees
4/17/2017	8:00	Stripper	4420 ACFM	MiniRAE 3000	Scott Beesinger	Max. 16.9 ppm Steady State 8.1 ppm	Clear 65 degrees
4/17/2017	14:00	Outside GWTP Office	4345 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 73 degrees
4/17/2017	14:00	Downwind	4345 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 73 degrees
4/17/2017	14:00	Stripper	4345 ACFM	MiniRAE 3000	Kennie moore	Max. 14.5 ppm Steady State 6.1 ppm	Clear 73 degrees
4/24/2017	8:00	Outside GWTP Office	4540 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 47 degrees
4/24/2017	8:00	Downwind	4540 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 47 degrees
4/24/2017	8:00	Stripper	4540 ACFM	MiniRAE 3000	Scott Beesinger	Max. 17.3 ppm Steady State 8.2 ppm	Clear 47 degrees
4/24/2017	14:00	Outside GWTP Office	4355 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 75 degrees
4/24/2017	14:00	Downwind	4355 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 75 degrees
4/24/2017	14:00	Stripper	4355 ACFM	MiniRAE 3000	Kennie moore	Max. 16.1 ppm Steady State 6.0 ppm	Clear 75 degrees
5/1/2017	8:00	Outside GWTP Office	4365 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 53 degrees
5/1/2017	8:00	Downwind	4365 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 53 degrees
5/1/2017	8:00	Stripper	4365 ACFM	MiniRAE 3000	Scott Beesinger	Max. 15.8 ppm Steady State 5.6 ppm	Clear 53 degrees
5/1/2017	14:00	Outside GWTP Office	4300 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 75 degrees
5/1/2017	14:00	Downwind	4300 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 75 degrees
5/1/2017	14:00	Stripper	4300 ACFM	MiniRAE 3000	Kennie moore	Max. 16.7 ppm Steady State 5.9 ppm	Clear 75 degrees
5/8/2017	8:00	Outside GWTP Office	4325 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 58 degrees
5/8/2017	8:00	Downwind	4325 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 58 degrees
5/8/2017	8:00	Stripper	4335 ACFM	MiniRAE 3000	Scott Beesinger	Max. 17.6 ppm Steady State 8.1 ppm	Clear 58 degrees
5/8/2017	14:00	Outside GWTP Office	4135 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 78 degrees
5/8/2017	14:00	Downwind	4135 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 78 degrees
5/8/2017	14:00	Stripper	4135 ACFM	MiniRAE 3000	Kennie moore	Max. 15.9 ppm Steady State 5.8 ppm	Clear 78 degrees
5/11/2017	8:00	Outside GWTP Office	4120 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 67 degrees
5/11/2017	8:00	Downwind	4120 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 67 degrees
5/11/2017	8:00	Stripper	4120 ACFM	MiniRAE 3000	Scott Beesinger	Max. 16.3 ppm Steady State 7.4 ppm	Clear 67 degrees
5/11/2017	13:00	Outside GWTP Office	4050 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 80 degrees
5/11/2017	13:00	Downwind	4050 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 80 degrees
5/11/2017	13:00	Stripper	4050 ACFM	MiniRAE 3000	Kennie moore	Max. 17.7 ppm Steady State 6.9 ppm	Clear 80 degrees
5/15/2017	8:00	Outside GWTP Office	4200 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 67 degrees
5/15/2017	8:00	Downwind	4200 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 67 degrees
5/15/2017	8:00	Stripper	4200 ACFM	MiniRAE 3000	Scott Beesinger	Max. 17.7 ppm Steady State 8.1 ppm	Clear 67 degrees
5/15/2017	14:00	Outside GWTP Office	4070 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 82 degrees
5/15/2017	14:00	Downwind	4070 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 82 degrees
5/15/2017	14:00	Stripper	4070 ACFM	MiniRAE 3000	Kennie moore	Max. 15.9 ppm Steady State 5.7 ppm	Clear 82 degrees
5/18/2017	8:00	Outside GWTP Office	4115 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 73 degrees
5/18/2017	8:00	Downwind	4115 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 73 degrees
5/18/2017	8:00	Stripper	4115 ACFM	MiniRAE 3000	Scott Beesinger	Max. 15.5 ppm Steady State 4.8 ppm	Clear 73 degrees
5/18/2017	13:00	Outside GWTP Office	4000 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 80 degrees
5/18/2017	13:00	Downwind	4000 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 80 degrees
5/18/2017	13:00	Stripper	4000 ACFM	MiniRAE 3000	Kennie moore	Max. 16.9 ppm Steady State 5.6 ppm	Clear 80 degrees
5/22/2017	8:00	Outside GWTP Office	4255 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Overcast/Rain 63 degrees
5/22/2017	8:00	Downwind	4255 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Overcast/Rain 63 degrees
5/22/2017	8:00	Stripper	4255 ACFM	MiniRAE 3000	Scott Beesinger	Max. 17.4 ppm Steady State 7.1 ppm	Overcast/Rain 63 degrees
5/22/2017	14:00	Outside GWTP Office	4230 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast/Rain 63 degrees
5/22/2017	14:00	Downwind	4230 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast/Rain 63 degrees
5/22/2017	14:00	Stripper	4230 ACFM	MiniRAE 3000	Kennie moore	Max. 15.3 ppm Steady State 5.0 ppm	Overcast/Rain 63 degrees
5/25/2017	8:00	Outside GWTP Office	4195 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 56 degrees
5/25/2017	8:00	Downwind	4195 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 56 degrees
5/25/2017	8:00	Stripper	4195 ACFM	MiniRAE 3000	Scott Beesinger	Max. 18.3 ppm Steady State 7.8 ppm	Clear 56 degrees
5/25/2017	14:00	Outside GWTP Office	4045 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 83 degrees
5/25/2017	14:00	Downwind	4045 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 83 degrees
5/25/2017	14:00	Stripper	4045 ACFM	MiniRAE 3000	Kennie moore	Max. 16.6 ppm Steady State 5.9 ppm	Clear 83 degrees
5/30/2017	8:00	Outside GWTP Office	4140 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Overcast 69 degrees
5/30/2017	8:00	Downwind	4140 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Overcast 69 degrees
5/30/2017	8:00	Stripper	4140 ACFM	MiniRAE 3000	Scott Beesinger	Max. 17.1 ppm Steady State 6.8 ppm	Overcast 69 degrees
5/30/2017	14:00	Outside GWTP Office	4010 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 80 degrees
5/30/2017	14:00	Downwind	4010 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 80 degrees
5/30/2017	14:00	Stripper	4010 ACFM	MiniRAE 3000	Kennie moore	Max. 18.3 ppm Steady State 7.7 ppm	Clear 80 degrees

Photoionization Detector Measurements During GWTP Operation 2nd Quarter 2017

Date	Time	Location	Air Flow Rate at Blower	Instrument ID	Person Collecting	PID Reading	Weather Conditions
6/2/2017	8:00	Outside GWTP Office	4210 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Cloudy 70 degrees
6/2/2017	8:00	Downwind	4210 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Cloudy 70 degrees
6/2/2017	8:00	Stripper	4210 ACFM	MiniRAE 3000	Scott Beesinger	Max. 17.0 ppm Steady State 6.5 ppm	Cloudy 70 degrees
6/2/2017	14:00	Outside GWTP Office	4025 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 75 degrees
6/2/2017	14:00	Downwind	4025 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 75 degrees
6/2/2017	14:00	Stripper	4025 ACFM	MiniRAE 3000	Kennie moore	Max. 15.3 ppm Steady State 4.8 ppm	Clear 75 degrees
6/5/2017	8:00	Outside GWTP Office	4100 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Cloudy 70 degrees
6/5/2017	8:00	Downwind	4100 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Cloudy 70 degrees
6/5/2017	8:00	Stripper	4100 ACFM	MiniRAE 3000	Scott Beesinger	Max. 16.6 ppm Steady State 4.5 ppm	Cloudy 70 degrees
6/5/2017	14:00	Outside GWTP Office	4055 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Cloudy 77 degrees
6/5/2017	14:00	Downwind	4055 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Cloudy 77 degrees
6/5/2017	14:00	Stripper	4055 ACFM	MiniRAE 3000	Kennie moore	Max. 17.9 ppm Steady State 5.8 ppm	Cloudy 77 degrees
6/8/2017	8:00	Outside GWTP Office	4110 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 68 degrees
6/8/2017	8:00	Downwind	4110 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 68 degrees
6/8/2017	8:00	Stripper	4110 ACFM	MiniRAE 3000	Kennie moore	Max. 15.7 ppm Steady State 4.9 ppm	Clear 68 degrees
6/8/2017	14:00	Outside GWTP Office	4030 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 79 degrees
6/8/2017	14:00	Downwind	4030 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 79 degrees
6/8/2017	14:00	Stripper	4030 ACFM	MiniRAE 3000	Kennie moore	Max. 14.3 ppm Steady State 5.6 ppm	Clear 79 degrees
6/12/2017	8:00	Outside GWTP Office	4120 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast 75 degrees
6/12/2017	8:00	Downwind	4120 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast 75 degrees
6/12/2017	8:00	Stripper	4120 ACFM	MiniRAE 3000	Kennie moore	Max. 17.3 ppm Steady State 6.5 ppm	Overcast 75 degrees
6/12/2017	14:00	Outside GWTP Office	3975 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 83 degrees
6/12/2017	14:00	Downwind	3975 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 83 degrees
6/12/2017	14:00	Stripper	3975 ACFM	MiniRAE 3000	Kennie moore	Max. 16.2 ppm Steady State 6.9 ppm	Clear 83 degrees
6/15/2017	8:00	Outside GWTP Office	4040 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Cloudy 75 degrees
6/15/2017	8:00	Downwind	4040 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Cloudy 75 degrees
6/15/2017	8:00	Stripper	4040 ACFM	MiniRAE 3000	Kennie moore	Max. 16.2 ppm Steady State 5.7 ppm	Cloudy 75 degrees
6/15/2017	14:00	Outside GWTP Office	3930 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 88 degrees
6/15/2017	14:00	Downwind	3930 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 88 degrees
6/15/2017	14:00	Stripper	3930 ACFM	MiniRAE 3000	Kennie moore	Max. 15.4 ppm Steady State 5.3 ppm	Clear 88 degrees
6/19/2017	8:00	Outside GWTP Office	4040 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast 77 degrees
6/19/2017	8:00	Downwind	4040 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast 77 degrees
6/19/2017	8:00	Stripper	4040 ACFM	MiniRAE 3000	Kennie moore	Max. 15.9 ppm Steady State 4.7 ppm	Overcast 77 degrees
6/19/2017	14:00	Outside GWTP Office	3930 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Cloudy 86 degrees
6/19/2017	14:00	Downwind	3930 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Cloudy 86 degrees
6/19/2017	14:00	Stripper	3930 ACFM	MiniRAE 3000	Kennie moore	Max. 16.3 ppm Steady State 4.2 ppm	Cloudy 86 degrees
6/22/2017	8:00	Outside GWTP Office	4010 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Rain 73 degrees
6/22/2017	8:00	Downwind	4010 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Rain 73 degrees
6/22/2017	8:00	Stripper	4010 ACFM	MiniRAE 3000	Scott Beesinger	Max. 17.0 ppm Steady State 5.2 ppm	Rain 73 degrees
6/22/2017	12:00	Outside GWTP Office	3875 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast 78 degrees
6/22/2017	12:00	Downwind	3875 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Overcast 78 degrees
6/22/2017	12:00	Stripper	3875 ACFM	MiniRAE 3000	Kennie moore	Max. 15.8 ppm Steady State 4.3 ppm	Overcast 78 degrees
6/27/2017	8:00	Outside GWTP Office	4040 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 73 degrees
6/27/2017	8:00	Downwind	4040 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 73 degrees
6/27/2017	8:00	Stripper	4040 ACFM	MiniRAE 3000	Scott Beesinger	Max. 18.1 ppm Steady State 6.7 ppm	Clear 73 degrees
6/27/2017	14:00	Outside GWTP Office	3860 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 85 degrees
6/27/2017	14:00	Downwind	3860 ACFM	MiniRAE 3000	Kennie moore	0.0 ppm	Clear 85 degrees
6/27/2017	14:00	Stripper	3860 ACFM	MiniRAE 3000	Kennie moore	Max. 16.9 ppm Steady State 4.7 ppm	Clear 85 degrees

00858706

EQUIPMENT CALIBRATION DAILY LOG

Date: 5/1/17	Project Name: LHAAP GWTP
Project Number: 60256135. GWTPTHRUMAR16	Recorded By: Scott Beesinger

PID					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Model: Mini Rae 3000		Bulb: ~~10.6~~ 11.7 meV				
	Equipment ID #: 1112989						
	Parameter	Standard	Exp. Date	Lot #	Time: 0700	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100ppm (isobutylene)	2/6/19	CAP-248-100-4	Value: SB	Value:	Value:

COMB. GAS/O_2 METER					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	Value:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Piont Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Piont Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:

00858707

EQUIPMENT CALIBRATION DAILY LOG

Date: 5/8/17	Project Name: GWTP LHAAP
Project Number: 60256135. GWTPTHRUMAR16	Recorded By: Scott Beesinger

PID	Model: Mini RAE 3000	Bulb: ~~10.6~~ 11.7 meV			Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #: 1112989						
	Parameter	Standard	Exp. Date	Lot #	Time: 0715	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100ppm (isobutylene)	2/6/19	CAP-248-100-4	Value: SB	Value:	Value:

COMB. GAS/O_2 METER	Model:				Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER	Model:				Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	Value:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Piont Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Piont Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:

00858708

EQUIPMENT CALIBRATION DAILY LOG

Date: 5/11/17 | Project Name: LHAAP GWTP

Project Number: 60256135.GWTPTHRU MAR16 | Recorded By: Scott Beesinger

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini Rae 3000		Bulb: ~~10.6~~ 10.7 meV				
	Equipment ID #: 112489						
	Parameter	Standard	Exp. Date	Lot #	Time: 0650	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: To zero SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100ppm (isobutylene)	2/6/19	~~CRP~~ CRP-248-100-4	Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	Value:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Piont Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Piont Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:

EQUIPMENT CALIBRATION DAILY LOG

Date: 5/15/17	**Project Name:** LHAAP GWTP
Project Number: ~~B~~10256135.GWTPTHRUMAR16	**Recorded By:** Scott Beesinger

PID							
	Model: MiniRAE 3000		Bulb: ~~10.6~~ 11.7 meV		**Morning Calibration**	**Evening Check**	**Additional Calib./Check (if necessary)**
	Equipment ID #: 1112989						
	Parameter	Standard	Exp. Date	Lot #	**Time:** 0645 **Initials:** SB	**Time:** **Initials:**	**Time:** **Initials:**
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100ppm (isobutylene)	2/6/19	Cap-248-100-4	Value: SB	Value:	Value:

COMB. GAS/O_2 METER							
	Model:				**Morning Calibration**	**Evening Check**	**Additional Calib./Check (if necessary)**
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	**Time:** **Initials:**	**Time:** **Initials:**	**Time:** **Initials:**
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER							
	Model:				**Morning Calibration/Check**	**Evening Check (one point only)**	**Additional Calib./Check (if necessary)**
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	**Time:** **Initials:**	**Time:** **Initials:**	**Time:** **Initials:**
First Point Calibration (Auto)	pH	4.00			Value:	Value:	Value:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Piont Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Piont Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:

00858710

EQUIPMENT CALIBRATION DAILY LOG

Date: 5/18/17	Project Name: LHAAP GWTP
Project Number: 60256135.GWTPTHROMAR16	Recorded By: Scott Beesinger

PID	Model: Mini RAE 3000	Bulb: ~~10.6~~ 11.7 eV			Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #: 1112989						
	Parameter	Standard	Exp. Date	Lot #	Time: 0705	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	2/6/18	CAP-248-100-4	Value: SB	Value:	Value:

COMB. GAS/O_2 METER	Model:				Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER	Model:				Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	Value:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Piont Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Piont Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:

00858711

EQUIPMENT CALIBRATION DAILY LOG

Date: 5/22/17 | Project Name: LHAAP GWTP

Project Number: 60256135.GWTPTHRUMAR16 | Recorded By: Scott Beesinger

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini RAE 3000		Bulb: ~~10.6~~ 11.7 meV				
	Equipment ID #: 1112989						
	Parameter	Standard	Exp. Date	Lot #	Time: 0700	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: To zero SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100ppm (isobutylene)	2/6/19	CAP-248-100-4	Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	Value:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Piont Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Piont Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:

00858712

EQUIPMENT CALIBRATION DAILY LOG

Date: 5/25/17	Project Name: LHAAP GWTP
Project Number: 60256135. GWTP THRU MAR16	Recorded By: Scott BEESINGER

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini Rae 3000		Bulb: ~~10.6~~ 11.7 meV				
	Equipment ID #: 1112989						
	Parameter	Standard	Exp. Date	Lot #	Time: 0715	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100ppm (isobutylene)	2/6/19	CAP-248-100-4	Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	Value:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Piont Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Piont Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:

00858713

EQUIPMENT CALIBRATION DAILY LOG

Date: 5/30/17 | Project Name: LHAAP GWTP

Project Number: 60256135. GWTP THRU MAR16 | Recorded By: Scott Beesinger

PID	Model: MiniRAE 3000	Bulb: ~~10.6~~ 11.7 eV			Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #: 1112989						
	Parameter	Standard	Exp. Date	Lot #	Time: 0650	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100ppm (isobutylene)	2/6/19	CAP-248-100-4	Value: SB	Value:	Value:

COMB. GAS/O_2 METER	Model:				Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER	Model:				Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	Value:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Piont Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Piont Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:

Attachment C

Air Analytical Laboratory Report

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Simi Valley, CA 93065
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LABORATORY REPORT

June 27, 2017

Linda Raabe
AECOM
112 E. Pecan Street Suite 400
San Antonio, TX 78205

RE: LHAAP GWTP / 60256135.GWTP THRUMAR16

Dear Linda:

Enclosed are the results of the samples submitted to our laboratory on June 8, 2017. For your reference, these analyses have been assigned our service request number P1702773.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko
By Kate Kaneko at 2:04 pm, 06/27/17
Kate Kaneko
Project Manager

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Client: AECOM
Project: LHAAP GWTP / 60256135.GWTP THRUMAR16

Service Request No: P1702773

CASE NARRATIVE

The samples were received intact under chain of custody on June 8, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-004
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM
Service Request: P1702773
Project ID: LHAAP GWTP / 60256135.GWTP THRUMAR16

Date Received: 6/8/2017
Time Received: 09:21

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 - VOC Cans
LH18/24-Air-5646-Stripper	P1702773-001	Air	6/5/2017	14:00	SC00280	-0.20	3.60	X
LH18/24-Air-5646-Stripper-Dup	P1702773-002	Air	6/5/2017	14:00	SC02219	-0.75	3.54	X
LH18/24-Air-5646-GWTP	P1702773-003	Air	6/5/2017	14:15	AC01983	-2.76	3.55	X
LH18/24-Air-5646-Downwind-North	P1702773-004	Air	6/6/2017	06:30	AS00470	-3.42	3.47	X

00858719

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

ALS
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Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) (10-Day-Standard) — circled

ALS Project No. P1702773

ALS Contact:

Company Name & Address (Reporting Information): AECOM, 112 E. Pecan, Suite 400, San Antonio, TX. 78205

Project Name: LHAAP GWTP

Project Number: 60256135. GWTPTHRUMAR16

Project Manager: Elspeth Sharp

P.O. # / Billing Information: AECOM, 112 E. Pecan, Suite 400, San Antonio, TX. 78205

Phone: 210-253-7518

Fax:

Email Address for Result Reporting: linda.raabe@aecom.com

Sampler (Print & Sign): Scott Beesinger [signature]

Analysis Method: TO-15

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15		Comments e.g. Actual Preservative or specific instructions
LH18/24-Air-5646-Stripper	1	6/5/17	1400	SC00280		26	0	6L	✓		
LH18/24-Air-5646-Stripper-Dup	2	6/5/17	1400	SC02219		26	0	6L	✓		
LH18/24-Air-5646-GWTP	3	6/5/17	1415	AC01983	OA01103	26.5	-5	6L	✓		
LH18/24-Air-5646-Downwind-North	4	6/6/17	0630	AS00470	FCR00291	28	-7	6L	✓		

Report Tier Levels - please select
Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature) Scott Beesinger	Date: 6/6/17	Time: 0700	Received by: (Signature) FedEx	Date:	Time:
Relinquished by: (Signature) FedEx	Date:	Time:	Received by: (Signature) [signature]	Date: 6/8/17	Time: 092

Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Work order: P1702773

Project: LHAAP GWTP / 60256135.GWTP THRUMAR16

Sample(s) received on: 6/8/17 Date opened: 6/8/17 by: SANDERSON

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1702773-001.01	6.0 L Source Can					
P1702773-002.01	6.0 L Source Can					
P1702773-003.01	6.0 L Ambient Can					
P1702773-004.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Stripper** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-001

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0030 Liter(s)
Test Notes:
Container ID: SC00280

Initial Pressure (psig): -0.20 Final Pressure (psig): 3.60

Canister Dilution Factor: 1.26

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	210	ND	120	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	210	ND	42	
74-87-3	Chloromethane	ND	210	ND	100	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	210	ND	30	
75-01-4	Vinyl Chloride	**300**	210	**120**	82	
106-99-0	1,3-Butadiene	ND	210	ND	95	
74-83-9	Bromomethane	ND	210	ND	54	
75-00-3	Chloroethane	ND	210	ND	80	
64-17-5	Ethanol	ND	2,100	ND	1,100	
75-05-8	Acetonitrile	ND	210	ND	130	
107-02-8	Acrolein	ND	840	ND	370	
67-64-1	Acetone	ND	2,100	ND	880	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	210	ND	37	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	2,100	ND	850	
107-13-1	Acrylonitrile	ND	210	ND	97	
75-35-4	1,1-Dichloroethene	**240**	210	**61**	53	
75-09-2	Methylene Chloride	**9,700**	210	**2,800**	60	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	210	ND	67	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**19,000**	210	**2,500**	27	
75-15-0	Carbon Disulfide	ND	2,100	ND	670	
156-60-5	trans-1,2-Dichloroethene	ND	210	ND	53	
75-34-3	1,1-Dichloroethane	ND	210	ND	52	
1634-04-4	Methyl tert-Butyl Ether	ND	210	ND	58	
108-05-4	Vinyl Acetate	ND	2,100	ND	600	
78-93-3	2-Butanone (MEK)	ND	2,100	ND	710	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Stripper** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-001

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0030 Liter(s)
Test Notes:
Container ID: SC00280

Initial Pressure (psig): -0.20 Final Pressure (psig): 3.60

Canister Dilution Factor: 1.26

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**15,000**	210	**3,900**	53	
141-78-6	Ethyl Acetate	ND	420	ND	120	
110-54-3	n-Hexane	ND	210	ND	60	
67-66-3	Chloroform	ND	210	ND	43	
109-99-9	Tetrahydrofuran (THF)	ND	210	ND	71	
107-06-2	1,2-Dichloroethane	**240**	210	**59**	52	
71-55-6	1,1,1-Trichloroethane	ND	210	ND	39	
71-43-2	Benzene	ND	210	ND	66	
56-23-5	Carbon Tetrachloride	ND	210	ND	33	
110-82-7	Cyclohexane	ND	420	ND	120	
78-87-5	1,2-Dichloropropane	ND	210	ND	45	
75-27-4	Bromodichloromethane	ND	210	ND	31	
79-01-6	Trichloroethene	**29,000**	210	**5,500**	39	
123-91-1	1,4-Dioxane	ND	210	ND	58	
80-62-6	Methyl Methacrylate	ND	420	ND	100	
142-82-5	n-Heptane	ND	210	ND	51	
10061-01-5	cis-1,3-Dichloropropene	ND	210	ND	46	
108-10-1	4-Methyl-2-pentanone	ND	210	ND	51	
10061-02-6	trans-1,3-Dichloropropene	ND	210	ND	46	
79-00-5	1,1,2-Trichloroethane	ND	210	ND	39	
108-88-3	Toluene	ND	210	ND	56	
591-78-6	2-Hexanone	ND	210	ND	51	
124-48-1	Dibromochloromethane	ND	210	ND	25	
106-93-4	1,2-Dibromoethane	ND	210	ND	27	
123-86-4	n-Butyl Acetate	ND	210	ND	44	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Stripper** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-001

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0030 Liter(s)
Test Notes:
Container ID: SC00280

Initial Pressure (psig): -0.20 Final Pressure (psig): 3.60

Canister Dilution Factor: 1.26

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	210	ND	45	
127-18-4	Tetrachloroethene	ND	210	ND	31	
108-90-7	Chlorobenzene	ND	210	ND	46	
100-41-4	Ethylbenzene	ND	210	ND	48	
179601-23-1	m,p-Xylenes	ND	420	ND	97	
75-25-2	Bromoform	ND	210	ND	20	
100-42-5	Styrene	ND	210	ND	49	
95-47-6	o-Xylene	ND	210	ND	48	
111-84-2	n-Nonane	ND	210	ND	40	
79-34-5	1,1,2,2-Tetrachloroethane	ND	210	ND	31	
98-82-8	Cumene	ND	210	ND	43	
80-56-8	alpha-Pinene	ND	210	ND	38	
103-65-1	n-Propylbenzene	ND	210	ND	43	
622-96-8	4-Ethyltoluene	ND	210	ND	43	
108-67-8	1,3,5-Trimethylbenzene	ND	210	ND	43	
95-63-6	1,2,4-Trimethylbenzene	ND	210	ND	43	
100-44-7	Benzyl Chloride	ND	210	ND	41	
541-73-1	1,3-Dichlorobenzene	ND	210	ND	35	
106-46-7	1,4-Dichlorobenzene	ND	210	ND	35	
95-50-1	1,2-Dichlorobenzene	ND	210	ND	35	
5989-27-5	d-Limonene	ND	210	ND	38	
96-12-8	1,2-Dibromo-3-chloropropane	ND	210	ND	22	
120-82-1	1,2,4-Trichlorobenzene	ND	210	ND	28	
91-20-3	Naphthalene	ND	210	ND	40	
87-68-3	Hexachlorobutadiene	ND	210	ND	20	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Stripper-Dup** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-002

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0030 Liter(s)
Test Notes:
Container ID: SC02219

Initial Pressure (psig): -0.75 Final Pressure (psig): 3.54

Canister Dilution Factor: 1.31

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	220	ND	130	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	220	ND	44	
74-87-3	Chloromethane	ND	220	ND	110	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	220	ND	31	
75-01-4	Vinyl Chloride	**320**	220	**130**	85	
106-99-0	1,3-Butadiene	ND	220	ND	99	
74-83-9	Bromomethane	ND	220	ND	56	
75-00-3	Chloroethane	ND	220	ND	83	
64-17-5	Ethanol	ND	2,200	ND	1,200	
75-05-8	Acetonitrile	ND	220	ND	130	
107-02-8	Acrolein	ND	870	ND	380	
67-64-1	Acetone	ND	2,200	ND	920	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	220	ND	39	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	2,200	ND	890	
107-13-1	Acrylonitrile	ND	220	ND	100	
75-35-4	1,1-Dichloroethene	**270**	220	**67**	55	
75-09-2	Methylene Chloride	**10,000**	220	**3,000**	63	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	220	ND	70	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**20,000**	220	**2,600**	29	
75-15-0	Carbon Disulfide	ND	2,200	ND	700	
156-60-5	trans-1,2-Dichloroethene	ND	220	ND	55	
75-34-3	1,1-Dichloroethane	ND	220	ND	54	
1634-04-4	Methyl tert-Butyl Ether	ND	220	ND	61	
108-05-4	Vinyl Acetate	ND	2,200	ND	620	
78-93-3	2-Butanone (MEK)	ND	2,200	ND	740	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Stripper-Dup** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-002

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0030 Liter(s)
Test Notes:
Container ID: SC02219

Initial Pressure (psig): -0.75 Final Pressure (psig): 3.54

Canister Dilution Factor: 1.31

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**16,000**	220	**4,100**	55	
141-78-6	Ethyl Acetate	ND	440	ND	120	
110-54-3	n-Hexane	ND	220	ND	62	
67-66-3	Chloroform	ND	220	ND	45	
109-99-9	Tetrahydrofuran (THF)	ND	220	ND	74	
107-06-2	1,2-Dichloroethane	**260**	220	**64**	54	
71-55-6	1,1,1-Trichloroethane	ND	220	ND	40	
71-43-2	Benzene	ND	220	ND	68	
56-23-5	Carbon Tetrachloride	ND	220	ND	35	
110-82-7	Cyclohexane	ND	440	ND	130	
78-87-5	1,2-Dichloropropane	ND	220	ND	47	
75-27-4	Bromodichloromethane	ND	220	ND	33	
79-01-6	Trichloroethene	**32,000**	220	**6,000**	41	
123-91-1	1,4-Dioxane	ND	220	ND	61	
80-62-6	Methyl Methacrylate	ND	440	ND	110	
142-82-5	n-Heptane	ND	220	ND	53	
10061-01-5	cis-1,3-Dichloropropene	ND	220	ND	48	
108-10-1	4-Methyl-2-pentanone	ND	220	ND	53	
10061-02-6	trans-1,3-Dichloropropene	ND	220	ND	48	
79-00-5	1,1,2-Trichloroethane	ND	220	ND	40	
108-88-3	Toluene	ND	220	ND	58	
591-78-6	2-Hexanone	ND	220	ND	53	
124-48-1	Dibromochloromethane	ND	220	ND	26	
106-93-4	1,2-Dibromoethane	ND	220	ND	28	
123-86-4	n-Butyl Acetate	ND	220	ND	46	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Stripper-Dup** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-002

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0030 Liter(s)
Test Notes:
Container ID: SC02219

Initial Pressure (psig): -0.75 Final Pressure (psig): 3.54

Canister Dilution Factor: 1.31

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	220	ND	47	
127-18-4	Tetrachloroethene	ND	220	ND	32	
108-90-7	Chlorobenzene	ND	220	ND	47	
100-41-4	Ethylbenzene	ND	220	ND	50	
179601-23-1	m,p-Xylenes	ND	440	ND	100	
75-25-2	Bromoform	ND	220	ND	21	
100-42-5	Styrene	ND	220	ND	51	
95-47-6	o-Xylene	ND	220	ND	50	
111-84-2	n-Nonane	ND	220	ND	42	
79-34-5	1,1,2,2-Tetrachloroethane	ND	220	ND	32	
98-82-8	Cumene	ND	220	ND	44	
80-56-8	alpha-Pinene	ND	220	ND	39	
103-65-1	n-Propylbenzene	ND	220	ND	44	
622-96-8	4-Ethyltoluene	ND	220	ND	44	
108-67-8	1,3,5-Trimethylbenzene	ND	220	ND	44	
95-63-6	1,2,4-Trimethylbenzene	ND	220	ND	44	
100-44-7	Benzyl Chloride	ND	220	ND	42	
541-73-1	1,3-Dichlorobenzene	ND	220	ND	36	
106-46-7	1,4-Dichlorobenzene	ND	220	ND	36	
95-50-1	1,2-Dichlorobenzene	ND	220	ND	36	
5989-27-5	d-Limonene	ND	220	ND	39	
96-12-8	1,2-Dibromo-3-chloropropane	ND	220	ND	23	
120-82-1	1,2,4-Trichlorobenzene	ND	220	ND	29	
91-20-3	Naphthalene	ND	220	ND	42	
87-68-3	Hexachlorobutadiene	ND	220	ND	20	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-GWTP** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-003

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01983

Initial Pressure (psig): -2.76 Final Pressure (psig): 3.55

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.77	ND	0.44	
75-71-8	Dichlorodifluoromethane (CFC 12)	**2.2**	0.77	**0.45**	0.15	
74-87-3	Chloromethane	ND	0.77	ND	0.37	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.77	ND	0.11	
75-01-4	Vinyl Chloride	ND	0.77	ND	0.30	
106-99-0	1,3-Butadiene	ND	0.77	ND	0.35	
74-83-9	Bromomethane	ND	0.77	ND	0.20	
75-00-3	Chloroethane	ND	0.77	ND	0.29	
64-17-5	Ethanol	ND	7.7	ND	4.1	
75-05-8	Acetonitrile	ND	0.77	ND	0.46	
107-02-8	Acrolein	ND	3.1	ND	1.3	
67-64-1	Acetone	**8.9**	7.7	**3.7**	3.2	
75-69-4	Trichlorofluoromethane (CFC 11)	**1.2**	0.77	**0.21**	0.14	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	7.7	ND	3.1	
107-13-1	Acrylonitrile	ND	0.77	ND	0.35	
75-35-4	1,1-Dichloroethene	ND	0.77	ND	0.19	
75-09-2	Methylene Chloride	**4.0**	0.77	**1.2**	0.22	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.77	ND	0.24	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**45**	0.77	**5.9**	0.10	
75-15-0	Carbon Disulfide	ND	7.7	ND	2.5	
156-60-5	trans-1,2-Dichloroethene	ND	0.77	ND	0.19	
75-34-3	1,1-Dichloroethane	ND	0.77	ND	0.19	
1634-04-4	Methyl tert-Butyl Ether	ND	0.77	ND	0.21	
108-05-4	Vinyl Acetate	ND	7.7	ND	2.2	
78-93-3	2-Butanone (MEK)	ND	7.7	ND	2.6	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-GWTP** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-003

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01983

Initial Pressure (psig): -2.76 Final Pressure (psig): 3.55

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**7.3**	0.77	**1.8**	0.19	
141-78-6	Ethyl Acetate	ND	1.5	ND	0.42	
110-54-3	n-Hexane	**1.0**	0.77	**0.28**	0.22	
67-66-3	Chloroform	ND	0.77	ND	0.16	
109-99-9	Tetrahydrofuran (THF)	**3.6**	0.77	**1.2**	0.26	
107-06-2	1,2-Dichloroethane	ND	0.77	ND	0.19	
71-55-6	1,1,1-Trichloroethane	ND	0.77	ND	0.14	
71-43-2	Benzene	ND	0.77	ND	0.24	
56-23-5	Carbon Tetrachloride	ND	0.77	ND	0.12	
110-82-7	Cyclohexane	ND	1.5	ND	0.44	
78-87-5	1,2-Dichloropropane	ND	0.77	ND	0.17	
75-27-4	Bromodichloromethane	ND	0.77	ND	0.11	
79-01-6	Trichloroethene	**22**	0.77	**4.0**	0.14	
123-91-1	1,4-Dioxane	ND	0.77	ND	0.21	
80-62-6	Methyl Methacrylate	ND	1.5	ND	0.37	
142-82-5	n-Heptane	ND	0.77	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	0.77	ND	0.17	
108-10-1	4-Methyl-2-pentanone	ND	0.77	ND	0.19	
10061-02-6	trans-1,3-Dichloropropene	ND	0.77	ND	0.17	
79-00-5	1,1,2-Trichloroethane	ND	0.77	ND	0.14	
108-88-3	Toluene	**1.5**	0.77	**0.39**	0.20	
591-78-6	2-Hexanone	ND	0.77	ND	0.19	
124-48-1	Dibromochloromethane	ND	0.77	ND	0.090	
106-93-4	1,2-Dibromoethane	ND	0.77	ND	0.10	
123-86-4	n-Butyl Acetate	ND	0.77	ND	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-GWTP** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-003

Test Code: EPA TO-15 Date Collected: 6/5/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01983

Initial Pressure (psig): -2.76 Final Pressure (psig): 3.55

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.77	ND	0.16	
127-18-4	Tetrachloroethene	ND	0.77	ND	0.11	
108-90-7	Chlorobenzene	ND	0.77	ND	0.17	
100-41-4	Ethylbenzene	ND	0.77	ND	0.18	
179601-23-1	m,p-Xylenes	ND	1.5	ND	0.35	
75-25-2	Bromoform	ND	0.77	ND	0.074	
100-42-5	Styrene	ND	0.77	ND	0.18	
95-47-6	o-Xylene	ND	0.77	ND	0.18	
111-84-2	n-Nonane	ND	0.77	ND	0.15	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.77	ND	0.11	
98-82-8	Cumene	ND	0.77	ND	0.16	
80-56-8	alpha-Pinene	**0.82**	0.77	**0.15**	0.14	
103-65-1	n-Propylbenzene	ND	0.77	ND	0.16	
622-96-8	4-Ethyltoluene	ND	0.77	ND	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.77	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	**1.0**	0.77	**0.21**	0.16	
100-44-7	Benzyl Chloride	ND	0.77	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	0.77	ND	0.13	
106-46-7	1,4-Dichlorobenzene	ND	0.77	ND	0.13	
95-50-1	1,2-Dichlorobenzene	ND	0.77	ND	0.13	
5989-27-5	d-Limonene	ND	0.77	ND	0.14	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.77	ND	0.079	
120-82-1	1,2,4-Trichlorobenzene	ND	0.77	ND	0.10	
91-20-3	Naphthalene	ND	0.77	ND	0.15	
87-68-3	Hexachlorobutadiene	ND	0.77	ND	0.072	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Downwind-North** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-004

Test Code: EPA TO-15 Date Collected: 6/6/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00470

Initial Pressure (psig): -3.42 Final Pressure (psig): 3.47

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.81	ND	0.47	
75-71-8	Dichlorodifluoromethane (CFC 12)	**4.7**	0.81	**0.95**	0.16	
74-87-3	Chloromethane	ND	0.81	ND	0.39	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.81	ND	0.12	
75-01-4	Vinyl Chloride	ND	0.81	ND	0.32	
106-99-0	1,3-Butadiene	ND	0.81	ND	0.36	
74-83-9	Bromomethane	ND	0.81	ND	0.21	
75-00-3	Chloroethane	ND	0.81	ND	0.31	
64-17-5	Ethanol	**11**	8.1	**5.7**	4.3	
75-05-8	Acetonitrile	ND	0.81	ND	0.48	
107-02-8	Acrolein	ND	3.2	ND	1.4	
67-64-1	Acetone	**16**	8.1	**6.8**	3.4	
75-69-4	Trichlorofluoromethane (CFC 11)	**2.6**	0.81	**0.46**	0.14	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	8.1	ND	3.3	
107-13-1	Acrylonitrile	ND	0.81	ND	0.37	
75-35-4	1,1-Dichloroethene	ND	0.81	ND	0.20	
75-09-2	Methylene Chloride	ND	0.81	ND	0.23	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.81	ND	0.26	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**2.7**	0.81	**0.35**	0.11	
75-15-0	Carbon Disulfide	ND	8.1	ND	2.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.81	ND	0.20	
75-34-3	1,1-Dichloroethane	ND	0.81	ND	0.20	
1634-04-4	Methyl tert-Butyl Ether	ND	0.81	ND	0.22	
108-05-4	Vinyl Acetate	ND	8.1	ND	2.3	
78-93-3	2-Butanone (MEK)	ND	8.1	ND	2.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Downwind-North** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-004

Test Code: EPA TO-15 Date Collected: 6/6/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00470

Initial Pressure (psig): -3.42 Final Pressure (psig): 3.47

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.81	ND	0.20	
141-78-6	Ethyl Acetate	**5.3**	1.6	**1.5**	0.45	
110-54-3	n-Hexane	**2.3**	0.81	**0.64**	0.23	
67-66-3	Chloroform	ND	0.81	ND	0.16	
109-99-9	Tetrahydrofuran (THF)	**11**	0.81	**3.7**	0.27	
107-06-2	1,2-Dichloroethane	ND	0.81	ND	0.20	
71-55-6	1,1,1-Trichloroethane	ND	0.81	ND	0.15	
71-43-2	Benzene	ND	0.81	ND	0.25	
56-23-5	Carbon Tetrachloride	ND	0.81	ND	0.13	
110-82-7	Cyclohexane	ND	1.6	ND	0.47	
78-87-5	1,2-Dichloropropane	ND	0.81	ND	0.17	
75-27-4	Bromodichloromethane	ND	0.81	ND	0.12	
79-01-6	Trichloroethene	ND	0.81	ND	0.15	
123-91-1	1,4-Dioxane	ND	0.81	ND	0.22	
80-62-6	Methyl Methacrylate	ND	1.6	ND	0.39	
142-82-5	n-Heptane	ND	0.81	ND	0.20	
10061-01-5	cis-1,3-Dichloropropene	ND	0.81	ND	0.18	
108-10-1	4-Methyl-2-pentanone	ND	0.81	ND	0.20	
10061-02-6	trans-1,3-Dichloropropene	ND	0.81	ND	0.18	
79-00-5	1,1,2-Trichloroethane	ND	0.81	ND	0.15	
108-88-3	Toluene	**3.4**	0.81	**0.90**	0.21	
591-78-6	2-Hexanone	ND	0.81	ND	0.20	
124-48-1	Dibromochloromethane	ND	0.81	ND	0.095	
106-93-4	1,2-Dibromoethane	ND	0.81	ND	0.10	
123-86-4	n-Butyl Acetate	ND	0.81	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **LH18/24-Air-5646-Downwind-North** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P1702773-004

Test Code: EPA TO-15 Date Collected: 6/6/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/8/17
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00470

Initial Pressure (psig): -3.42 Final Pressure (psig): 3.47

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.81	ND	0.17	
127-18-4	Tetrachloroethene	**3.4**	0.81	**0.51**	0.12	
108-90-7	Chlorobenzene	ND	0.81	ND	0.17	
100-41-4	Ethylbenzene	ND	0.81	ND	0.19	
179601-23-1	m,p-Xylenes	**1.9**	1.6	**0.43**	0.37	
75-25-2	Bromoform	ND	0.81	ND	0.078	
100-42-5	Styrene	ND	0.81	ND	0.19	
95-47-6	o-Xylene	ND	0.81	ND	0.19	
111-84-2	n-Nonane	ND	0.81	ND	0.15	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.81	ND	0.12	
98-82-8	Cumene	ND	0.81	ND	0.16	
80-56-8	alpha-Pinene	**1.5**	0.81	**0.27**	0.14	
103-65-1	n-Propylbenzene	ND	0.81	ND	0.16	
622-96-8	4-Ethyltoluene	ND	0.81	ND	0.16	
108-67-8	1,3,5-Trimethylbenzene	ND	0.81	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	ND	0.81	ND	0.16	
100-44-7	Benzyl Chloride	ND	0.81	ND	0.16	
541-73-1	1,3-Dichlorobenzene	ND	0.81	ND	0.13	
106-46-7	1,4-Dichlorobenzene	ND	0.81	ND	0.13	
95-50-1	1,2-Dichlorobenzene	ND	0.81	ND	0.13	
5989-27-5	d-Limonene	ND	0.81	ND	0.14	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.81	ND	0.083	
120-82-1	1,2,4-Trichlorobenzene	ND	0.81	ND	0.11	
91-20-3	Naphthalene	ND	0.81	ND	0.15	
87-68-3	Hexachlorobutadiene	ND	0.81	ND	0.075	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **Method Blank** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P170615-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	ND	0.29	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	ND	0.10	
74-87-3	Chloromethane	ND	0.50	ND	0.24	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	ND	0.072	
75-01-4	Vinyl Chloride	ND	0.50	ND	0.20	
106-99-0	1,3-Butadiene	ND	0.50	ND	0.23	
74-83-9	Bromomethane	ND	0.50	ND	0.13	
75-00-3	Chloroethane	ND	0.50	ND	0.19	
64-17-5	Ethanol	ND	5.0	ND	2.7	
75-05-8	Acetonitrile	ND	0.50	ND	0.30	
107-02-8	Acrolein	ND	2.0	ND	0.87	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	0.50	ND	0.089	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	ND	2.0	
107-13-1	Acrylonitrile	ND	0.50	ND	0.23	
75-35-4	1,1-Dichloroethene	ND	0.50	ND	0.13	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.50	ND	0.16	
76-13-1	Trichlorotrifluoroethane (CFC 113)	ND	0.50	ND	0.065	
75-15-0	Carbon Disulfide	ND	5.0	ND	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.50	ND	0.12	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **Method Blank** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P170615-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.50	ND	0.13	
141-78-6	Ethyl Acetate	ND	1.0	ND	0.28	
110-54-3	n-Hexane	ND	0.50	ND	0.14	
67-66-3	Chloroform	ND	0.50	ND	0.10	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	ND	0.17	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ND	0.092	
71-43-2	Benzene	ND	0.50	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.50	ND	0.080	
110-82-7	Cyclohexane	ND	1.0	ND	0.29	
78-87-5	1,2-Dichloropropane	ND	0.50	ND	0.11	
75-27-4	Bromodichloromethane	ND	0.50	ND	0.075	
79-01-6	Trichloroethene	ND	0.50	ND	0.093	
123-91-1	1,4-Dioxane	ND	0.50	ND	0.14	
80-62-6	Methyl Methacrylate	ND	1.0	ND	0.24	
142-82-5	n-Heptane	ND	0.50	ND	0.12	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ND	0.092	
108-88-3	Toluene	ND	0.50	ND	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.50	ND	0.059	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
123-86-4	n-Butyl Acetate	ND	0.50	ND	0.11	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM**
Client Sample ID: **Method Blank** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P170615-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	ND	0.11	
127-18-4	Tetrachloroethene	ND	0.50	ND	0.074	
108-90-7	Chlorobenzene	ND	0.50	ND	0.11	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
111-84-2	n-Nonane	ND	0.50	ND	0.095	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ND	0.073	
98-82-8	Cumene	ND	0.50	ND	0.10	
80-56-8	alpha-Pinene	ND	0.50	ND	0.090	
103-65-1	n-Propylbenzene	ND	0.50	ND	0.10	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	
100-44-7	Benzyl Chloride	ND	0.50	ND	0.097	
541-73-1	1,3-Dichlorobenzene	ND	0.50	ND	0.083	
106-46-7	1,4-Dichlorobenzene	ND	0.50	ND	0.083	
95-50-1	1,2-Dichlorobenzene	ND	0.50	ND	0.083	
5989-27-5	d-Limonene	ND	0.50	ND	0.090	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	ND	0.052	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	ND	0.067	
91-20-3	Naphthalene	ND	0.50	ND	0.095	
87-68-3	Hexachlorobutadiene	ND	0.50	ND	0.047	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM**
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Project ID: P1702773

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 6/5 - 6/6/17
Analyst: Simon Cao Date(s) Received: 6/8/17
Sample Type: 6.0 L Summa Canister(s) / 6.0 L Silonite Canister(s) Date(s) Analyzed: 6/15/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P170615-MB	**97**	**102**	**102**	70-130	
Lab Control Sample	P170615-LCS	**95**	**101**	**103**	70-130	
LH18/24-Air-5646-Stripper	P1702773-001	**96**	**100**	**102**	70-130	
LH18/24-Air-5646-Stripper-Dup	P1702773-002	**95**	**100**	**102**	70-130	
LH18/24-Air-5646-GWTP	P1702773-003	**99**	**99**	**102**	70-130	
LH18/24-Air-5646-Downwind-North	P1702773-004	**97**	**100**	**103**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P170615-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
115-07-1	Propene	210	**164**	**78**	52-127	
75-71-8	Dichlorodifluoromethane (CFC 12)	210	**169**	**80**	68-109	
74-87-3	Chloromethane	210	**169**	**80**	51-130	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	211	**168**	**80**	66-114	
75-01-4	Vinyl Chloride	210	**171**	**81**	61-125	
106-99-0	1,3-Butadiene	210	**204**	**97**	62-144	
74-83-9	Bromomethane	210	**181**	**86**	73-123	
75-00-3	Chloroethane	210	**178**	**85**	69-122	
64-17-5	Ethanol	1,060	**912**	**86**	62-124	
75-05-8	Acetonitrile	213	**182**	**85**	57-114	
107-02-8	Acrolein	212	**171**	**81**	62-116	
67-64-1	Acetone	1,060	**888**	**84**	57-117	
75-69-4	Trichlorofluoromethane (CFC 11)	210	**165**	**79**	63-98	
67-63-0	2-Propanol (Isopropyl Alcohol)	424	**363**	**86**	66-121	
107-13-1	Acrylonitrile	213	**207**	**97**	68-123	
75-35-4	1,1-Dichloroethene	213	**181**	**85**	76-118	
75-09-2	Methylene Chloride	212	**168**	**79**	60-118	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	212	**192**	**91**	65-126	
76-13-1	Trichlorotrifluoroethane (CFC 113)	212	**176**	**83**	73-114	
75-15-0	Carbon Disulfide	213	**170**	**80**	57-102	
156-60-5	trans-1,2-Dichloroethene	213	**182**	**85**	74-123	
75-34-3	1,1-Dichloroethane	212	**175**	**83**	69-111	
1634-04-4	Methyl tert-Butyl Ether	213	**174**	**82**	69-113	
108-05-4	Vinyl Acetate	1,060	**1060**	**100**	76-128	
78-93-3	2-Butanone (MEK)	212	**188**	**89**	63-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P170615-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	212	**175**	**83**	72-117	
141-78-6	Ethyl Acetate	426	**384**	**90**	68-127	
110-54-3	n-Hexane	213	**175**	**82**	55-116	
67-66-3	Chloroform	212	**171**	**81**	70-109	
109-99-9	Tetrahydrofuran (THF)	213	**176**	**83**	72-113	
107-06-2	1,2-Dichloroethane	212	**171**	**81**	69-113	
71-55-6	1,1,1-Trichloroethane	212	**167**	**79**	72-115	
71-43-2	Benzene	212	**168**	**79**	65-107	
56-23-5	Carbon Tetrachloride	213	**172**	**81**	71-113	
110-82-7	Cyclohexane	425	**359**	**84**	71-115	
78-87-5	1,2-Dichloropropane	212	**181**	**85**	71-115	
75-27-4	Bromodichloromethane	214	**174**	**81**	75-118	
79-01-6	Trichloroethene	212	**175**	**83**	68-114	
123-91-1	1,4-Dioxane	213	**188**	**88**	81-131	
80-62-6	Methyl Methacrylate	424	**390**	**92**	72-130	
142-82-5	n-Heptane	213	**178**	**84**	68-116	
10061-01-5	cis-1,3-Dichloropropene	210	**188**	**90**	77-126	
108-10-1	4-Methyl-2-pentanone	213	**188**	**88**	69-126	
10061-02-6	trans-1,3-Dichloropropene	213	**200**	**94**	79-125	
79-00-5	1,1,2-Trichloroethane	212	**181**	**85**	75-119	
108-88-3	Toluene	212	**175**	**83**	59-118	
591-78-6	2-Hexanone	213	**197**	**92**	69-129	
124-48-1	Dibromochloromethane	213	**193**	**91**	74-136	
106-93-4	1,2-Dibromoethane	212	**198**	**93**	73-131	
123-86-4	n-Butyl Acetate	216	**194**	**90**	69-130	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16** ALS Sample ID: P170615-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	212	**181**	**85**	66-120	
127-18-4	Tetrachloroethene	213	**187**	**88**	65-130	
108-90-7	Chlorobenzene	212	**185**	**87**	68-120	
100-41-4	Ethylbenzene	212	**179**	**84**	68-122	
179601-23-1	m,p-Xylenes	424	**359**	**85**	68-123	
75-25-2	Bromoform	212	**204**	**96**	69-130	
100-42-5	Styrene	212	**203**	**96**	71-133	
95-47-6	o-Xylene	212	**182**	**86**	68-122	
111-84-2	n-Nonane	212	**192**	**91**	65-120	
79-34-5	1,1,2,2-Tetrachloroethane	212	**203**	**96**	69-130	
98-82-8	Cumene	212	**186**	**88**	70-123	
80-56-8	alpha-Pinene	213	**193**	**91**	70-128	
103-65-1	n-Propylbenzene	214	**193**	**90**	69-125	
622-96-8	4-Ethyltoluene	212	**198**	**93**	67-130	
108-67-8	1,3,5-Trimethylbenzene	212	**184**	**87**	67-124	
95-63-6	1,2,4-Trimethylbenzene	212	**195**	**92**	67-129	
100-44-7	Benzyl Chloride	212	**244**	**115**	79-138	
541-73-1	1,3-Dichlorobenzene	212	**208**	**98**	65-136	
106-46-7	1,4-Dichlorobenzene	213	**208**	**98**	66-141	
95-50-1	1,2-Dichlorobenzene	212	**205**	**97**	67-136	
5989-27-5	d-Limonene	212	**190**	**90**	71-134	
96-12-8	1,2-Dibromo-3-chloropropane	212	**234**	**110**	73-136	
120-82-1	1,2,4-Trichlorobenzene	212	**240**	**113**	64-134	
91-20-3	Naphthalene	214	**238**	**111**	62-136	
87-68-3	Hexachlorobutadiene	213	**198**	**93**	60-133	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM** ALS Project ID: P1702773
Client Project ID: **LHAAP GWTP / 60256135.GWTP THRUMAR16**

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Lab File ID: 06151701.D
Analyst: Simon Cao Date Analyzed: 6/15/17
Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 05:40
Test Notes:

		IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	24 Hour Standard	173564	9.11	854073	11.09	352141	15.44
	Upper Limit	242990	9.44	1195702	11.42	492997	15.77
	Lower Limit	104138	8.78	512444	10.76	211285	15.11
	Client Sample ID						
01	Method Blank	169408	9.11	844133	11.08	345560	15.44
02	Lab Control Sample	179836	9.13	880250	11.09	363686	15.44
03	LH18/24-Air-5646-Stripper	183340	9.11	897249	11.09	380026	15.44
04	LH18/24-Air-5646-Stripper-Dup	183424	9.11	879649	11.09	372732	15.44
05	LH18/24-Air-5646-GWTP	174318	9.11	877672	11.08	378560	15.44
06	LH18/24-Air-5646-Downwind-North	175499	9.11	869692	11.08	371573	15.44
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area
AREA LOWER LIMIT = 60% of internal standard area
RT UPPER LIMIT = 0.33 minutes of internal standard RT
RT LOWER LIMIT = 0.33 minutes of internal standard RT

# Column used to flag values outside QC limits with an I.
I = Internal standard not within the specified limits.

Data File: I:\MS09\Data\2017 06\15\06151715.D
Acq On : 15 Jun 2017 16:23 Operator: SC
Sample : P1702773-001 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

6/16/17

Quant Time: Jun 16 11:49:10 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	183340	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	11.09	114	897249	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	380026	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	9.89	65	256389	11.940	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.52%			
57) Toluene-d8 (SS2)	13.53	98	967351	12.497	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.00%			
73) Bromofluorobenzene (SS3)	17.04	174	282418	12.768	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.16%			
Target Compounds						Qvalue
2) Propene	3.89	42	1075	N.D.		
3) Dichlorodifluoromethan...	3.90	85	1328	N.D.		
4) Chloromethane	0.00	50	0	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	4.46	62	22767	0.719	ng	98
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	5.35	45	1151	N.D.		
11) Acetonitrile	5.58	41	231	N.D.		
12) Acrolein	5.70	56	63	N.D.		
13) Acetone	5.86	58	4584	N.D.		
14) Trichlorofluoromethane	5.80	101	433	N.D.		
15) 2-Propanol (Isopropanol)	6.16	45	1303	N.D.		
16) Acrylonitrile	6.52	53	218	N.D.		
17) 1,1-Dichloroethene	6.69	96	11335	0.577	ng	95
18) 2-Methyl-2-Propanol (t...	6.85	59	63	N.D.		
19) Methylene Chloride	6.82	84	523435	23.042	ng	94
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.	d	
21) Trichlorotrifluoroethane	7.15	151	766007	44.812	ng	98
22) Carbon Disulfide	7.13	76	3165	N.D.		
23) trans-1,2-Dichloroethene	7.86	61	3025	N.D.		
24) 1,1-Dichloroethane	8.07	63	3489	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	0.00	72	0	N.D.		
28) cis-1,2-Dichloroethene	8.94	61	1036643	36.630	ng	99
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	9.20	57	464	N.D.		
32) Chloroform	9.25	83	5061	N.D.		
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	10.00	62	14356	0.570	ng	98
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	10.71	56	1362	N.D.		
41) Benzene	10.74	78	6729	N.D.		
42) Carbon Tetrachloride	10.89	117	662	N.D.		
43) Cyclohexane	11.01	84	1210	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D.	d	
47) Trichloroethene	11.78	130	1567177	70.086	ng	99
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	11.85	57	1076	N.D.		

Data File: I:\MS09\Data\2017 06\15\06151715.D
Acq On : 15 Jun 2017 16:23 Operator: SC
Sample : P1702773-001 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

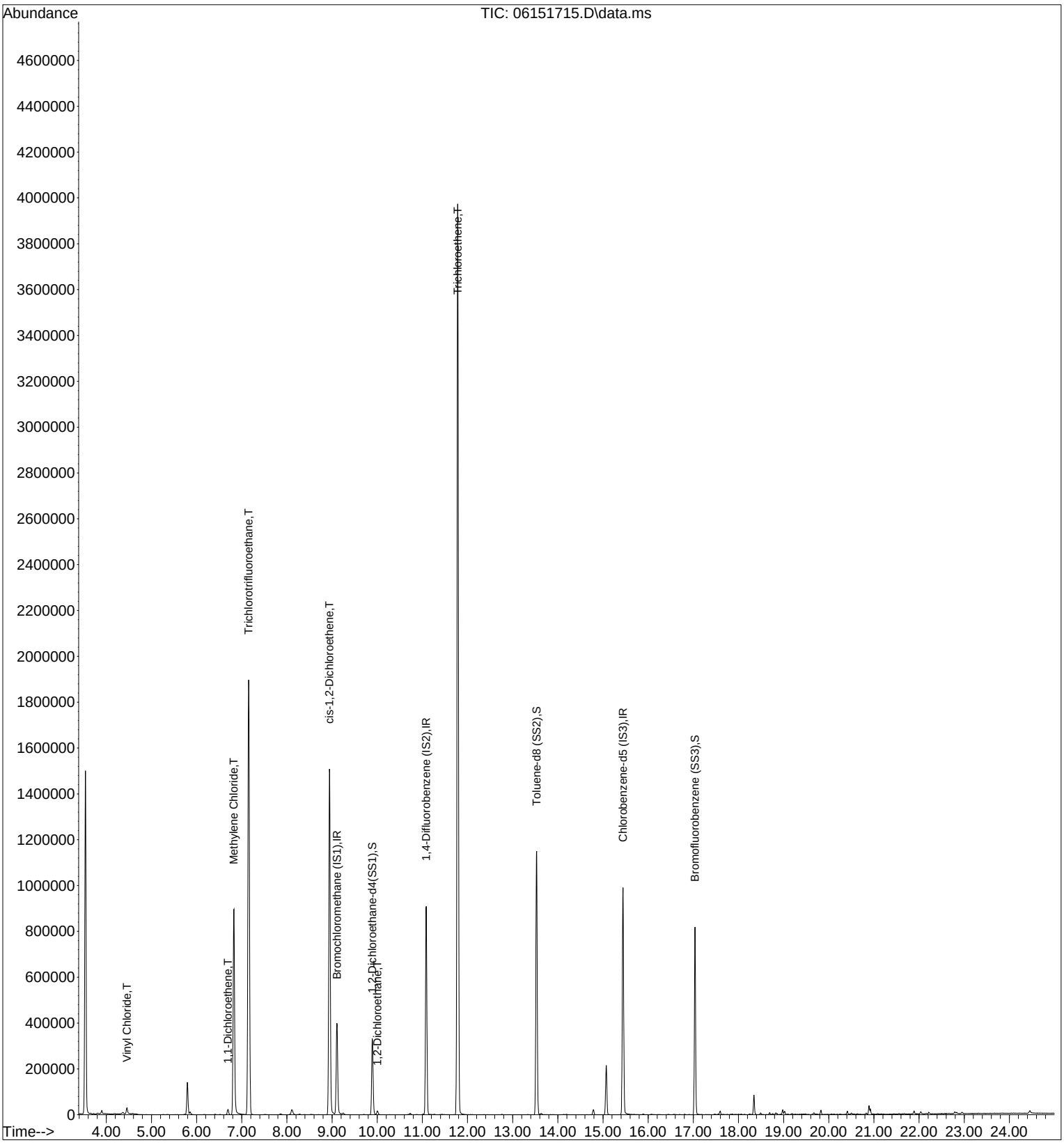
Quant Time: Jun 16 11:49:10 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units Dev(Min)
50) Methyl Methacrylate	11.78	100	3336	N.D.
51) n-Heptane	0.00	71	0	N.D.
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.
55) 1,1,2-Trichloroethane	13.33	97	441	N.D.
58) Toluene	13.63	91	5292	N.D.
59) 2-Hexanone	13.90	43	457	N.D.
60) Dibromochloromethane	0.00	129	0	N.D.
61) 1,2-Dibromoethane	0.00	107	0	N.D.
62) n-Butyl Acetate	0.00	43	0	N.D.
63) n-Octane	0.00	57	0	N.D.
64) Tetrachloroethene	14.79	166	8324	N.D.
65) Chlorobenzene	0.00	112	0	N.D.
66) Ethylbenzene	15.89	91	3587	N.D.
67) m- & p-Xylenes	16.07	91	2665	N.D.
68) Bromoform	0.00	173	0	N.D.
69) Styrene	16.46	104	700	N.D.
70) o-Xylene	16.57	91	1458	N.D.
71) n-Nonane	16.82	43	1229	N.D.
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.
74) Cumene	17.19	105	716	N.D.
75) alpha-Pinene	17.59	93	7027	N.D.
76) n-Propylbenzene	17.68	91	1270	N.D.
77) 3-Ethyltoluene	17.83	105	962	N.D.
78) 4-Ethyltoluene	17.87	105	413	N.D.
79) 1,3,5-Trimethylbenzene	17.95	105	417	N.D.
80) alpha-Methylstyrene	0.00	118	0	N.D.
81) 2-Ethyltoluene	18.15	105	550	N.D.
82) 1,2,4-Trimethylbenzene	18.37	105	1626	N.D.
83) n-Decane	18.49	57	3095	N.D.
84) Benzyl Chloride	0.00	91	0	N.D.
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.
87) sec-Butylbenzene	18.82	105	858	N.D.
88) 4-Isopropyltoluene (p-...	18.83	119	4289	N.D.
89) 1,2,3-Trimethylbenzene	18.82	105	858	N.D.
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.
91) d-Limonene	18.98	68	5752	N.D.
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.
93) n-Undecane	19.82	57	7432	N.D.
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.
95) Naphthalene	20.89	128	31983	N.D.
96) n-Dodecane	20.92	57	7217	N.D.
97) Hexachlorobutadiene	0.00	225	0	N.D.
98) Cyclohexanone	0.00	55	0	N.D.
99) tert-Butylbenzene	18.34	119	985	N.D.
100) n-Butylbenzene	19.27	91	817	N.D.

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151715.D
Acq On : 15 Jun 2017 16:23 Operator: SC
Sample : P1702773-001 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Jun 16 11:49:10 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 06\15\06151715.D
Acq On : 15 Jun 2017 16:23 Operator: SC
Sample : P1702773-001 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

6/16/17

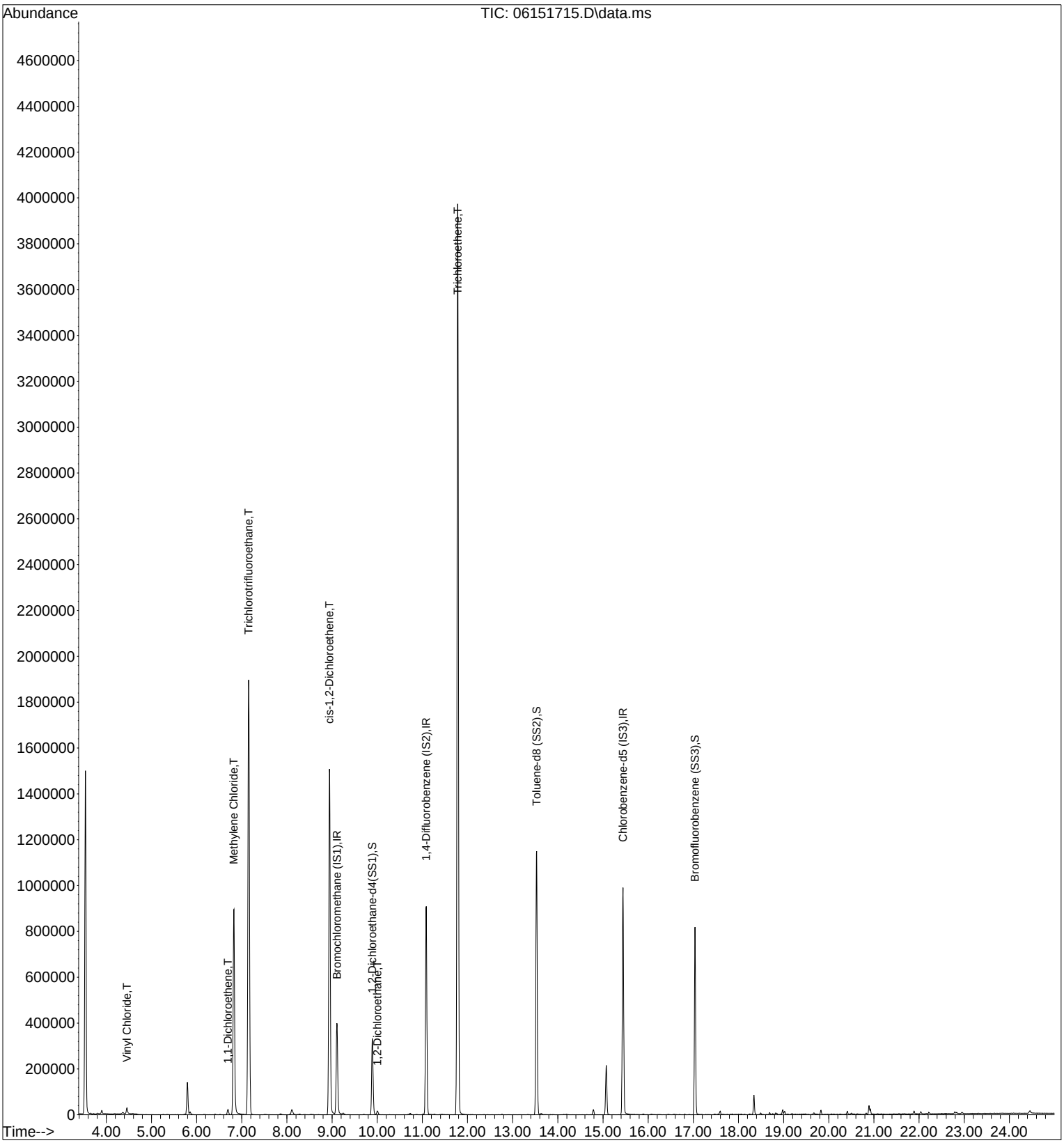
Quant Time: Jun 16 11:49:10 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

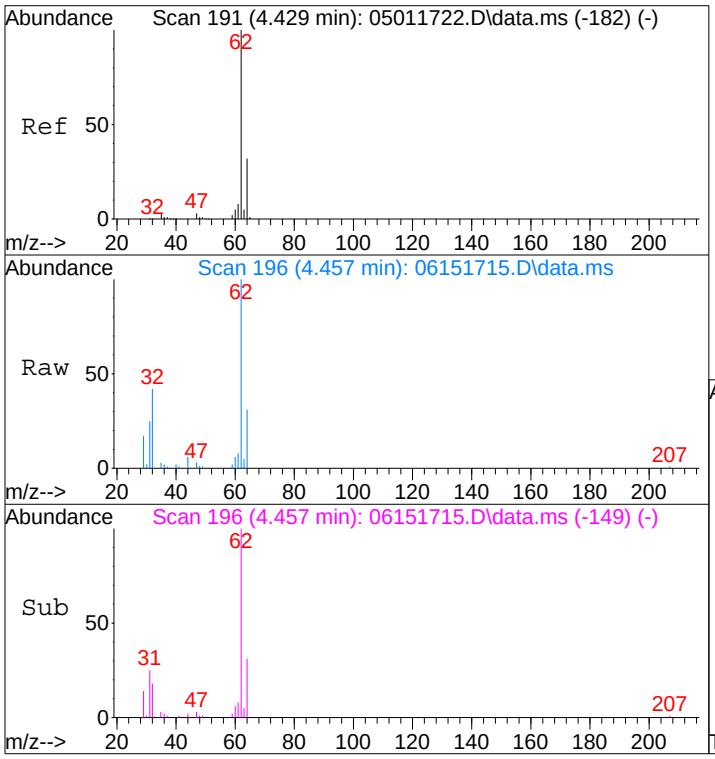
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	183340	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	11.09	114	897249	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	380026	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	9.89	65	256389	11.940	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.52%			
57) Toluene-d8 (SS2)	13.53	98	967351	12.497	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.00%			
73) Bromofluorobenzene (SS3)	17.04	174	282418	12.768	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.16%			
Target Compounds						Qvalue
6) Vinyl Chloride	4.46	62	22767	0.719	ng	98
17) 1,1-Dichloroethene	6.69	96	11335	0.577	ng	95
19) Methylene Chloride	6.82	84	523435	23.042	ng	94
21) Trichlorotrifluoroethane	7.15	151	766007	44.812	ng	98
28) cis-1,2-Dichloroethene	8.94	61	1036643	36.630	ng	99
36) 1,2-Dichloroethane	10.00	62	14356	0.570	ng	98
47) Trichloroethene	11.78	130	1567177	70.086	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151715.D
Acq On : 15 Jun 2017 16:23 Operator: SC
Sample : P1702773-001 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Jun 16 11:49:10 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

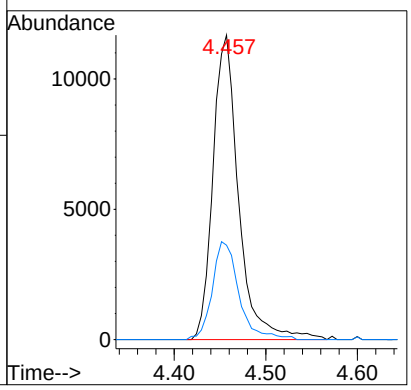


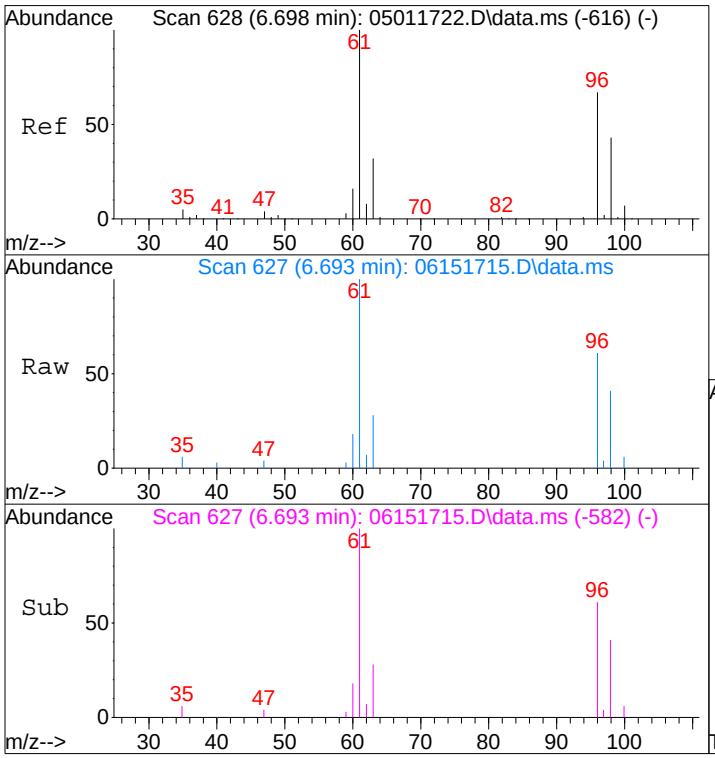


#6
Vinyl Chloride
Concen: 0.72 ng
RT: 4.46 min Scan# 196
Delta R.T. 0.005 min
Lab File: 06151715.D
Acq: 15 Jun 2017 16:23

Tgt Ion: 62 Resp: 22767

Ion	Ratio	Lower	Upper
62	100		
64	33.3	12.1	52.1

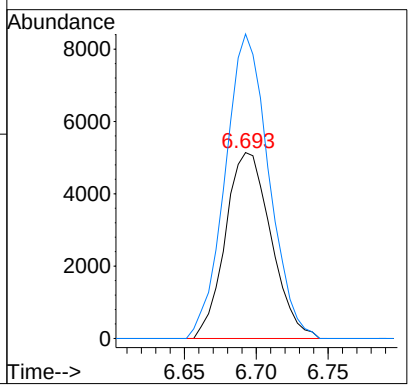


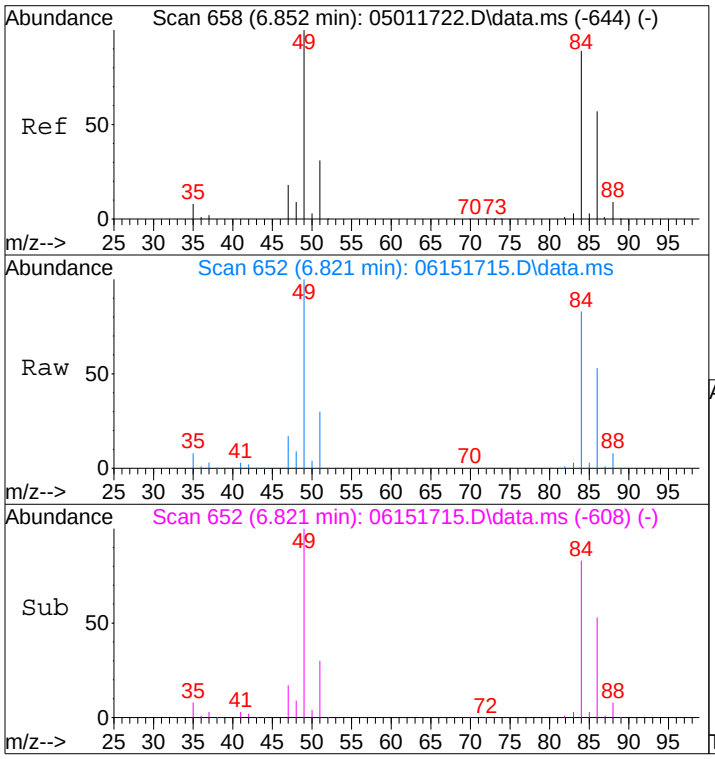


#17
1,1-Dichloroethene
Concen: 0.58 ng
RT: 6.69 min Scan# 627
Delta R.T. -0.015 min
Lab File: 06151715.D
Acq: 15 Jun 2017 16:23

Tgt Ion: 96 Resp: 11335

Ion	Ratio	Lower	Upper
96	100		
61	157.5	131.1	171.1

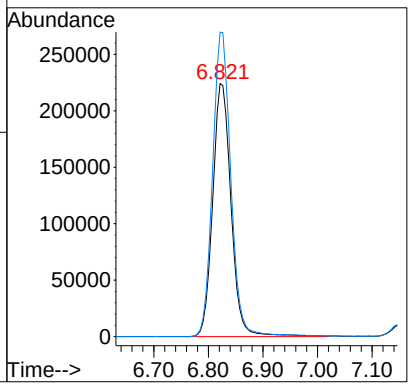


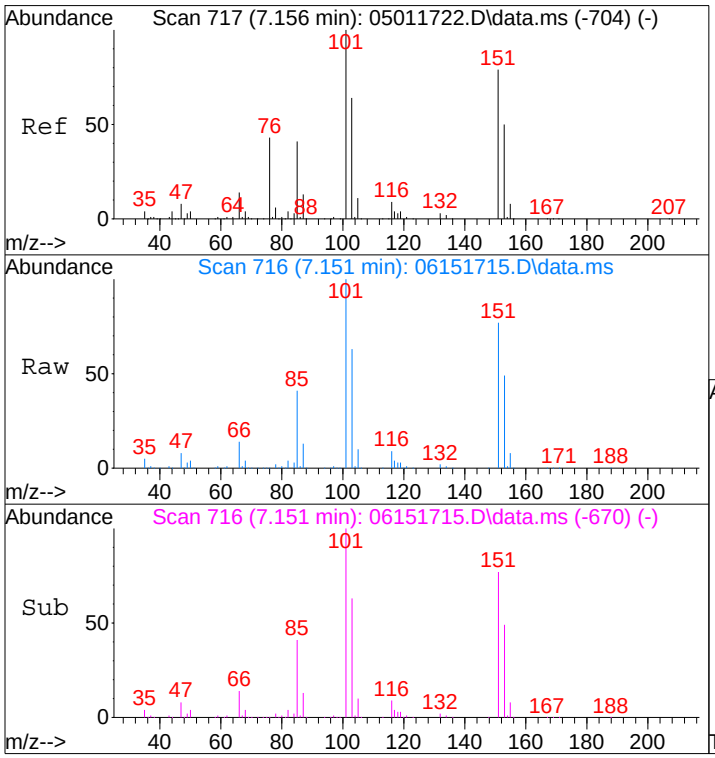


#19
Methylene Chloride
Concen: 23.04 ng
RT: 6.82 min Scan# 652
Delta R.T. -0.021 min
Lab File: 06151715.D
Acq: 15 Jun 2017 16:23

Tgt Ion: 84 Resp: 523435

Ion	Ratio	Lower	Upper
84	100		
49	120.4	89.3	139.3

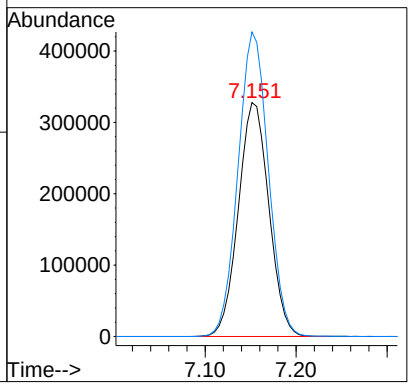


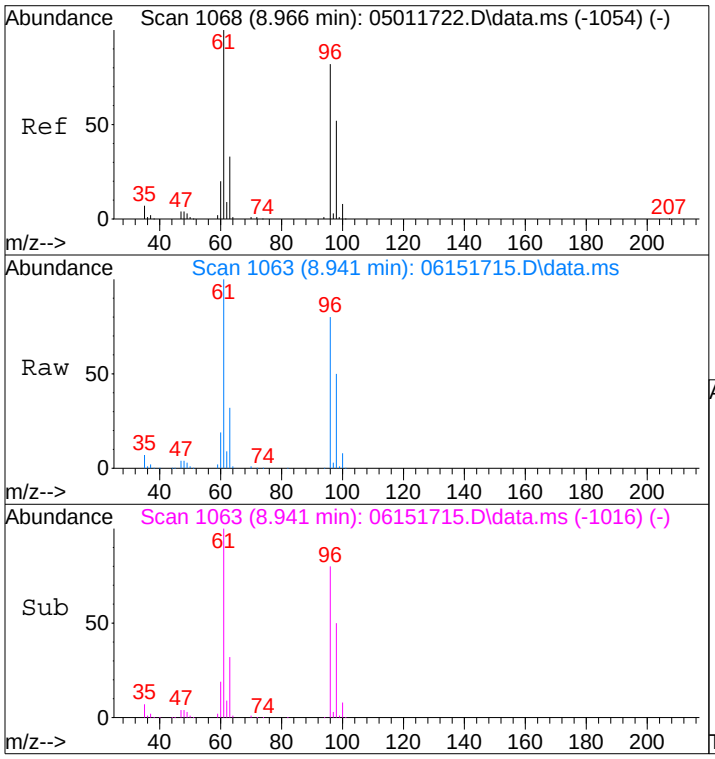


#21
Trichlorotrifluoroethane
Concen: 44.81 ng
RT: 7.15 min Scan# 716
Delta R.T. -0.010 min
Lab File: 06151715.D
Acq: 15 Jun 2017 16:23

Tgt Ion:151 Resp: 766007

Ion	Ratio	Lower	Upper
151	100		
101	129.1	106.3	146.3

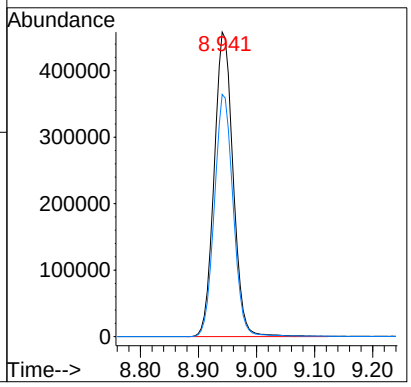


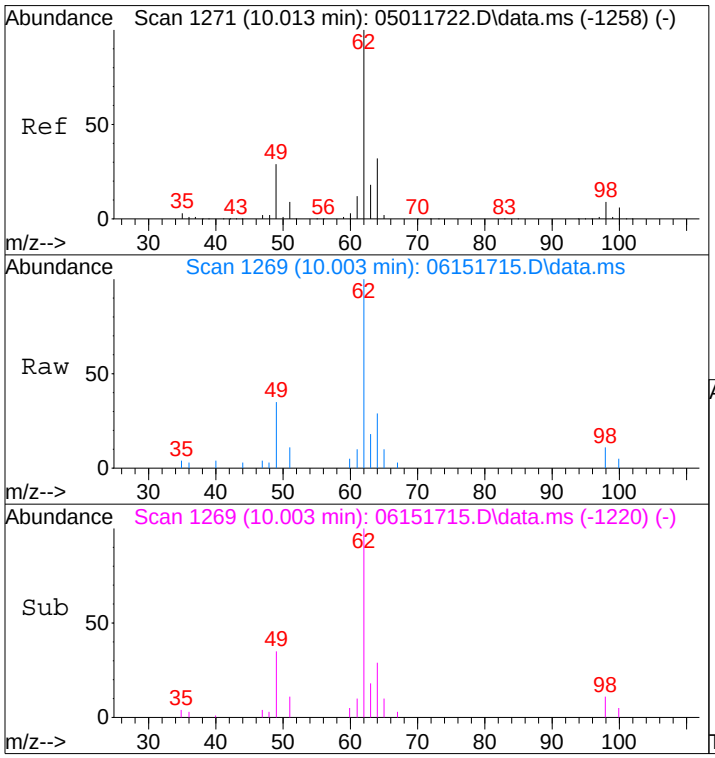


#28
cis-1,2-Dichloroethene
Concen: 36.63 ng
RT: 8.94 min Scan# 1063
Delta R.T. -0.005 min
Lab File: 06151715.D
Acq: 15 Jun 2017 16:23

Tgt Ion: 61 Resp: 1036643

Ion	Ratio	Lower	Upper
61	100		
96	79.1	60.3	100.3

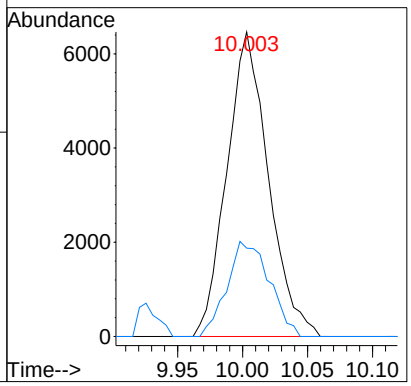


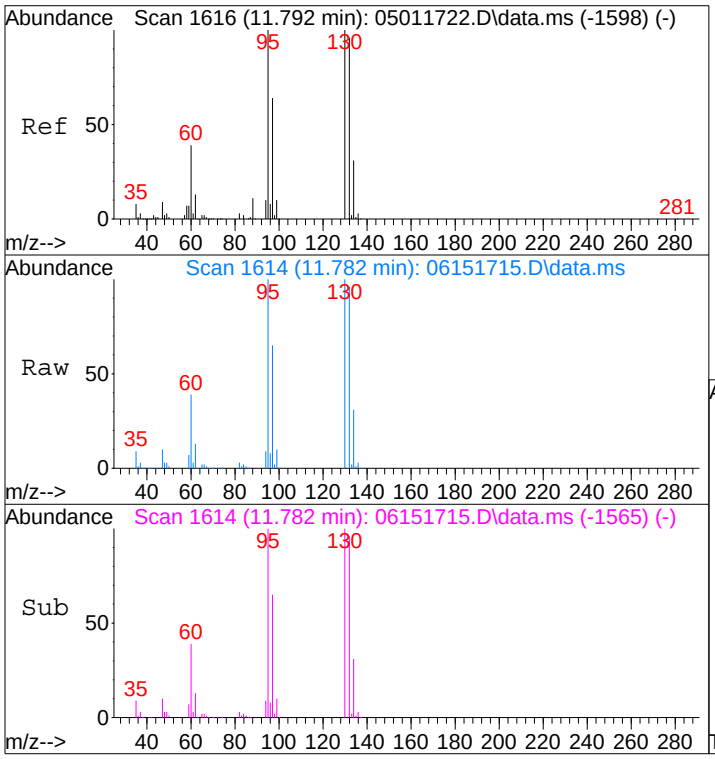


#36
1,2-Dichloroethane
Concen: 0.57 ng
RT: 10.00 min Scan# 1269
Delta R.T. 0.005 min
Lab File: 06151715.D
Acq: 15 Jun 2017 16:23

Tgt Ion: 62 Resp: 14356

Ion	Ratio	Lower	Upper
62	100		
64	31.8	12.7	52.7

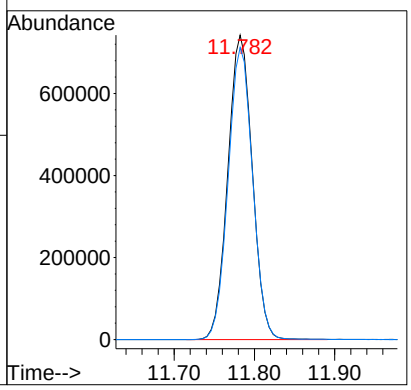




#47
Trichloroethene
Concen: 70.09 ng
RT: 11.78 min Scan# 1614
Delta R.T. 0.005 min
Lab File: 06151715.D
Acq: 15 Jun 2017 16:23

Tgt Ion:130 Resp: 1567177

Ion	Ratio	Lower	Upper
130	100		
132	96.1	75.1	115.1



Data File: I:\MS09\Data\2017 06\15\06151716.D
Acq On : 15 Jun 2017 16:57 Operator: SC
Sample : P1702773-002 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

6/16/17

Quant Time: Jun 16 11:50:02 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	183424	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	11.09	114	879649	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	372732	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	9.89	65	254775	11.860	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.88%			
57) Toluene-d8 (SS2)	13.53	98	947822	12.484	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.84%			
73) Bromofluorobenzene (SS3)	17.04	174	276713	12.755	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.08%			
Target Compounds						Qvalue
2) Propene	3.89	42	876	N.D.		
3) Dichlorodifluoromethan...	3.90	85	1277	N.D.		
4) Chloromethane	0.00	50	0	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	4.46	62	23188	0.732	ng	99
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	5.36	45	724	N.D.		
11) Acetonitrile	5.58	41	47	N.D.		
12) Acrolein	5.86	56	375	N.D.		
13) Acetone	5.86	58	3870	N.D.		
14) Trichlorofluoromethane	5.80	101	434	N.D.		
15) 2-Propanol (Isopropanol)	6.17	45	883	N.D.		
16) Acrylonitrile	6.52	53	148	N.D.		
17) 1,1-Dichloroethene	6.70	96	11947	0.608	ng	100
18) 2-Methyl-2-Propanol (t...	6.69	59	386	N.D.		
19) Methylene Chloride	6.83	84	537736	23.661	ng	96
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.	d	
21) Trichlorotrifluoroethane	7.15	151	784040	45.846	ng	98
22) Carbon Disulfide	7.14	76	4379	N.D.		
23) trans-1,2-Dichloroethene	7.86	61	2976	N.D.		
24) 1,1-Dichloroethane	8.07	63	3560	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	0.00	72	0	N.D.		
28) cis-1,2-Dichloroethene	8.94	61	1058902	37.400	ng	99
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	0.00	57	0	N.D.		
32) Chloroform	9.25	83	5095	N.D.		
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	10.00	62	14863	0.590	ng	98
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	10.69	56	827	N.D.		
41) Benzene	10.73	78	6390	N.D.		
42) Carbon Tetrachloride	10.87	117	765	N.D.		
43) Cyclohexane	11.01	84	1213	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D.	d	
47) Trichloroethene	11.78	130	1618265	73.819	ng	99
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	11.85	57	1057	N.D.		

Data File: I:\MS09\Data\2017 06\15\06151716.D
Acq On : 15 Jun 2017 16:57 Operator: SC
Sample : P1702773-002 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

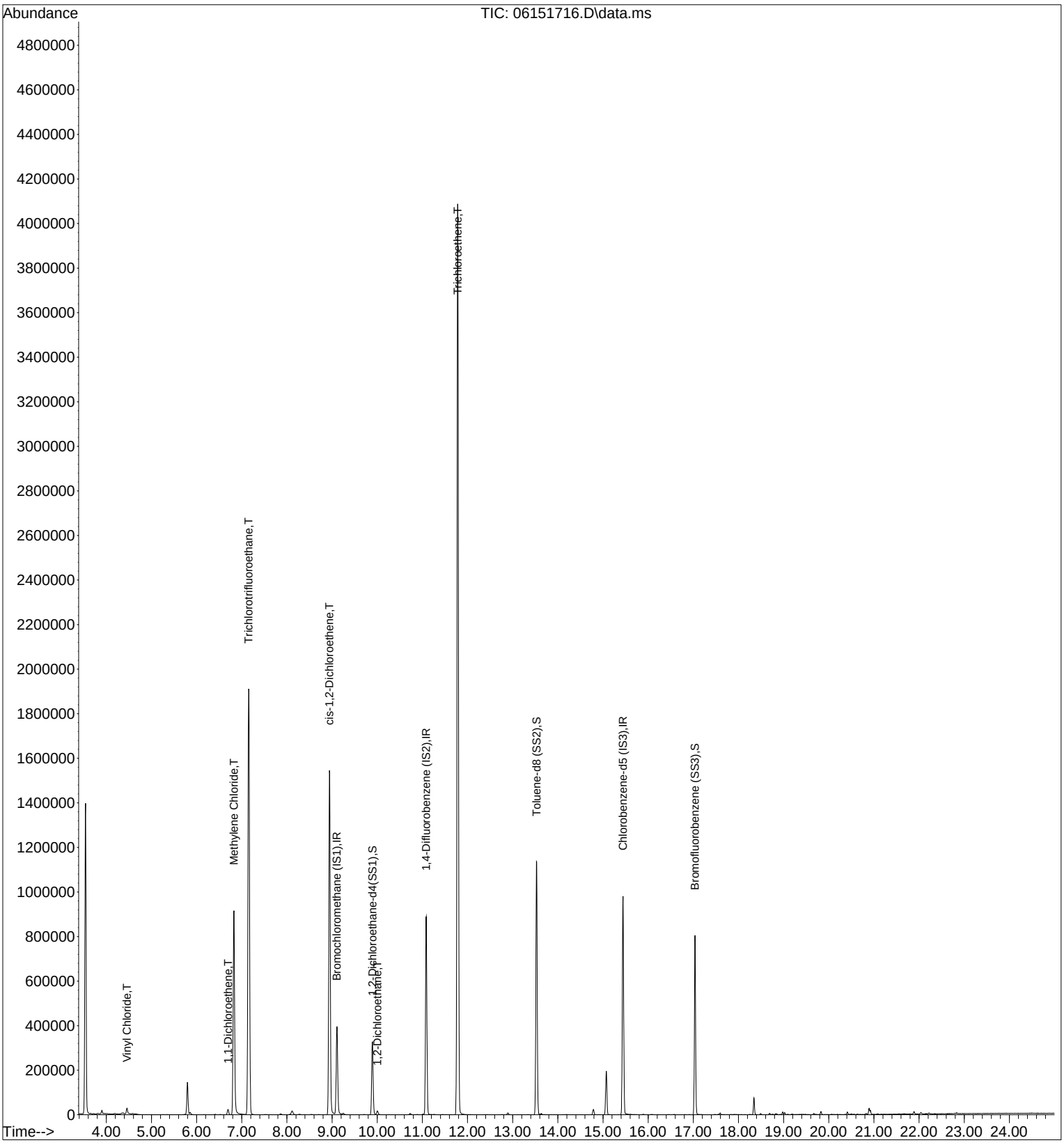
Quant Time: Jun 16 11:50:02 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D. d
51) n-Heptane	0.00	71	0	N.D.
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.
55) 1,1,2-Trichloroethane	13.33	97	421	N.D.
58) Toluene	13.63	91	4187	N.D.
59) 2-Hexanone	0.00	43	0	N.D.
60) Dibromochloromethane	0.00	129	0	N.D.
61) 1,2-Dibromoethane	0.00	107	0	N.D.
62) n-Butyl Acetate	0.00	43	0	N.D.
63) n-Octane	0.00	57	0	N.D.
64) Tetrachloroethene	14.78	166	8950	N.D.
65) Chlorobenzene	0.00	112	0	N.D.
66) Ethylbenzene	15.90	91	2534	N.D.
67) m- & p-Xylenes	16.08	91	1725	N.D.
68) Bromoform	0.00	173	0	N.D.
69) Styrene	16.46	104	596	N.D.
70) o-Xylene	16.58	91	1019	N.D.
71) n-Nonane	16.80	43	679	N.D.
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.
74) Cumene	0.00	105	0	N.D.
75) alpha-Pinene	17.59	93	3763	N.D.
76) n-Propylbenzene	17.68	91	554	N.D.
77) 3-Ethyltoluene	17.82	105	440	N.D.
78) 4-Ethyltoluene	17.82	105	440	N.D.
79) 1,3,5-Trimethylbenzene	17.82	105	440	N.D.
80) alpha-Methylstyrene	0.00	118	0	N.D.
81) 2-Ethyltoluene	0.00	105	0	N.D.
82) 1,2,4-Trimethylbenzene	18.37	105	978	N.D.
83) n-Decane	18.49	57	2048	N.D.
84) Benzyl Chloride	0.00	91	0	N.D.
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.
87) sec-Butylbenzene	18.82	105	592	N.D.
88) 4-Isopropyltoluene (p-...	18.83	119	2675	N.D.
89) 1,2,3-Trimethylbenzene	18.82	105	592	N.D.
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.
91) d-Limonene	18.98	68	3472	N.D.
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.
93) n-Undecane	19.83	57	5353	N.D.
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.
95) Naphthalene	20.89	128	24867	N.D.
96) n-Dodecane	20.92	57	5817	N.D.
97) Hexachlorobutadiene	0.00	225	0	N.D.
98) Cyclohexanone	0.00	55	0	N.D.
99) tert-Butylbenzene	18.34	119	626	N.D.
100) n-Butylbenzene	19.27	91	495	N.D.

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151716.D
Acq On : 15 Jun 2017 16:57 Operator: SC
Sample : P1702773-002 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Jun 16 11:50:02 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 06\15\06151716.D
Acq On : 15 Jun 2017 16:57 Operator: SC
Sample : P1702773-002 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

6/16/17

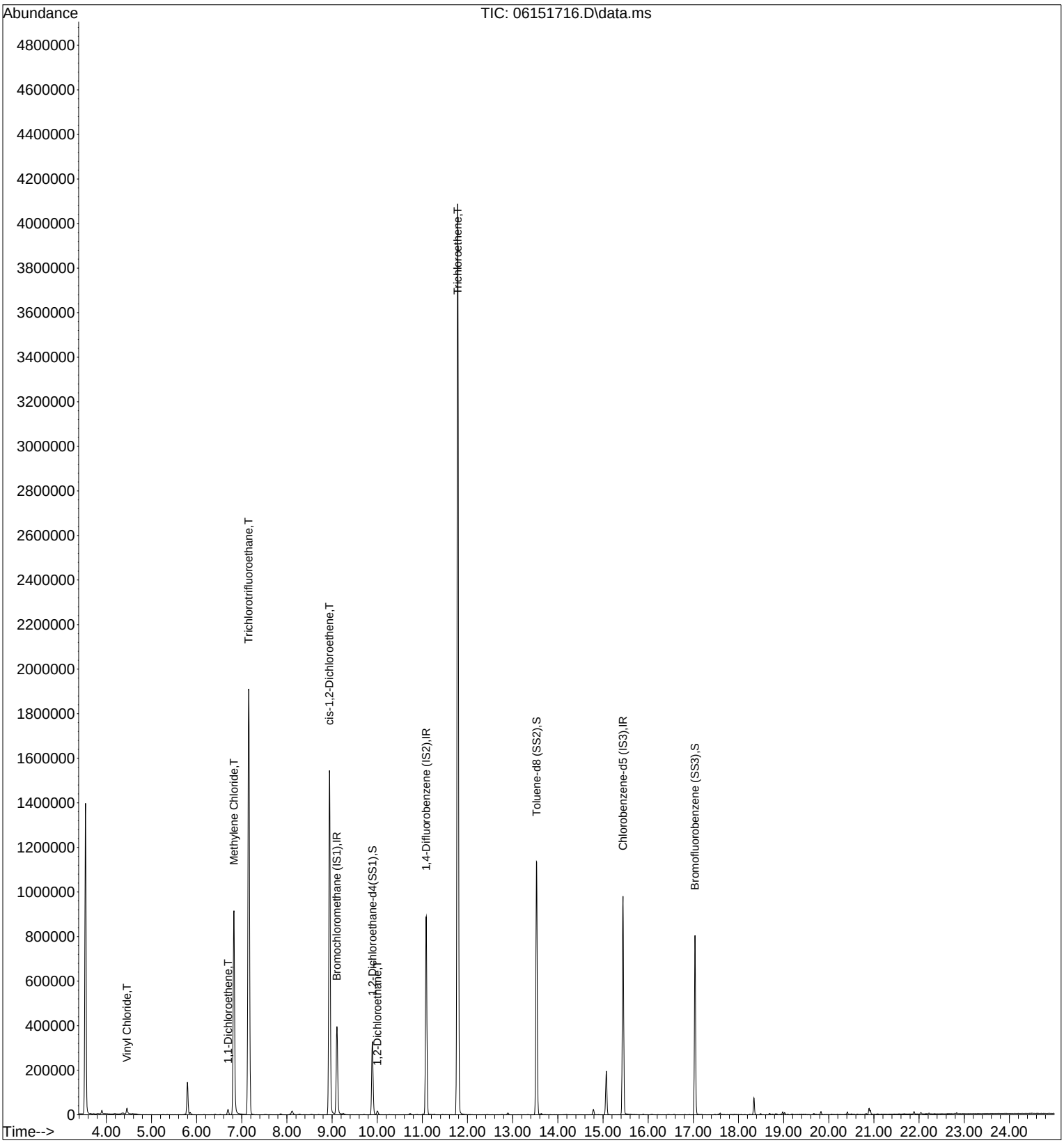
Quant Time: Jun 16 11:50:02 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

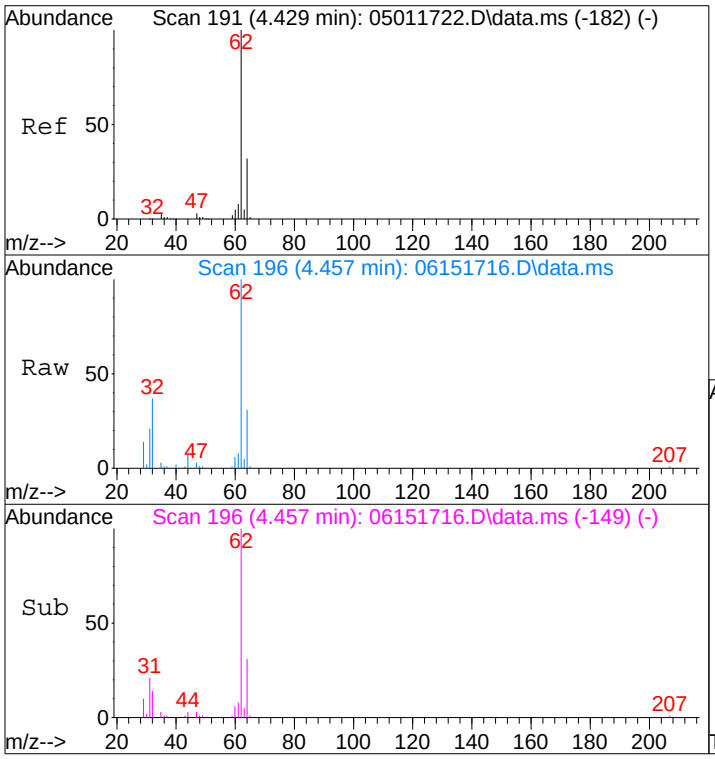
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	183424	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	11.09	114	879649	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	372732	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	9.89	65	254775	11.860	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.88%			
57) Toluene-d8 (SS2)	13.53	98	947822	12.484	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.84%			
73) Bromofluorobenzene (SS3)	17.04	174	276713	12.755	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.08%			
Target Compounds						Qvalue
6) Vinyl Chloride	4.46	62	23188	0.732	ng	99
17) 1,1-Dichloroethene	6.70	96	11947	0.608	ng	100
19) Methylene Chloride	6.83	84	537736	23.661	ng	96
21) Trichlorotrifluoroethane	7.15	151	784040	45.846	ng	98
28) cis-1,2-Dichloroethene	8.94	61	1058902	37.400	ng	99
36) 1,2-Dichloroethane	10.00	62	14863	0.590	ng	98
47) Trichloroethene	11.78	130	1618265	73.819	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151716.D
Acq On : 15 Jun 2017 16:57 Operator: SC
Sample : P1702773-002 (3.0mL)
Misc : S31-06061702
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Jun 16 11:50:02 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

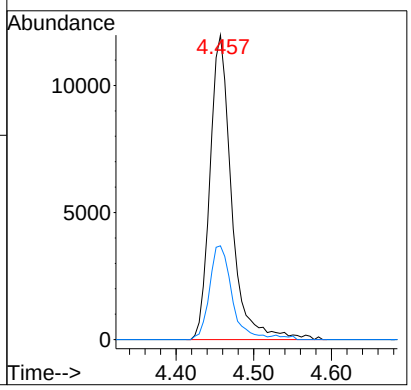


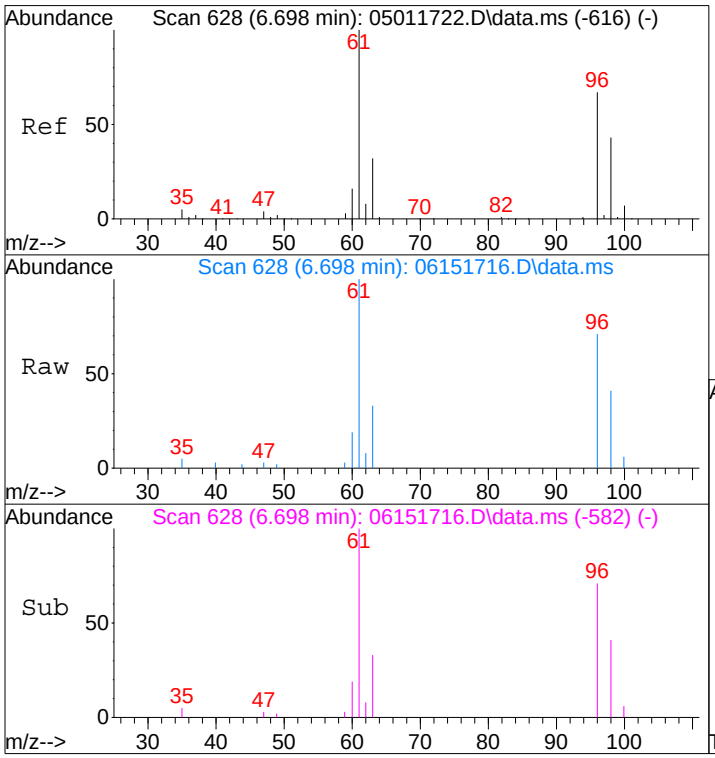


#6
Vinyl Chloride
Concen: 0.73 ng
RT: 4.46 min Scan# 196
Delta R.T. 0.005 min
Lab File: 06151716.D
Acq: 15 Jun 2017 16:57

Tgt Ion: 62 Resp: 23188

Ion	Ratio	Lower	Upper
62	100		
64	31.7	12.1	52.1

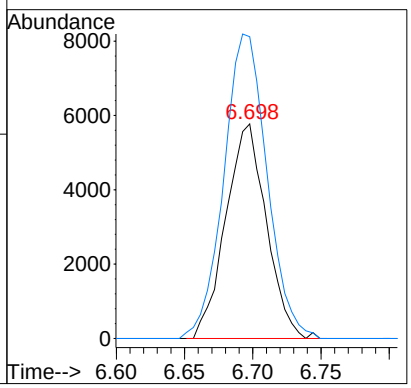


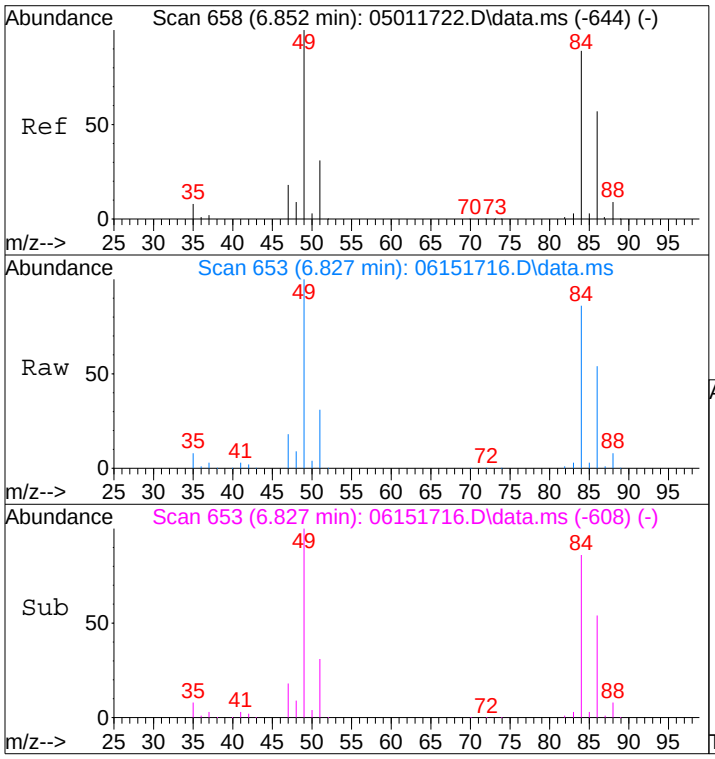


#17
1,1-Dichloroethene
Concen: 0.61 ng
RT: 6.70 min Scan# 628
Delta R.T. -0.010 min
Lab File: 06151716.D
Acq: 15 Jun 2017 16:57

Tgt Ion: 96 Resp: 11947

Ion	Ratio	Lower	Upper
96	100		
61	151.3	131.1	171.1

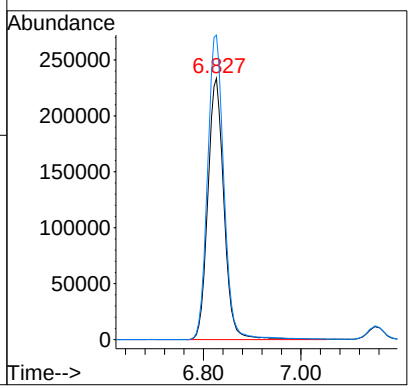


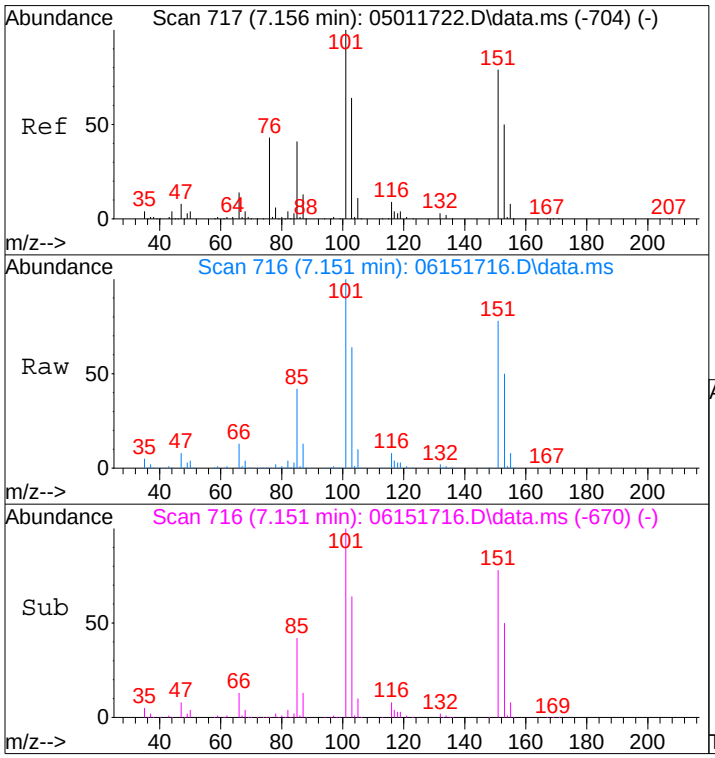


#19
Methylene Chloride
Concen: 23.66 ng
RT: 6.83 min Scan# 653
Delta R.T. -0.015 min
Lab File: 06151716.D
Acq: 15 Jun 2017 16:57

Tgt Ion: 84 Resp: 537736

Ion	Ratio	Lower	Upper
84	100		
49	118.8	89.3	139.3

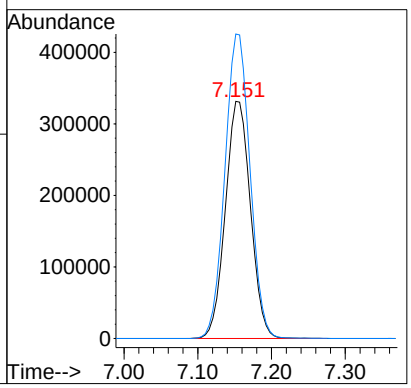


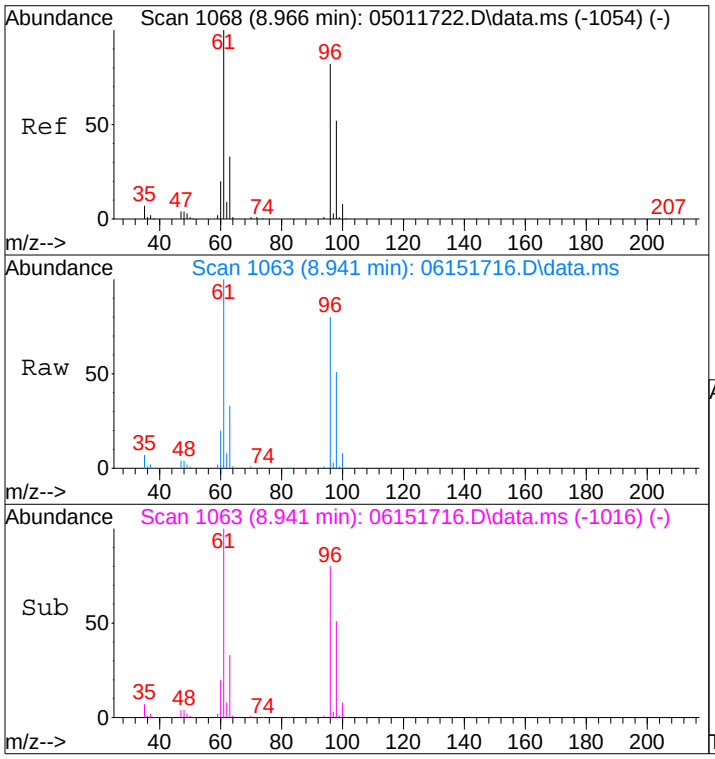


#21
Trichlorotrifluoroethane
Concen: 45.85 ng
RT: 7.15 min Scan# 716
Delta R.T. -0.010 min
Lab File: 06151716.D
Acq: 15 Jun 2017 16:57

Tgt Ion:151 Resp: 784040

Ion	Ratio	Lower	Upper
151	100		
101	128.6	106.3	146.3

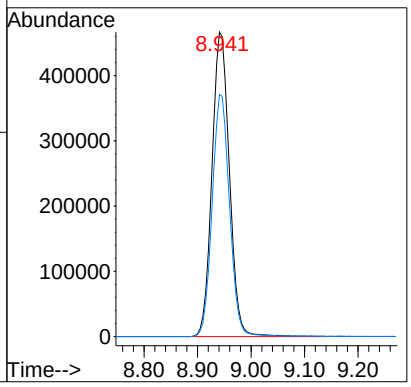


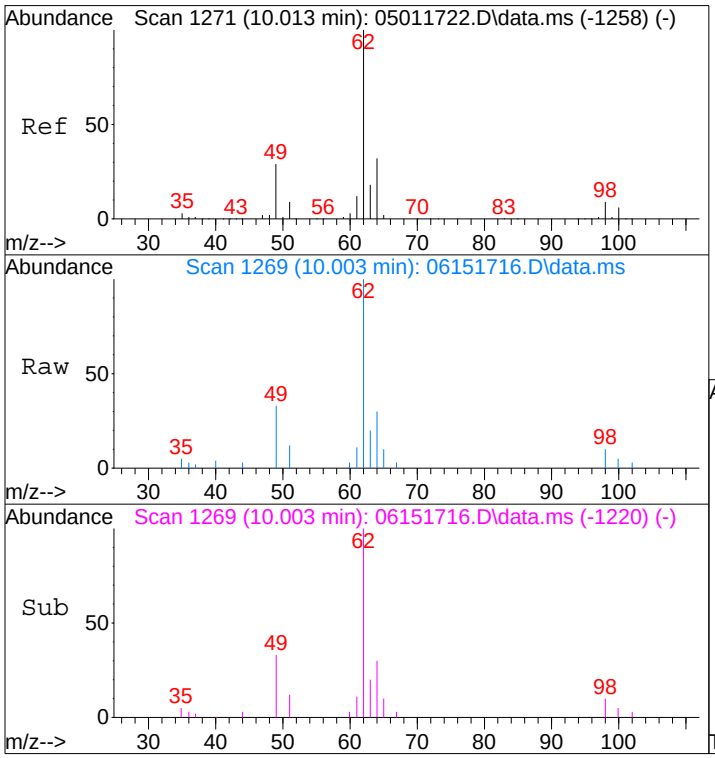


#28
cis-1,2-Dichloroethene
Concen: 37.40 ng
RT: 8.94 min Scan# 1063
Delta R.T. -0.005 min
Lab File: 06151716.D
Acq: 15 Jun 2017 16:57

Tgt Ion: 61 Resp: 1058902

Ion	Ratio	Lower	Upper
61	100		
96	79.3	60.3	100.3

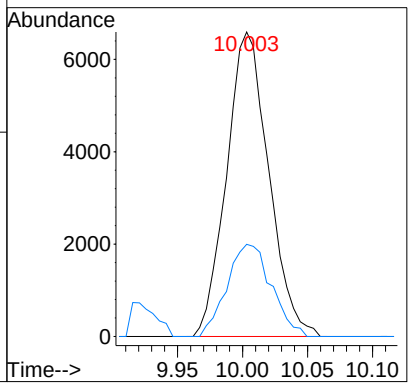


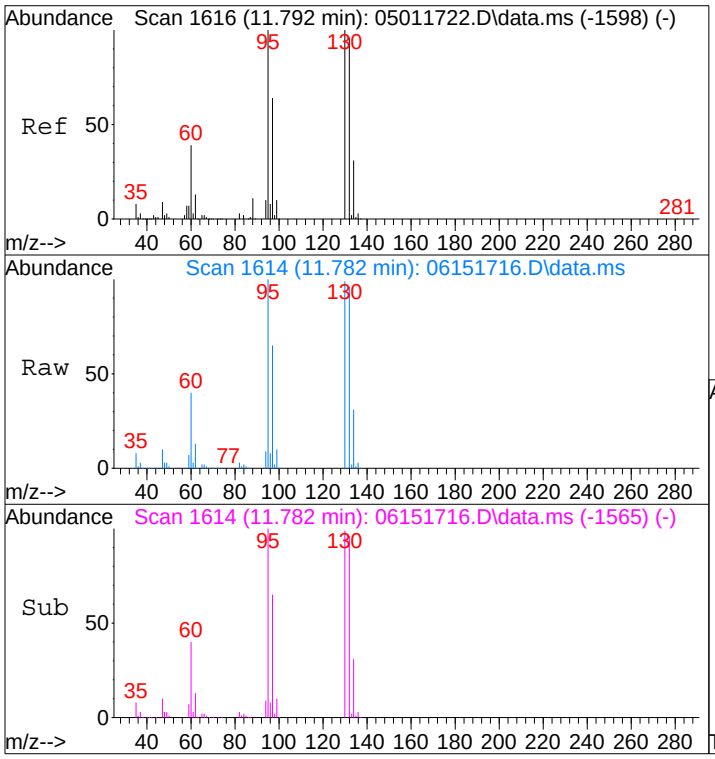


#36
1,2-Dichloroethane
Concen: 0.59 ng
RT: 10.00 min Scan# 1269
Delta R.T. 0.005 min
Lab File: 06151716.D
Acq: 15 Jun 2017 16:57

Tgt Ion: 62 Resp: 14863

Ion	Ratio	Lower	Upper
62	100		
64	31.8	12.7	52.7

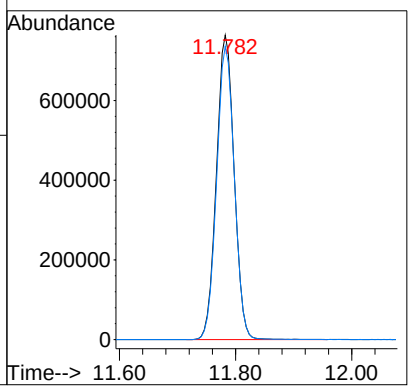




#47
Trichloroethene
Concen: 73.82 ng
RT: 11.78 min Scan# 1614
Delta R.T. 0.005 min
Lab File: 06151716.D
Acq: 15 Jun 2017 16:57

Tgt Ion:130 Resp: 1618265

Ion	Ratio	Lower	Upper
130	100		
132	96.2	75.1	115.1



Data File: I:\MS09\Data\2017 06\15\06151721.D
Acq On : 15 Jun 2017 19:55 Operator: SC
Sample : P1702773-003 (1000mL)
Misc : S31-06061702
ALS Vial : 3 Sample Multiplier: 1

6/16/17

Quant Time: Jun 16 11:55:52 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	174318	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.08	114	877672	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	378560	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	253907	12.437	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%				
57) Toluene-d8 (SS2)	13.53	98	955781	12.395	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.20%				
73) Bromofluorobenzene (SS3)	17.04	174	280303	12.722	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.76%				
Target Compounds							Qvalue
2) Propene	0.00	42	0	N.D.	d		
3) Dichlorodifluoromethan...	3.95	85	52431	1.466	ng		100
4) Chloromethane	4.16	50	5496	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	4.33	135	1140	N.D.			
6) Vinyl Chloride	4.45	62	6990	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	5.31	45	58764	4.230	ng		97
11) Acetonitrile	5.53	41	14377	N.D.			
12) Acrolein	5.67	56	3464	N.D.			
13) Acetone	5.81	58	84553	5.790	ng	#	77
14) Trichlorofluoromethane	6.00	101	23189	0.768	ng		99
15) 2-Propanol (Isopropanol)	6.14	45	7547	N.D.			
16) Acrylonitrile	6.34	53	1097	N.D.			
17) 1,1-Dichloroethene	6.70	96	3732	N.D.			
18) 2-Methyl-2-Propanol (t...	6.81	59	1809	N.D.			
19) Methylene Chloride	6.83	84	56774	2.629	ng		94
20) 3-Chloro-1-propene (Al...	6.89	41	693	N.D.			
21) Trichlorotrifluoroethane	7.15	151	480606	29.571	ng		98
22) Carbon Disulfide	7.13	76	4436	N.D.			
23) trans-1,2-Dichloroethene	7.85	61	775	N.D.			
24) 1,1-Dichloroethane	8.06	63	426	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	8.28	86	1190	N.D.			
27) 2-Butanone (MEK)	8.49	72	17831	1.331	ng		93
28) cis-1,2-Dichloroethene	8.94	61	127778	4.749	ng		98
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	9.20	61	6225	0.889	ng		92
31) n-Hexane	9.19	57	22294	0.653	ng		99
32) Chloroform	9.25	83	2084	N.D.			
34) Tetrahydrofuran (THF)	9.65	72	31895	2.333	ng	#	89
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	10.00	62	1801	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	10.73	61	488	N.D.			
40) 1-Butanol	10.67	56	8737	N.D.			
41) Benzene	10.72	78	42498	0.482	ng		99
42) Carbon Tetrachloride	10.87	117	6151	N.D.			
43) Cyclohexane	11.01	84	6571	N.D.			
44) tert-Amyl Methyl Ether	11.40	73	1063	N.D.			
45) 1,2-Dichloropropane	11.36	63	1232	N.D.			
46) Bromodichloromethane	11.78	83	3811	N.D.			
47) Trichloroethene	11.78	130	310597	14.200	ng		98
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	11.84	57	5625	N.D.			

Data File: I:\MS09\Data\2017 06\15\06151721.D
Acq On : 15 Jun 2017 19:55 Operator: SC
Sample : P1702773-003 (1000mL)
Misc : S31-06061702
ALS Vial : 3 Sample Multiplier: 1

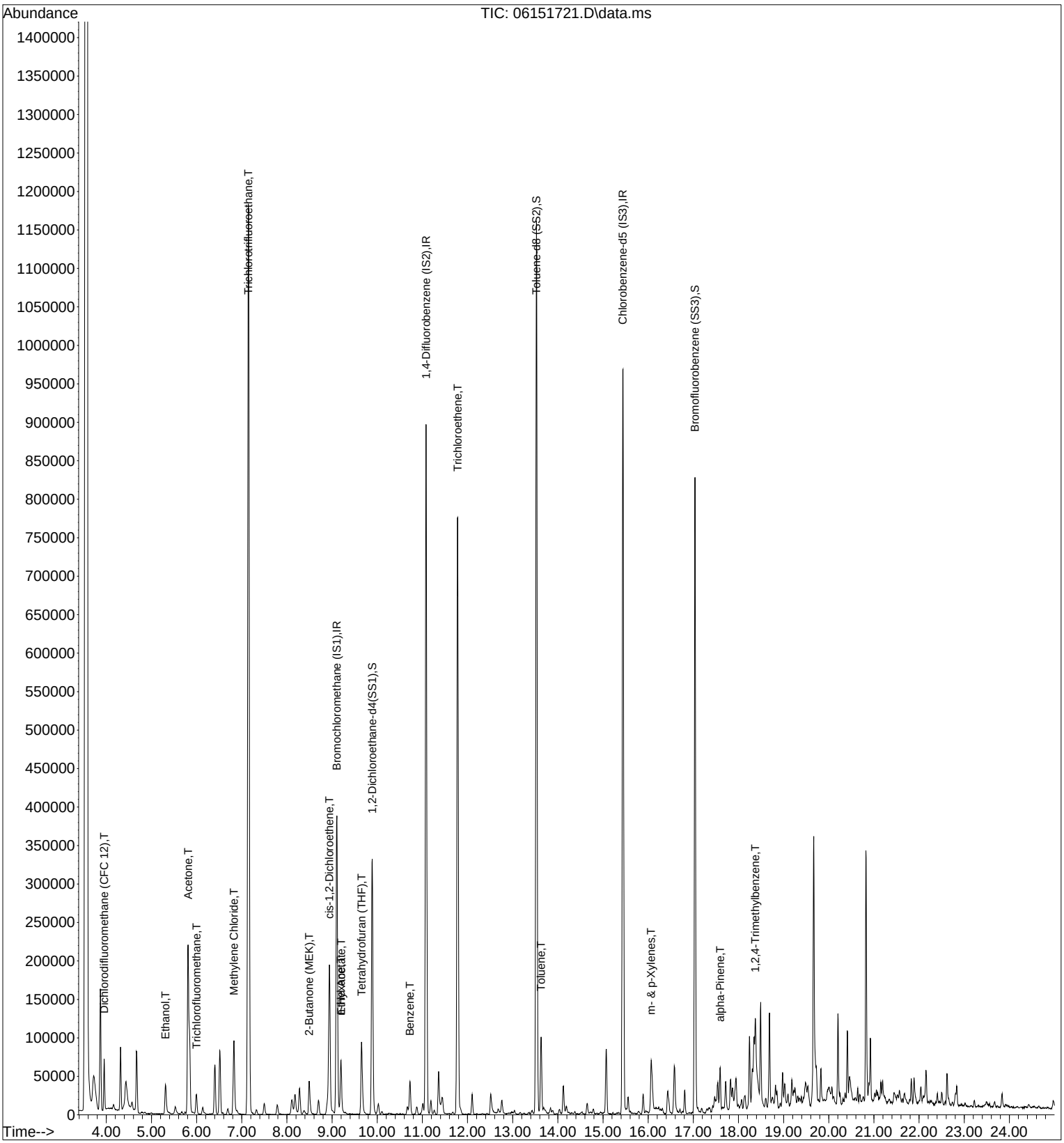
Quant Time: Jun 16 11:55:52 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	12.11	100	1822	N.D.	
51) n-Heptane	12.10	71	7010	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	12.68	58	2034	N.D.	
54) trans-1,3-Dichloropropene	13.16	75	1100	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	13.63	91	85859	0.954 ng	100
59) 2-Hexanone	13.88	43	3317	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	14.29	107	562	N.D.	
62) n-Butyl Acetate	14.54	43	2463	N.D.	
63) n-Octane	14.65	57	2938	N.D.	
64) Tetrachloroethene	14.78	166	2699	N.D.	
65) Chlorobenzene	15.48	112	953	N.D.	
66) Ethylbenzene	15.89	91	23620	N.D.	
67) m- & p-Xylenes	16.07	91	65170	0.859 ng	100
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	16.45	104	8624	N.D.	
70) o-Xylene	16.57	91	23195	N.D.	
71) n-Nonane	16.81	43	11991	N.D.	
72) 1,1,2,2-Tetrachloroethane	16.59	83	1077	N.D.	
74) Cumene	17.19	105	2155	N.D.	
75) alpha-Pinene	17.59	93	25215	0.534 ng	93
76) n-Propylbenzene	17.71	91	10733	N.D.	
77) 3-Ethyltoluene	17.82	105	23528	N.D.	
78) 4-Ethyltoluene	17.87	105	11711	N.D.	
79) 1,3,5-Trimethylbenzene	17.94	105	8550	N.D.	
80) alpha-Methylstyrene	18.10	118	792	N.D.	
81) 2-Ethyltoluene	18.15	105	9053	N.D.	
82) 1,2,4-Trimethylbenzene	18.37	105	51173m	0.678 ng	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	18.51	91	2362	N.D.	
85) 1,3-Dichlorobenzene	18.53	146	834	N.D.	
86) 1,4-Dichlorobenzene	18.60	146	5222	N.D.	
87) sec-Butylbenzene	18.66	105	1643	N.D.	
88) 4-Isopropyltoluene (p-...	18.83	119	6368	N.D.	
89) 1,2,3-Trimethylbenzene	18.82	105	9135	N.D.	
90) 1,2-Dichlorobenzene	18.97	146	525	N.D.	
91) d-Limonene	18.98	68	13201	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	19.82	57	17043	N.D.	
94) 1,2,4-Trichlorobenzene	20.78	180	1220	N.D.	
95) Naphthalene	20.89	128	18791	N.D.	
96) n-Dodecane	0.00	57	0	N.D. d	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	16.24	55	4226	N.D.	
99) tert-Butylbenzene	18.38	119	5904	N.D.	
100) n-Butylbenzene	19.26	91	7222	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151721.D
Acq On : 15 Jun 2017 19:55 Operator: SC
Sample : P1702773-003 (1000mL)
Misc : S31-06061702
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Jun 16 11:55:52 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 06\15\06151721.D
Acq On : 15 Jun 2017 19:55 Operator: SC
Sample : P1702773-003 (1000mL)
Misc : S31-06061702
ALS Vial : 3 Sample Multiplier: 1

6/16/17

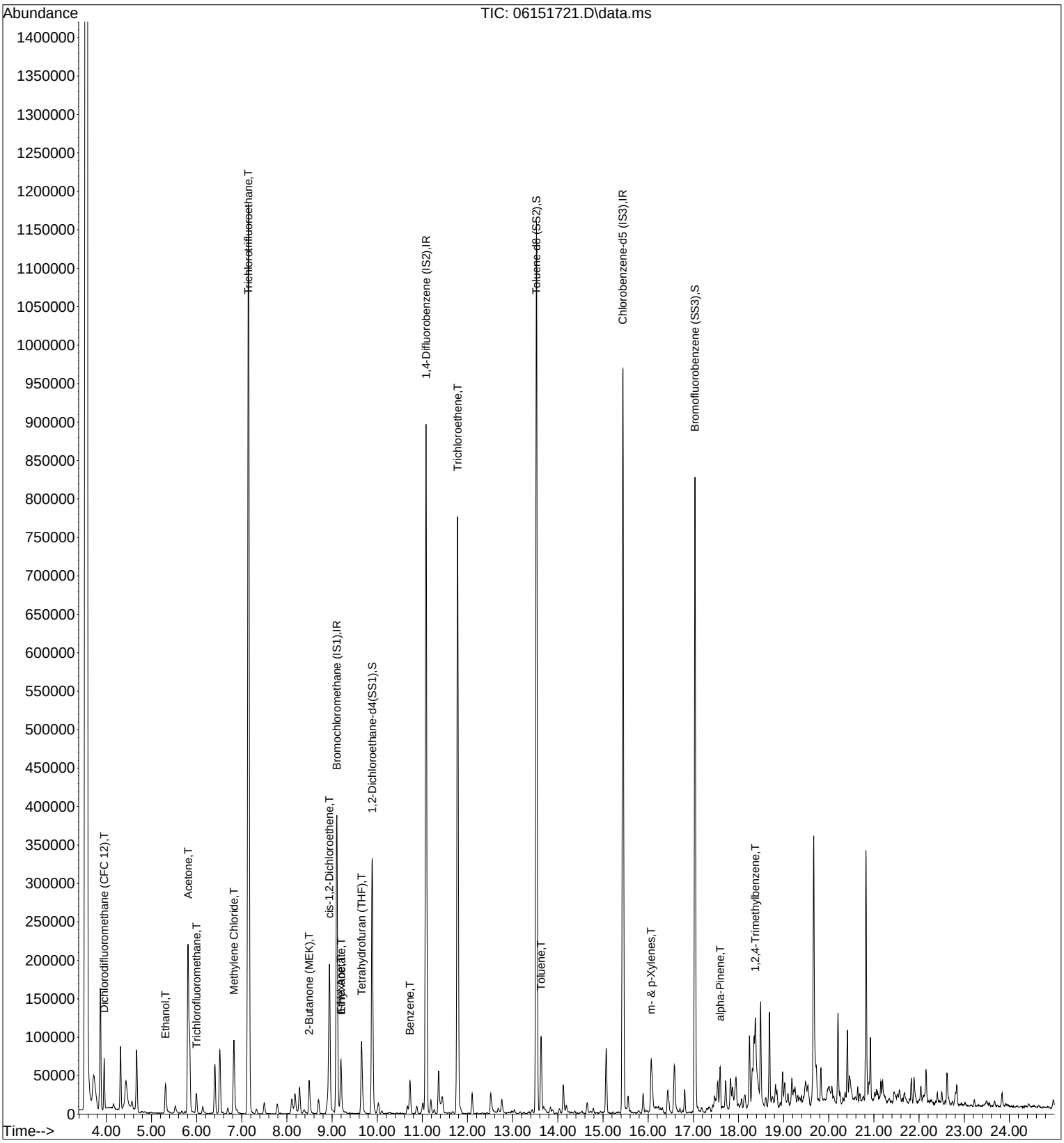
Quant Time: Jun 16 11:55:52 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

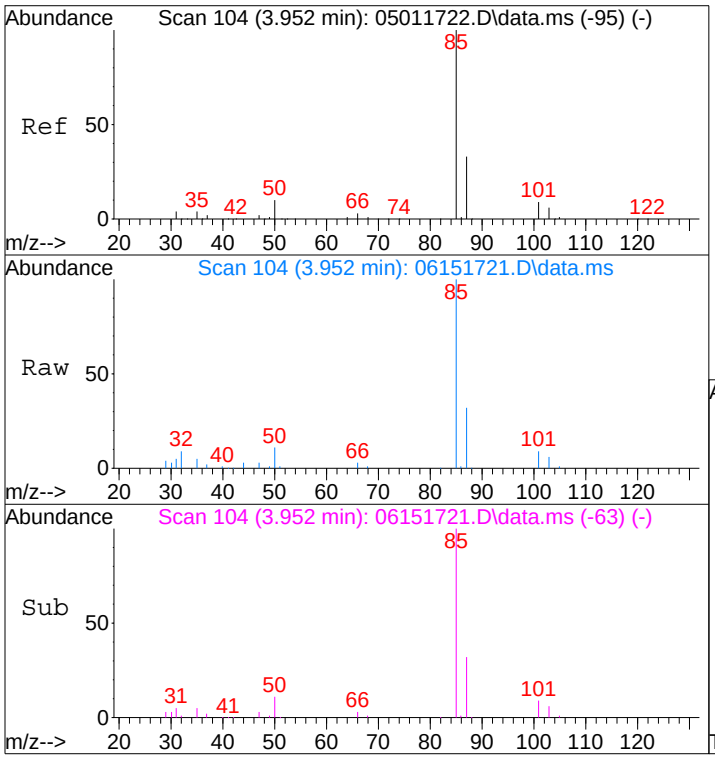
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	174318	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.08	114	877672	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	378560	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	253907	12.437	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%				
57) Toluene-d8 (SS2)	13.53	98	955781	12.395	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.20%				
73) Bromofluorobenzene (SS3)	17.04	174	280303	12.722	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.76%				
Target Compounds							Qvalue
3) Dichlorodifluoromethan...	3.95	85	52431	1.466	ng		100
10) Ethanol	5.31	45	58764	4.230	ng		97
13) Acetone	5.81	58	84553	5.790	ng	#	77
14) Trichlorofluoromethane	6.00	101	23189	0.768	ng		99
19) Methylene Chloride	6.83	84	56774	2.629	ng		94
21) Trichlorotrifluoroethane	7.15	151	480606	29.571	ng		98
27) 2-Butanone (MEK)	8.49	72	17831	1.331	ng		93
28) cis-1,2-Dichloroethene	8.94	61	127778	4.749	ng		98
30) Ethyl Acetate	9.20	61	6225	0.889	ng		92
31) n-Hexane	9.19	57	22294	0.653	ng		99
34) Tetrahydrofuran (THF)	9.65	72	31895	2.333	ng	#	89
41) Benzene	10.72	78	42498	0.482	ng		99
47) Trichloroethene	11.78	130	310597	14.200	ng		98
58) Toluene	13.63	91	85859	0.954	ng		100
67) m- & p-Xylenes	16.07	91	65170	0.859	ng		100
75) alpha-Pinene	17.59	93	25215	0.534	ng		93
82) 1,2,4-Trimethylbenzene	18.37	105	51173m	0.678	ng		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151721.D
Acq On : 15 Jun 2017 19:55 Operator: SC
Sample : P1702773-003 (1000mL)
Misc : S31-06061702
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Jun 16 11:55:52 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

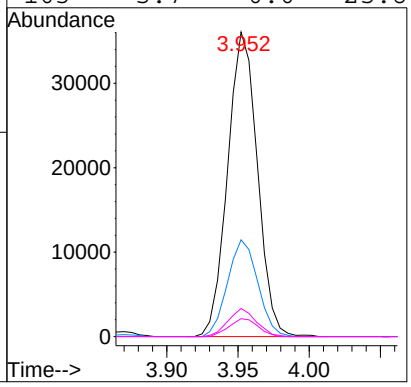


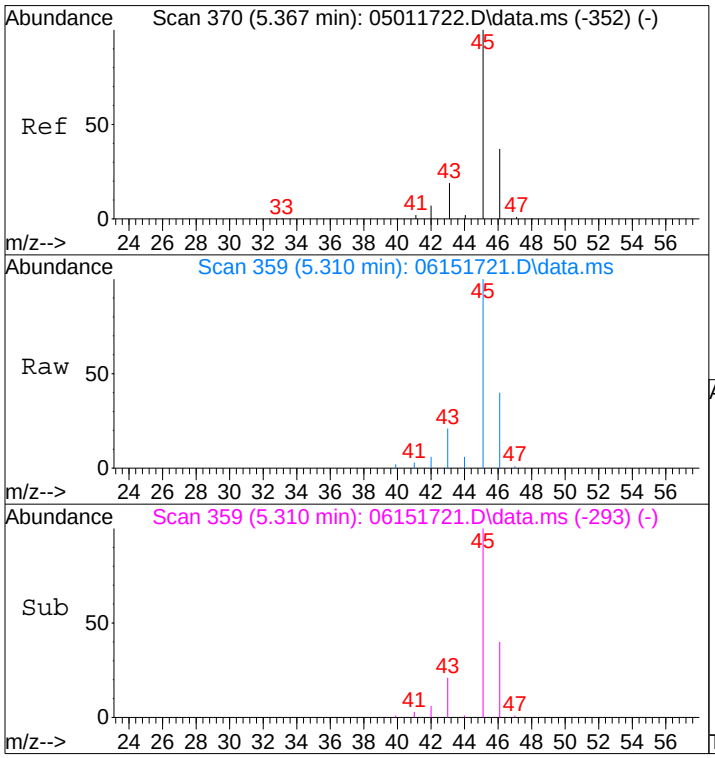


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.47 ng
RT: 3.95 min Scan# 104
Delta R.T. -0.028 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 85 Resp: 52431

Ion	Ratio	Lower	Upper
85	100		
87	32.2	12.3	52.3
101	8.7	0.0	29.1
103	5.7	0.0	25.8

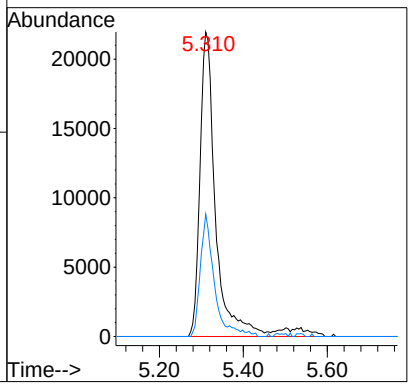


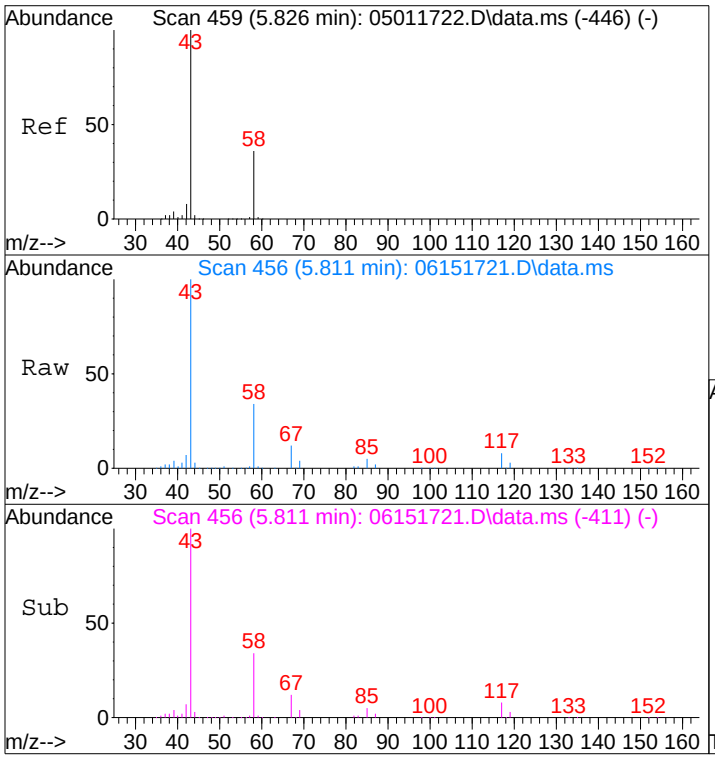


#10
Ethanol
Concen: 4.23 ng
RT: 5.31 min Scan# 359
Delta R.T. -0.010 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 45 Resp: 58764

Ion	Ratio	Lower	Upper
45	100		
46	34.9	16.6	56.6

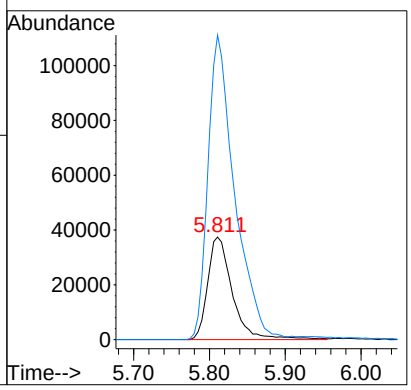


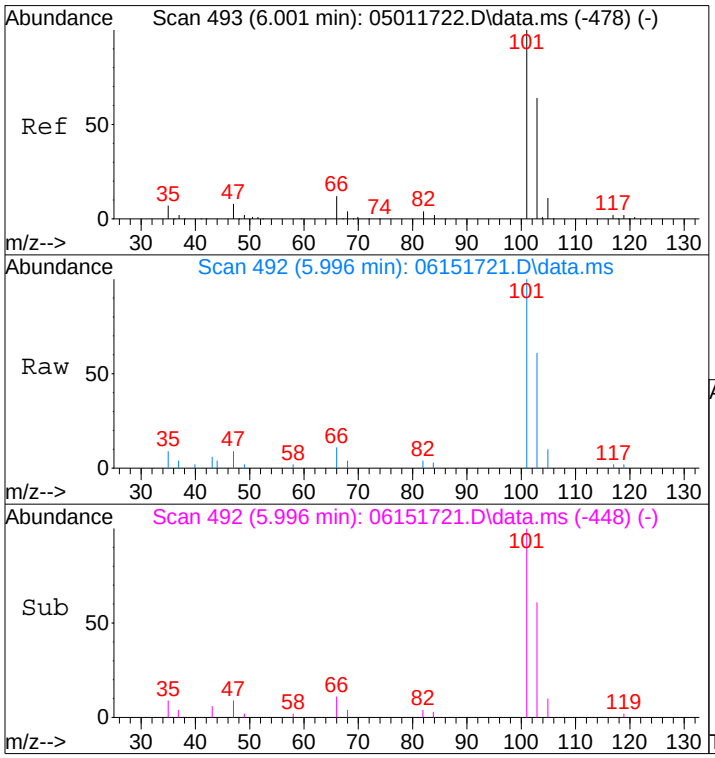


#13
Acetone
Concen: 5.79 ng
RT: 5.81 min Scan# 456
Delta R.T. -0.016 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 58 Resp: 84553

Ion	Ratio	Lower	Upper
58	100		
43	320.8	248.1	308.1#

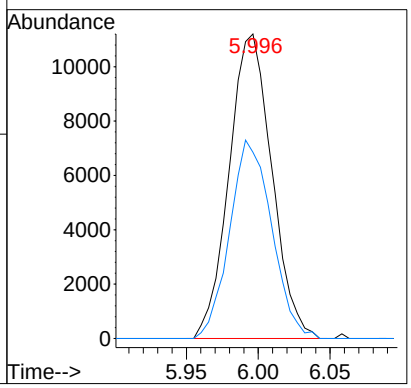


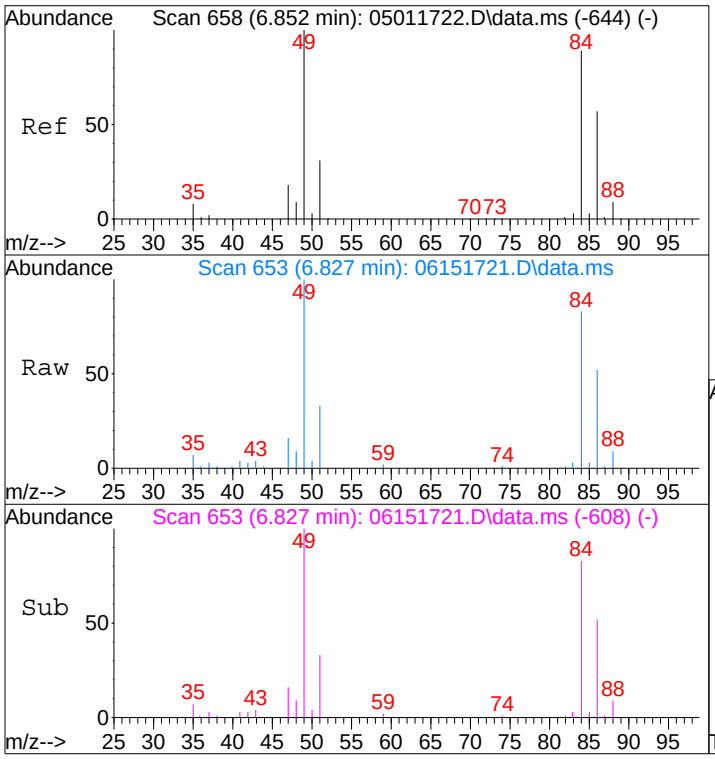


#14
Trichlorofluoromethane
Concen: 0.77 ng
RT: 6.00 min Scan# 492
Delta R.T. -0.021 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion:101 Resp: 23189

Ion	Ratio	Lower	Upper
101	100		
103	64.0	44.7	84.7

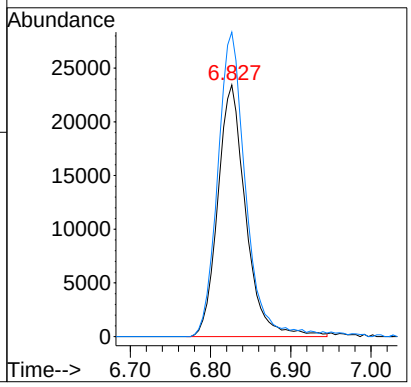


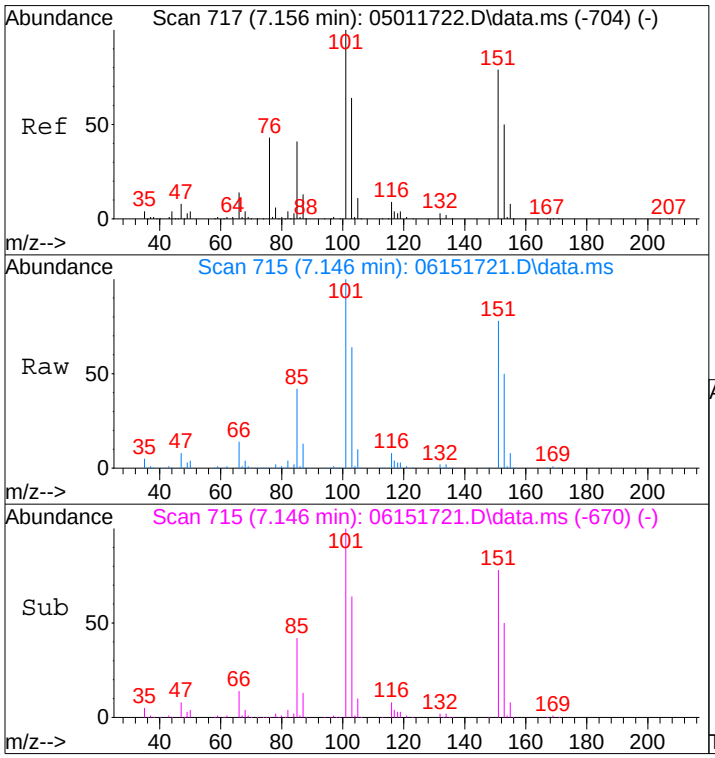


#19
Methylene Chloride
Concen: 2.63 ng
RT: 6.83 min Scan# 653
Delta R.T. -0.016 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 84 Resp: 56774

Ion	Ratio	Lower	Upper
84	100		
49	120.3	89.3	139.3

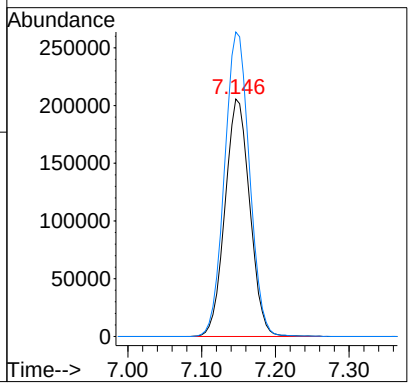


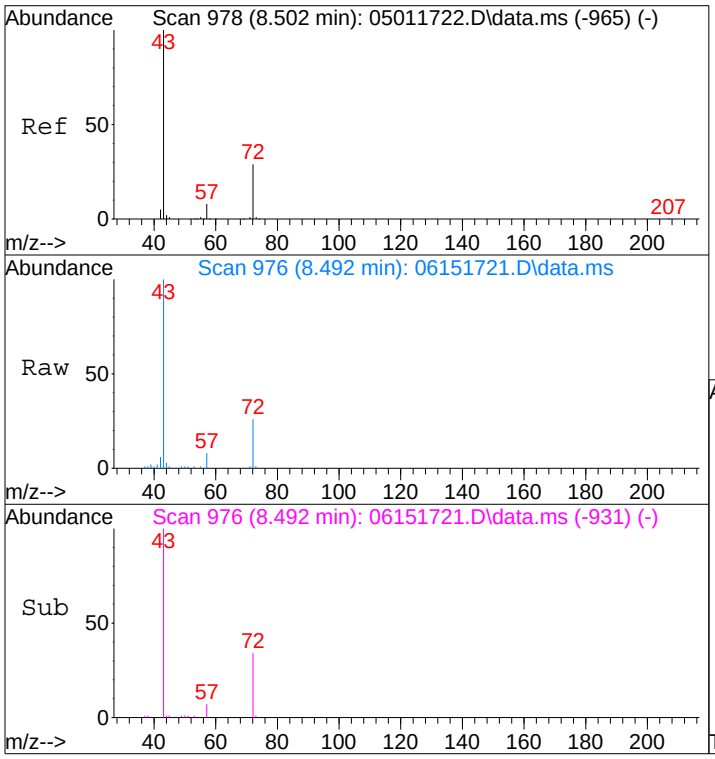


#21
Trichlorotrifluoroethane
Concen: 29.57 ng
RT: 7.15 min Scan# 715
Delta R.T. -0.016 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion:151 Resp: 480606

Ion	Ratio	Lower	Upper
151	100		
101	128.9	106.3	146.3

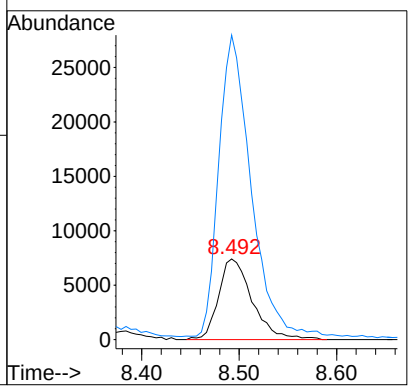


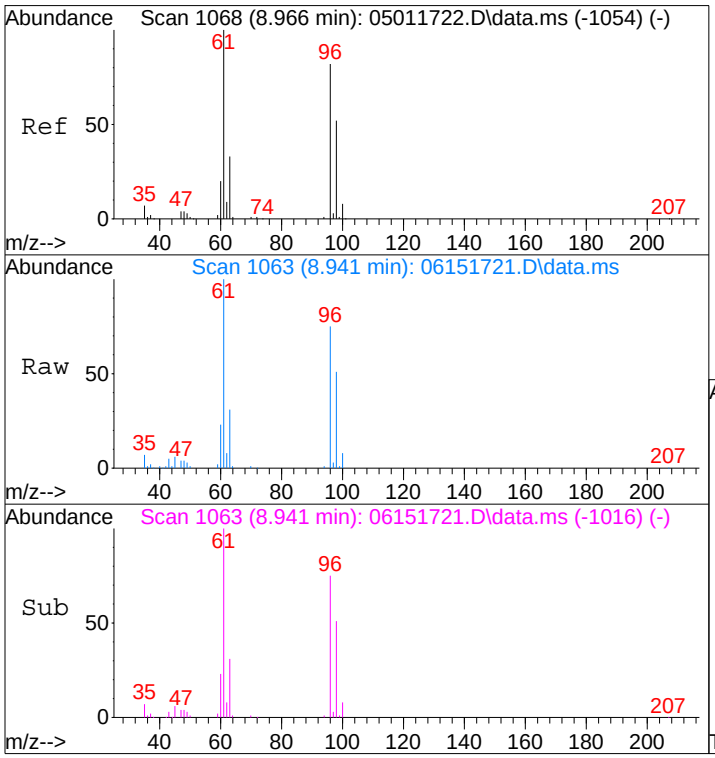


#27
2-Butanone (MEK)
Concen: 1.33 ng
RT: 8.49 min Scan# 976
Delta R.T. -0.016 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 72 Resp: 17831

Ion	Ratio	Lower	Upper
72	100		
43	362.6	326.9	366.9

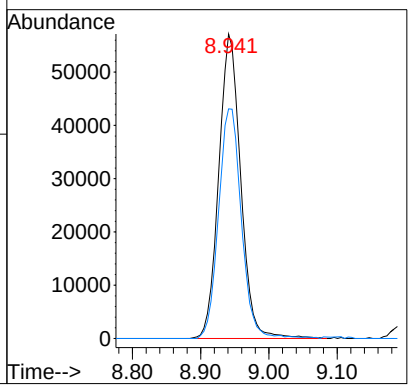


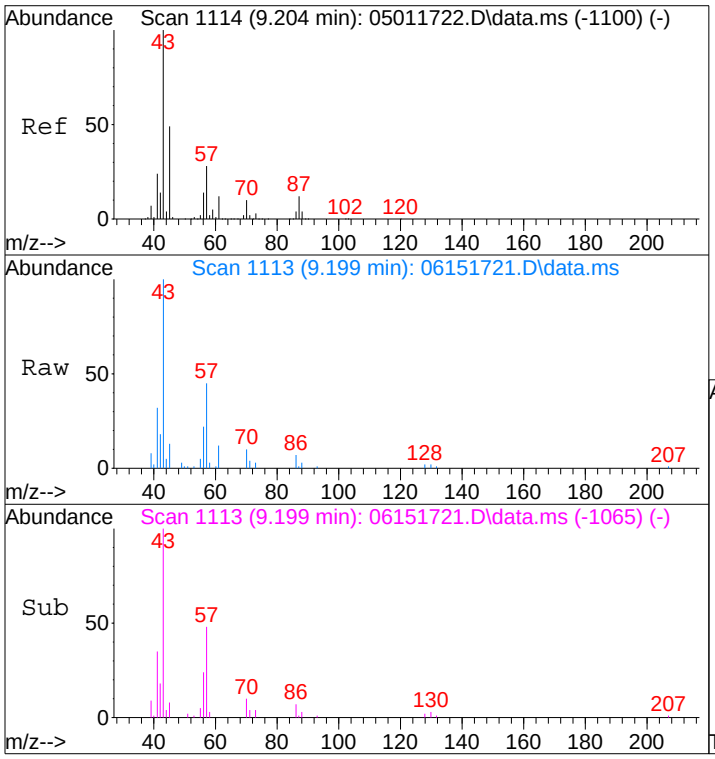


#28
cis-1,2-Dichloroethene
Concen: 4.75 ng
RT: 8.94 min Scan# 1063
Delta R.T. -0.005 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 61 Resp: 127778

Ion	Ratio	Lower	Upper
61	100		
96	78.2	60.3	100.3

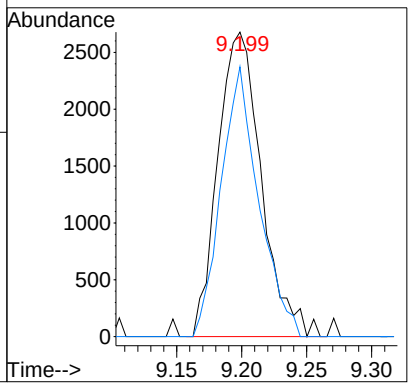


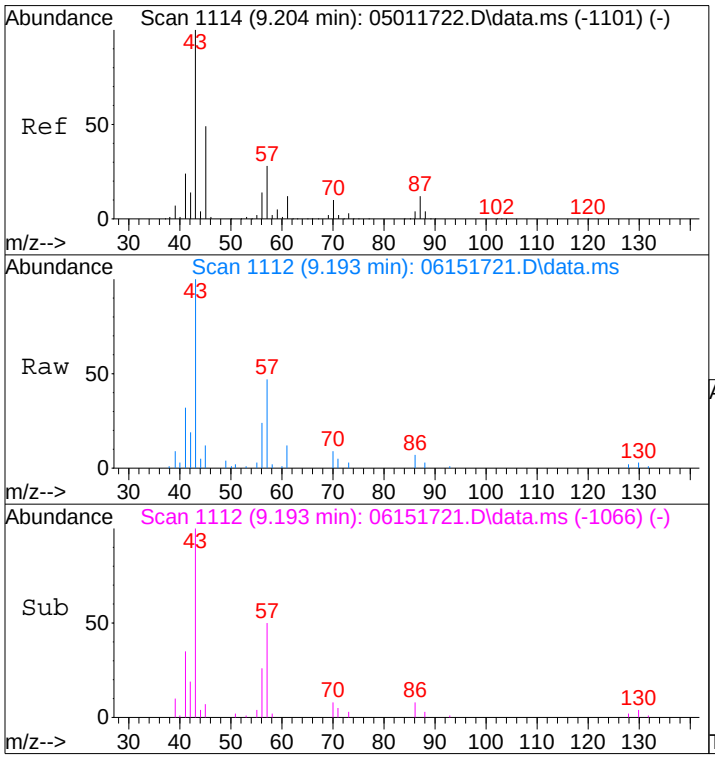


#30
Ethyl Acetate
Concen: 0.89 ng
RT: 9.20 min Scan# 1113
Delta R.T. -0.000 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 61 Resp: 6225

Ion	Ratio	Lower	Upper
61	100		
70	76.7	63.8	103.8

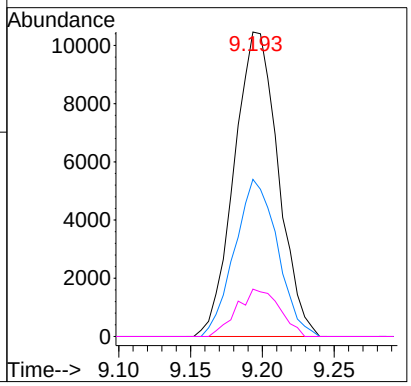


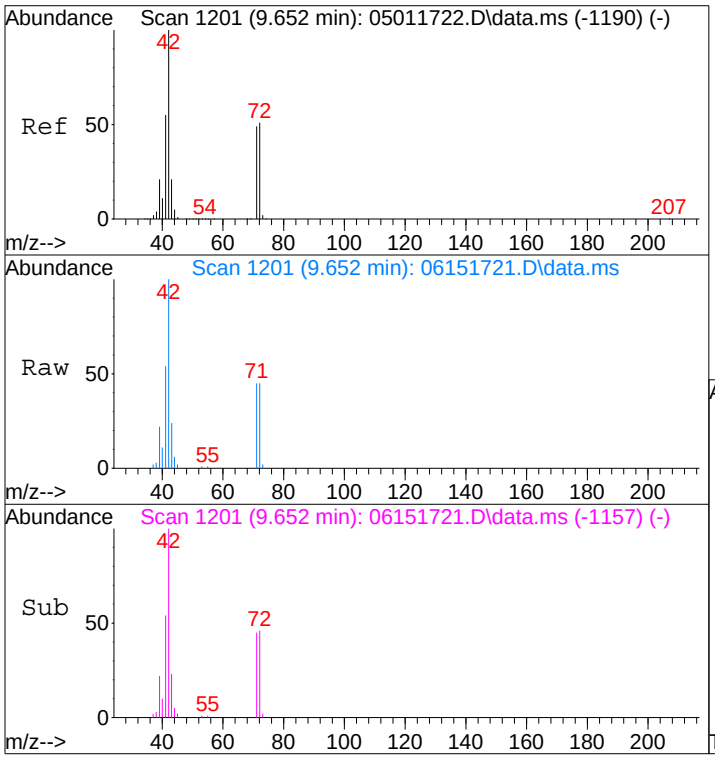


#31
n-Hexane
Concen: 0.65 ng
RT: 9.19 min Scan# 1112
Delta R.T. -0.010 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 57 Resp: 22294

Ion	Ratio	Lower	Upper
57	100		
56	50.2	41.1	61.7
86	15.1	12.1	18.1

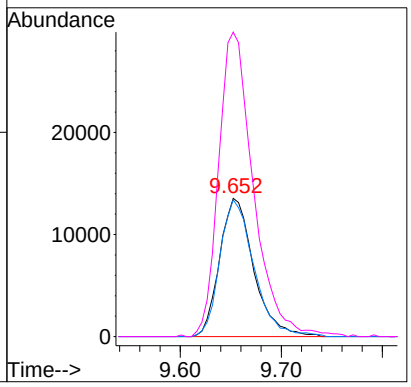


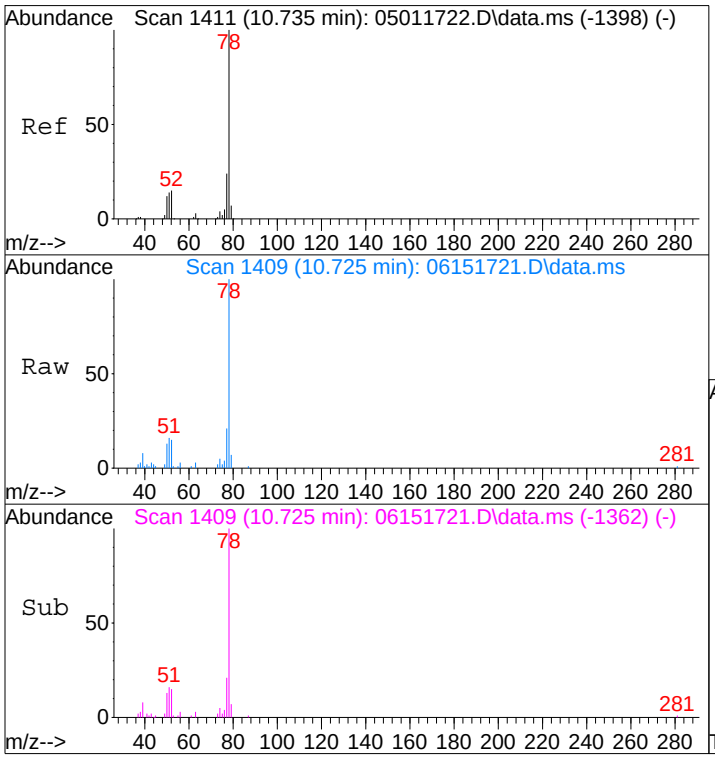


#34
Tetrahydrofuran (THF)
Concen: 2.33 ng
RT: 9.65 min Scan# 1201
Delta R.T. -0.021 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 72 Resp: 31895

Ion	Ratio	Lower	Upper
72	100		
71	98.6	77.5	117.5
42	224.3	181.0	221.0#

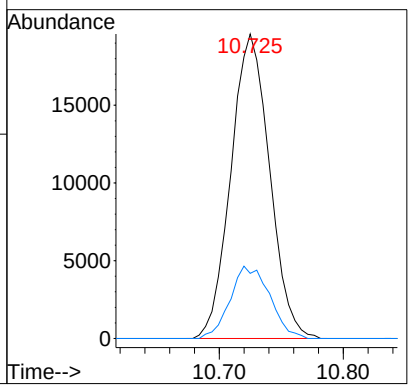


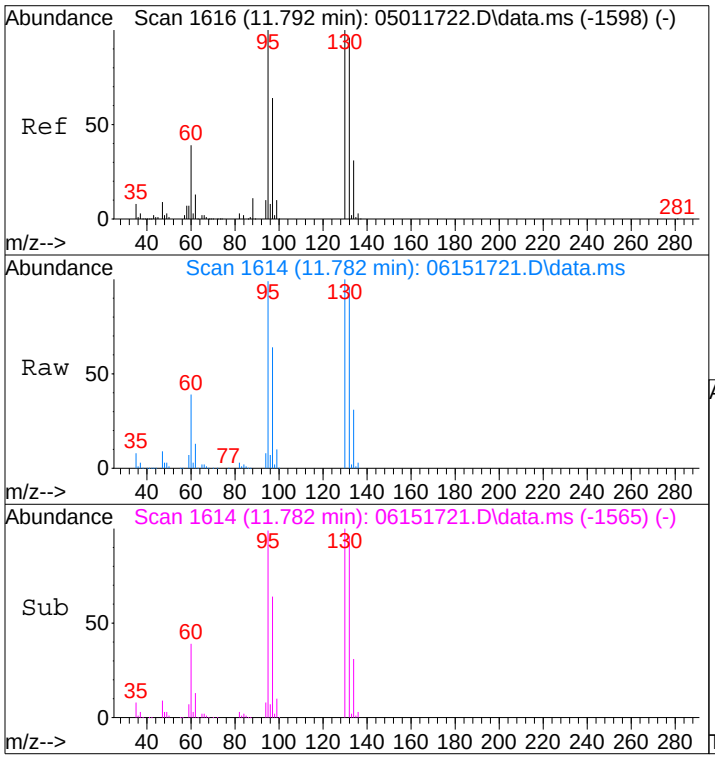


#41
Benzene
Concen: 0.48 ng
RT: 10.72 min Scan# 1409
Delta R.T. -0.005 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 78 Resp: 42498

Ion	Ratio	Lower	Upper
78	100		
77	24.3	3.8	43.8

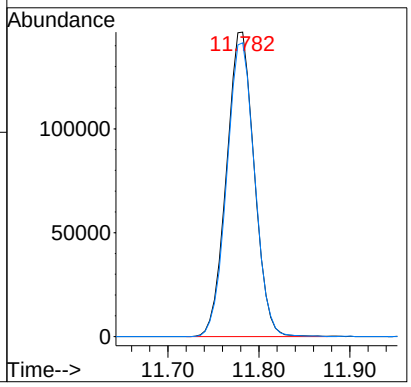


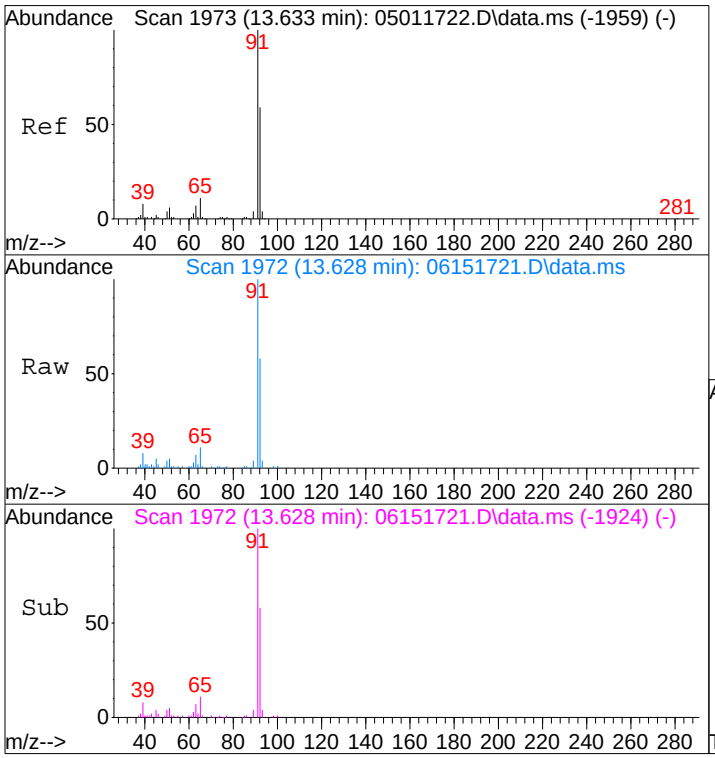


#47
Trichloroethene
Concen: 14.20 ng
RT: 11.78 min Scan# 1614
Delta R.T. 0.005 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion:130 Resp: 310597

Ion	Ratio	Lower	Upper
130	100		
132	96.8	75.1	115.1

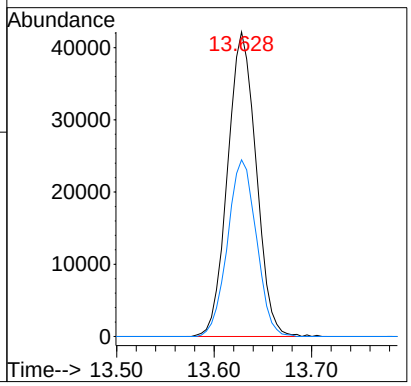


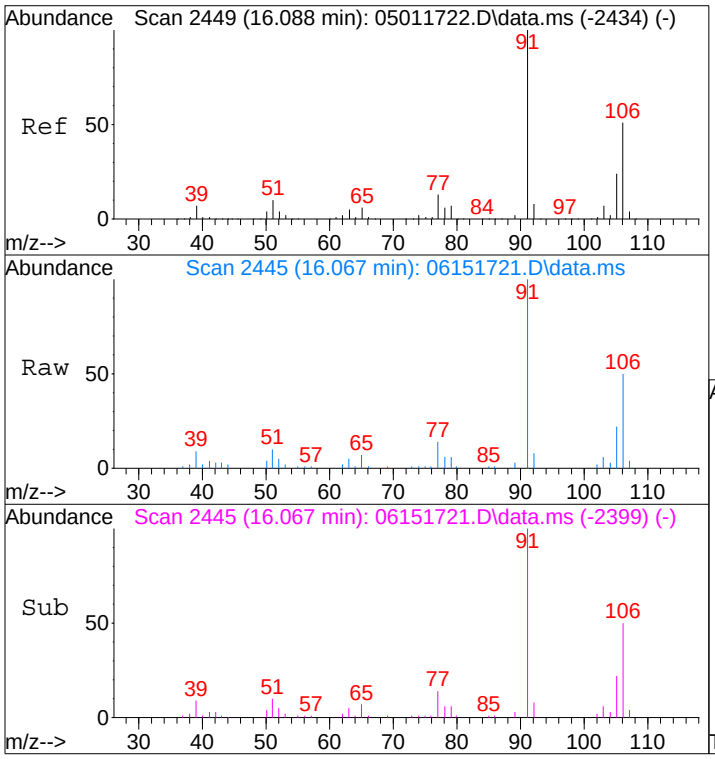


#58
Toluene
Concen: 0.95 ng
RT: 13.63 min Scan# 1972
Delta R.T. -0.000 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 91 Resp: 85859

Ion	Ratio	Lower	Upper
91	100		
92	58.6	38.5	78.5

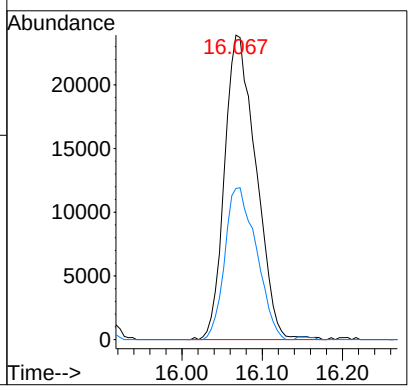


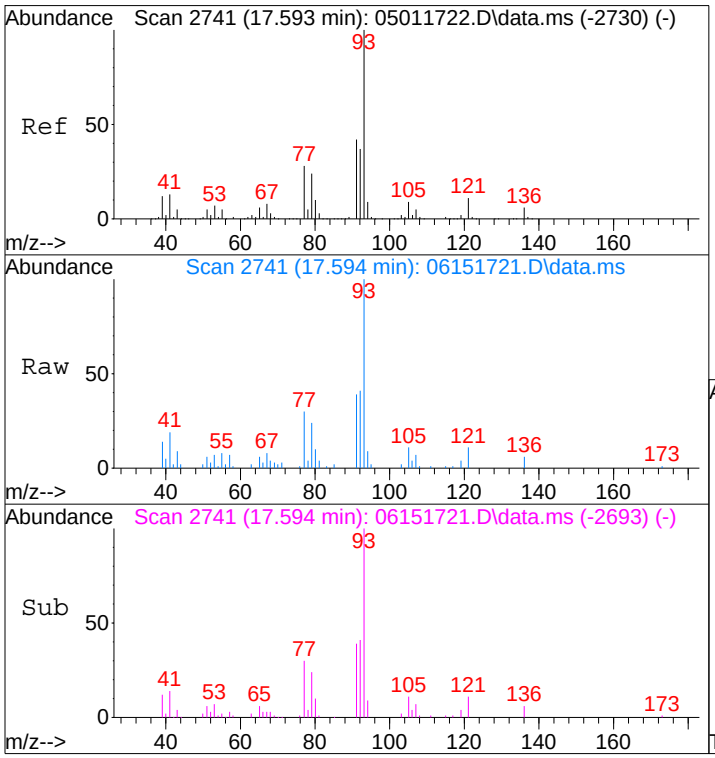


#67
m- & p-Xylenes
Concen: 0.86 ng
RT: 16.07 min Scan# 2445
Delta R.T. -0.010 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 91 Resp: 65170

Ion	Ratio	Lower	Upper
91	100		
106	49.9	30.2	70.2

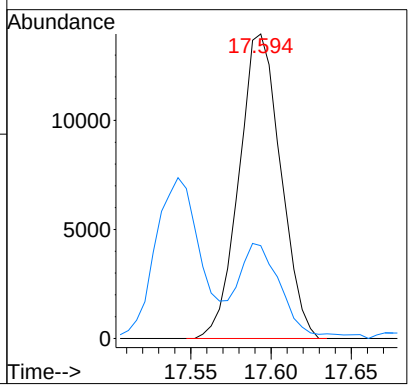


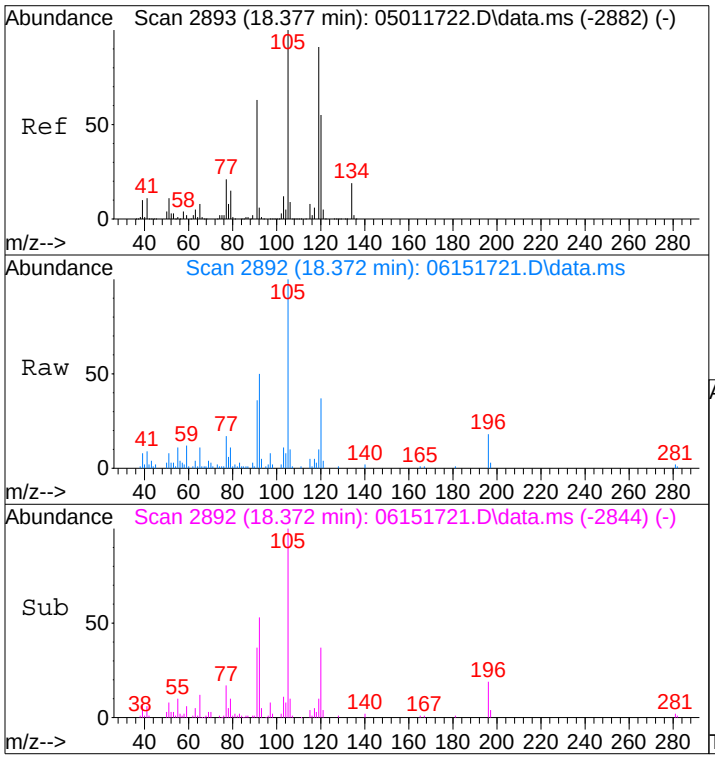


#75
alpha-Pinene
Concen: 0.53 ng
RT: 17.59 min Scan# 2741
Delta R.T. -0.000 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

Tgt Ion: 93 Resp: 25215

Ion	Ratio	Lower	Upper
93	100		
77	33.3	9.4	49.4

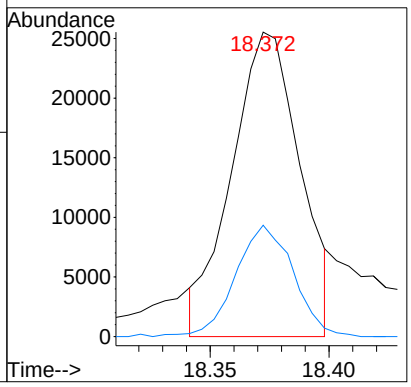




#82
1,2,4-Trimethylbenzene
Concen: 0.68 ng m
RT: 18.37 min Scan# 2892
Delta R.T. -0.000 min
Lab File: 06151721.D
Acq: 15 Jun 2017 19:55

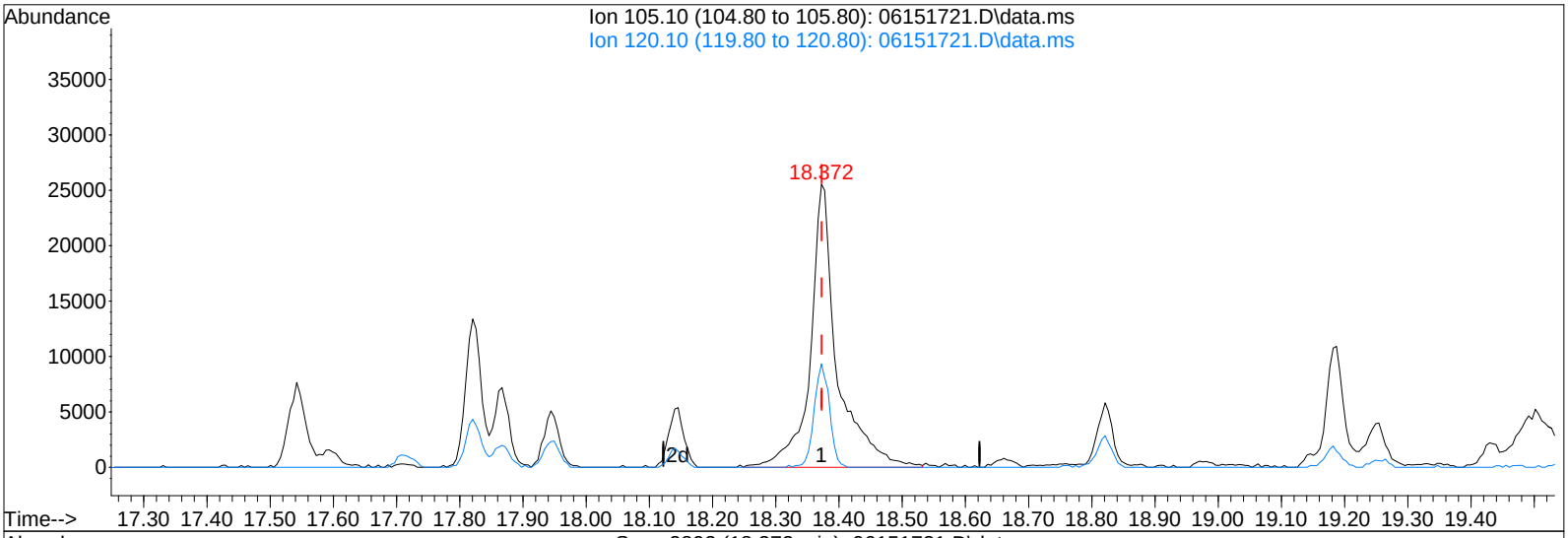
Tgt Ion:105 Resp: 51173

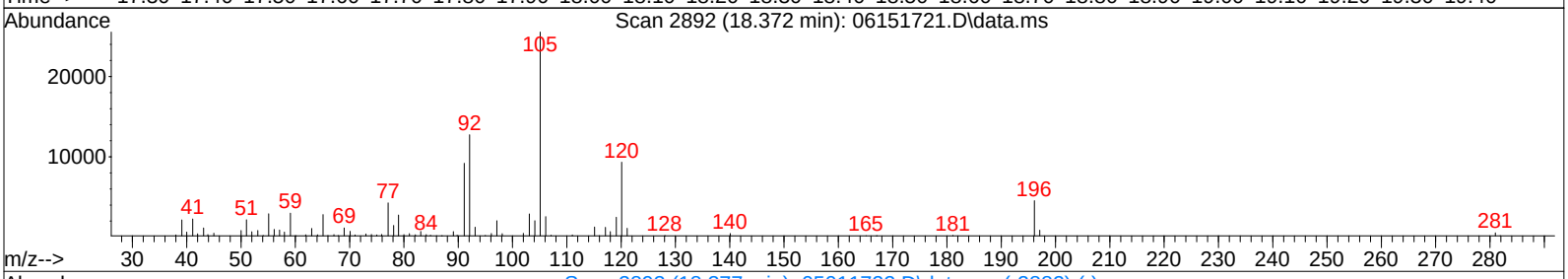
Ion	Ratio	Lower	Upper
105	100		
120	30.9	34.8	74.8#

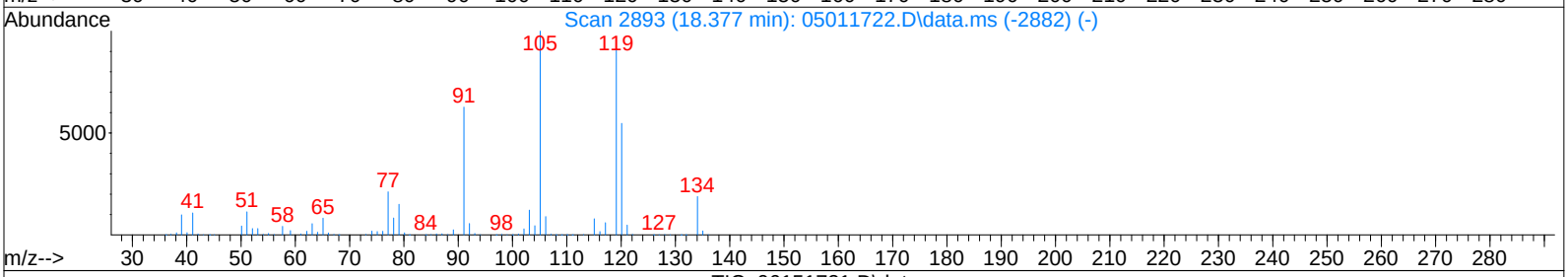


Data File: I:\MS09\Data\2017 06\15\06151721.D
Acq On : 15 Jun 2017 19:55 Operator: SC
Sample : P1702773-003 (1000mL)
Misc : S31-06061702
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Jun 16 08:27:07 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 06151721.D\data.ms

(82) 1,2,4-Trimethylbenzene (T)

18.372min (-0.000) 1.00ng

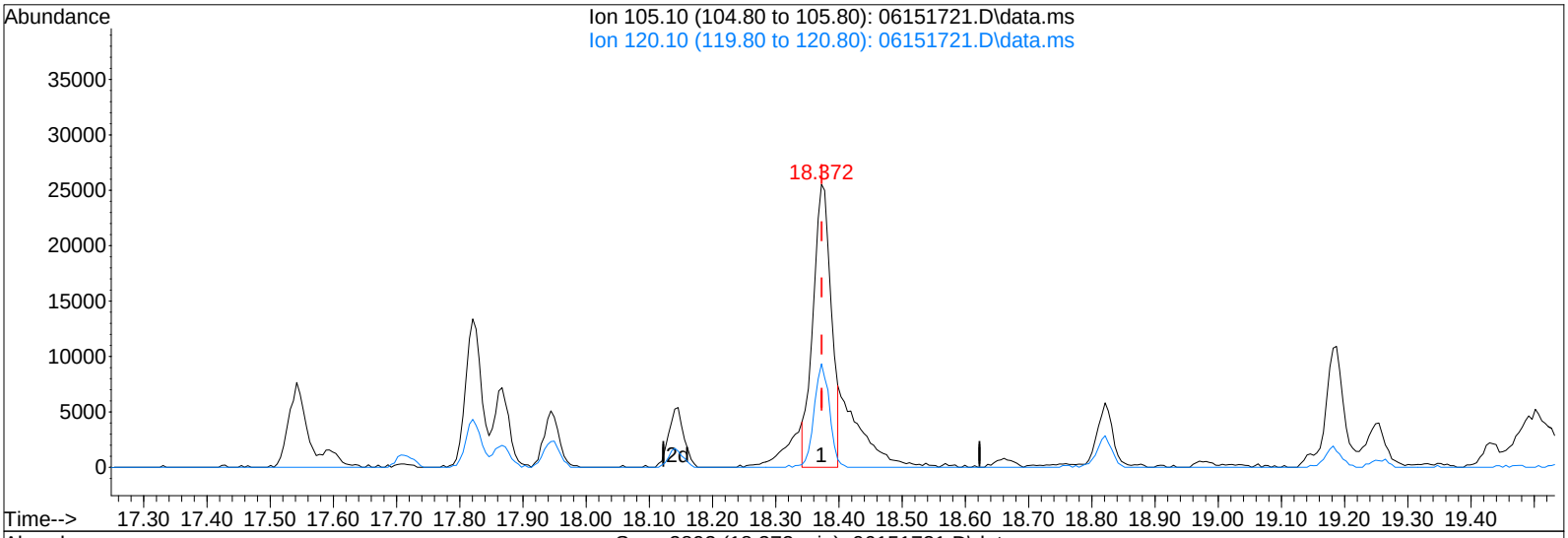
response 75365

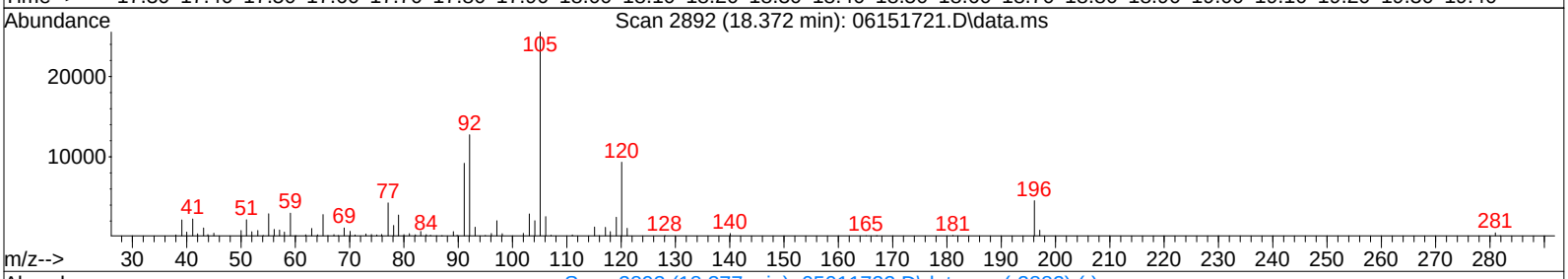
Ion	Exp%	Act%
105.10	100	100
120.10	54.80	20.98#
0.00	0.00	0.00
0.00	0.00	0.00

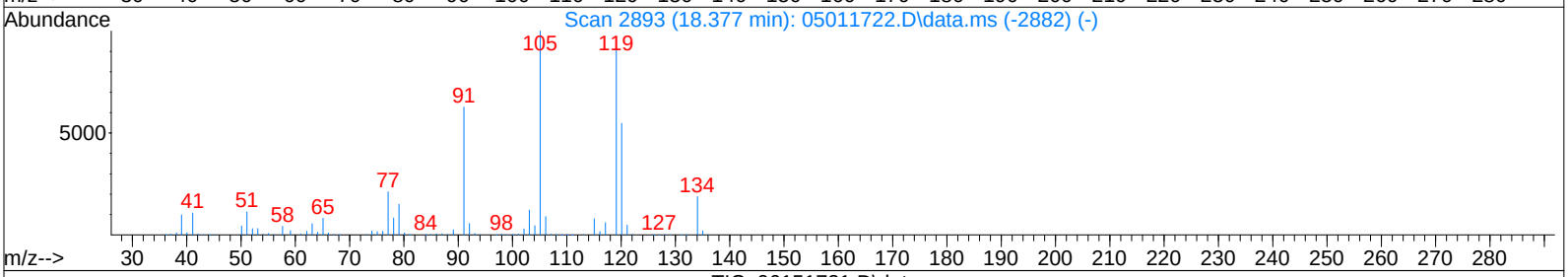
00858774

Data File: I:\MS09\Data\2017 06\15\06151721.D
Acq On : 15 Jun 2017 19:55 Operator: SC
Sample : P1702773-003 (1000mL)
Misc : S31-06061702
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Jun 16 08:27:07 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 06151721.D\data.ms

(82) 1,2,4-Trimethylbenzene (T)

18.372min (-0.000) 0.68ng m

response 51173

Ion	Exp%	Act%
105.10	100	100
120.10	54.80	30.90#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

6/16/17

06/19/17

Data File: I:\MS09\Data\2017 06\15\06151722.D
Acq On : 15 Jun 2017 20:29 Operator: SC
Sample : P1702773-004 (1000mL)
Misc : S31-06061702
ALS Vial : 4 Sample Multiplier: 1

6/16/17

Quant Time: Jun 16 11:58:32 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	175499	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.08	114	869692	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	371573	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	248322	12.081	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.64%				
57) Toluene-d8 (SS2)	13.53	98	943497	12.466	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.76%				
73) Bromofluorobenzene (SS3)	17.04	174	277739	12.843	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.72%				
Target Compounds							Qvalue
2) Propene	0.00	42	0	N.D. d			
3) Dichlorodifluoromethan...	3.95	85	104647	2.906	ng		99
4) Chloromethane	4.14	50	5126	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	4.32	135	1083	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	5.31	45	93535	6.688	ng		99
11) Acetonitrile	5.53	41	10000	N.D.			
12) Acrolein	5.67	56	4075	N.D.			
13) Acetone	5.80	58	146766	9.982	ng	#	54
14) Trichlorofluoromethane	5.99	101	48915	1.610	ng		100
15) 2-Propanol (Isopropanol)	6.13	45	15480	N.D.			
16) Acrylonitrile	6.36	53	625	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	6.80	59	2759	N.D.			
19) Methylene Chloride	6.83	84	4657	N.D.			
20) 3-Chloro-1-propene (Al...	6.89	41	4586	N.D.			
21) Trichlorotrifluoroethane	7.15	151	27338	1.671	ng		100
22) Carbon Disulfide	7.13	76	19319	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D. d			
27) 2-Butanone (MEK)	8.49	72	44786	3.320	ng	#	80
28) cis-1,2-Dichloroethene	8.95	61	5128	N.D.			
29) Diisopropyl Ether	9.19	87	695	N.D.			
30) Ethyl Acetate	9.19	61	22988	3.261	ng		94
31) n-Hexane	9.20	57	48238	1.403	ng		97
32) Chloroform	9.25	83	1645	N.D.			
34) Tetrahydrofuran (THF)	9.65	72	93030	6.758	ng		91
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	10.00	62	712	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	10.72	78	39622	0.453	ng		100
42) Carbon Tetrachloride	10.88	117	5692	N.D.			
43) Cyclohexane	11.00	84	8450	N.D.			
44) tert-Amyl Methyl Ether	11.39	73	1505	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D. d			
46) Bromodichloromethane	11.76	83	495	N.D.			
47) Trichloroethene	11.78	130	9771	0.451	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	11.85	57	17492	N.D.			

Data File: I:\MS09\Data\2017 06\15\06151722.D
Acq On : 15 Jun 2017 20:29 Operator: SC
Sample : P1702773-004 (1000mL)
Misc : S31-06061702
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Jun 16 11:58:32 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	12.10	100	2224	N.D.	
51) n-Heptane	12.10	71	8546	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	12.68	58	3258	N.D.	
54) trans-1,3-Dichloropropene	13.16	75	974	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	13.63	91	186511	2.111 ng	99
59) 2-Hexanone	13.88	43	3178	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	14.53	43	3449	N.D.	
63) n-Octane	14.65	57	2476	N.D.	
64) Tetrachloroethene	14.79	166	46068	2.132 ng	99
65) Chlorobenzene	15.48	112	812	N.D.	
66) Ethylbenzene	15.89	91	31983	N.D.	
67) m- & p-Xylenes	16.07	91	86923	1.168 ng	99
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	16.46	104	10832	N.D.	
70) o-Xylene	16.57	91	28981	N.D.	
71) n-Nonane	16.81	43	11837	N.D.	
72) 1,1,2,2-Tetrachloroethane	16.59	83	776	N.D.	
74) Cumene	17.19	105	2146	N.D.	
75) alpha-Pinene	17.59	93	42900	0.926 ng	96
76) n-Propylbenzene	17.71	91	8290	N.D.	
77) 3-Ethyltoluene	17.82	105	18333	N.D.	
78) 4-Ethyltoluene	17.86	105	9323	N.D.	
79) 1,3,5-Trimethylbenzene	17.94	105	6755	N.D.	
80) alpha-Methylstyrene	18.11	118	556	N.D.	
81) 2-Ethyltoluene	18.14	105	6875	N.D.	
82) 1,2,4-Trimethylbenzene	18.37	105	26640	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	18.52	91	1037	N.D.	
85) 1,3-Dichlorobenzene	18.60	146	3045	N.D.	
86) 1,4-Dichlorobenzene	18.60	146	3045	N.D.	
87) sec-Butylbenzene	18.66	105	959	N.D.	
88) 4-Isopropyltoluene (p-...	18.83	119	4380	N.D.	
89) 1,2,3-Trimethylbenzene	18.82	105	6417	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	18.98	68	13237	0.450 ng	98
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	19.83	57	14992	N.D.	
94) 1,2,4-Trichlorobenzene	20.78	180	468	N.D.	
95) Naphthalene	20.89	128	10161	N.D.	
96) n-Dodecane	20.92	57	10756	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	16.23	55	3670	N.D.	
99) tert-Butylbenzene	18.37	119	3261	N.D.	
100) n-Butylbenzene	19.26	91	4500	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

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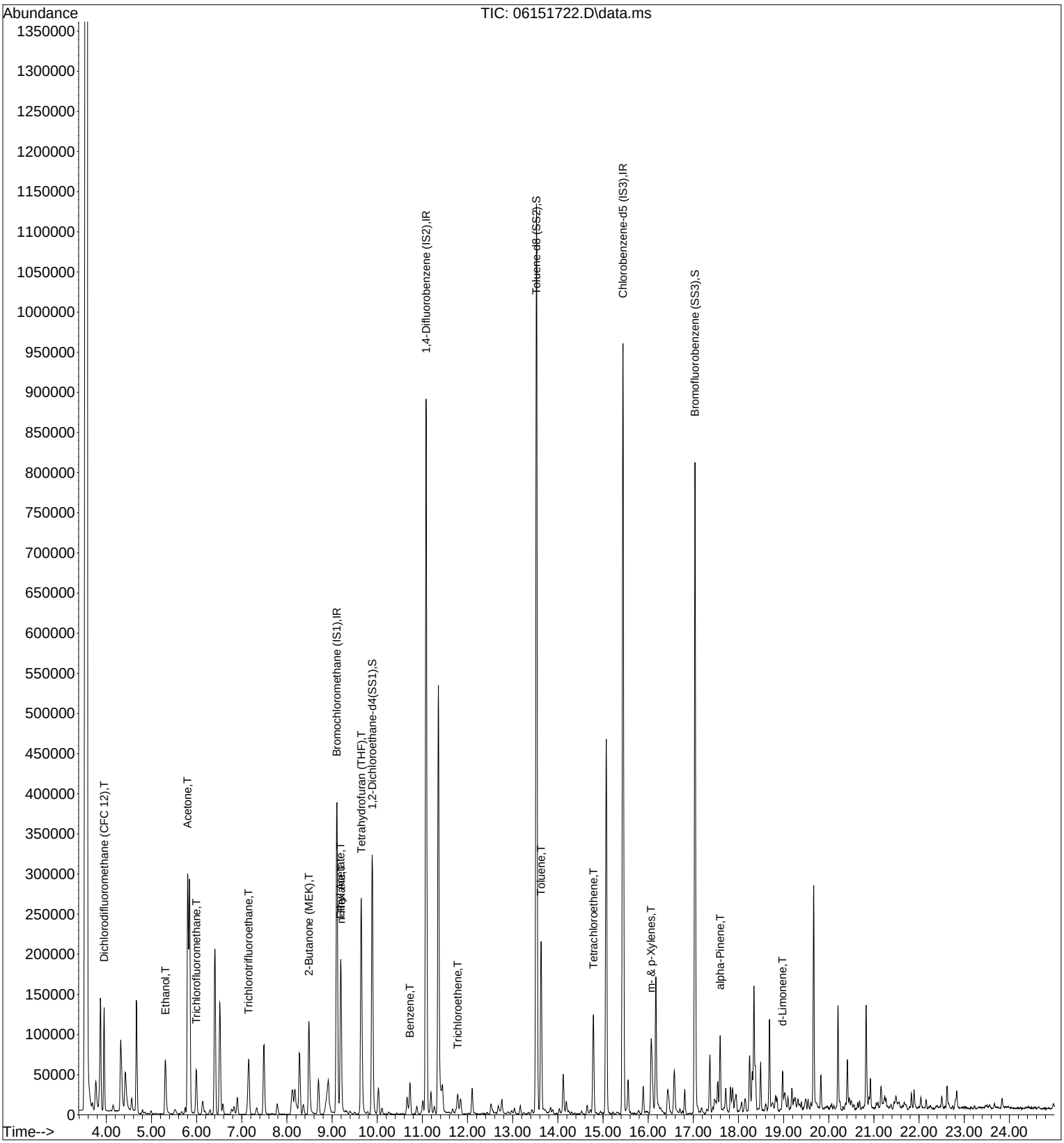
Acq On : 15 Jun 2017 20:29 Operator: SC
Sample : P1702773-004 (1000mL)
Misc : S31-06061702
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Jun 16 11:58:32 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 06\15\06151722.D
Acq On : 15 Jun 2017 20:29 Operator: SC
Sample : P1702773-004 (1000mL)
Misc : S31-06061702
ALS Vial : 4 Sample Multiplier: 1

6/16/17

Quant Time: Jun 16 11:58:32 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	175499	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.08	114	869692	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	371573	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	248322	12.081	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.64%				
57) Toluene-d8 (SS2)	13.53	98	943497	12.466	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.76%				
73) Bromofluorobenzene (SS3)	17.04	174	277739	12.843	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.72%				
Target Compounds							Qvalue
3) Dichlorodifluoromethan...	3.95	85	104647	2.906	ng		99
10) Ethanol	5.31	45	93535	6.688	ng		99
13) Acetone	5.80	58	146766	9.982	ng	#	54
14) Trichlorofluoromethane	5.99	101	48915	1.610	ng		100
21) Trichlorotrifluoroethane	7.15	151	27338	1.671	ng		100
27) 2-Butanone (MEK)	8.49	72	44786	3.320	ng	#	80
30) Ethyl Acetate	9.19	61	22988	3.261	ng		94
31) n-Hexane	9.20	57	48238	1.403	ng		97
34) Tetrahydrofuran (THF)	9.65	72	93030	6.758	ng		91
41) Benzene	10.72	78	39622	0.453	ng		100
47) Trichloroethene	11.78	130	9771	0.451	ng		99
58) Toluene	13.63	91	186511	2.111	ng		99
64) Tetrachloroethene	14.79	166	46068	2.132	ng		99
67) m- & p-Xylenes	16.07	91	86923	1.168	ng		99
75) alpha-Pinene	17.59	93	42900	0.926	ng		96
91) d-Limonene	18.98	68	13237	0.450	ng		98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

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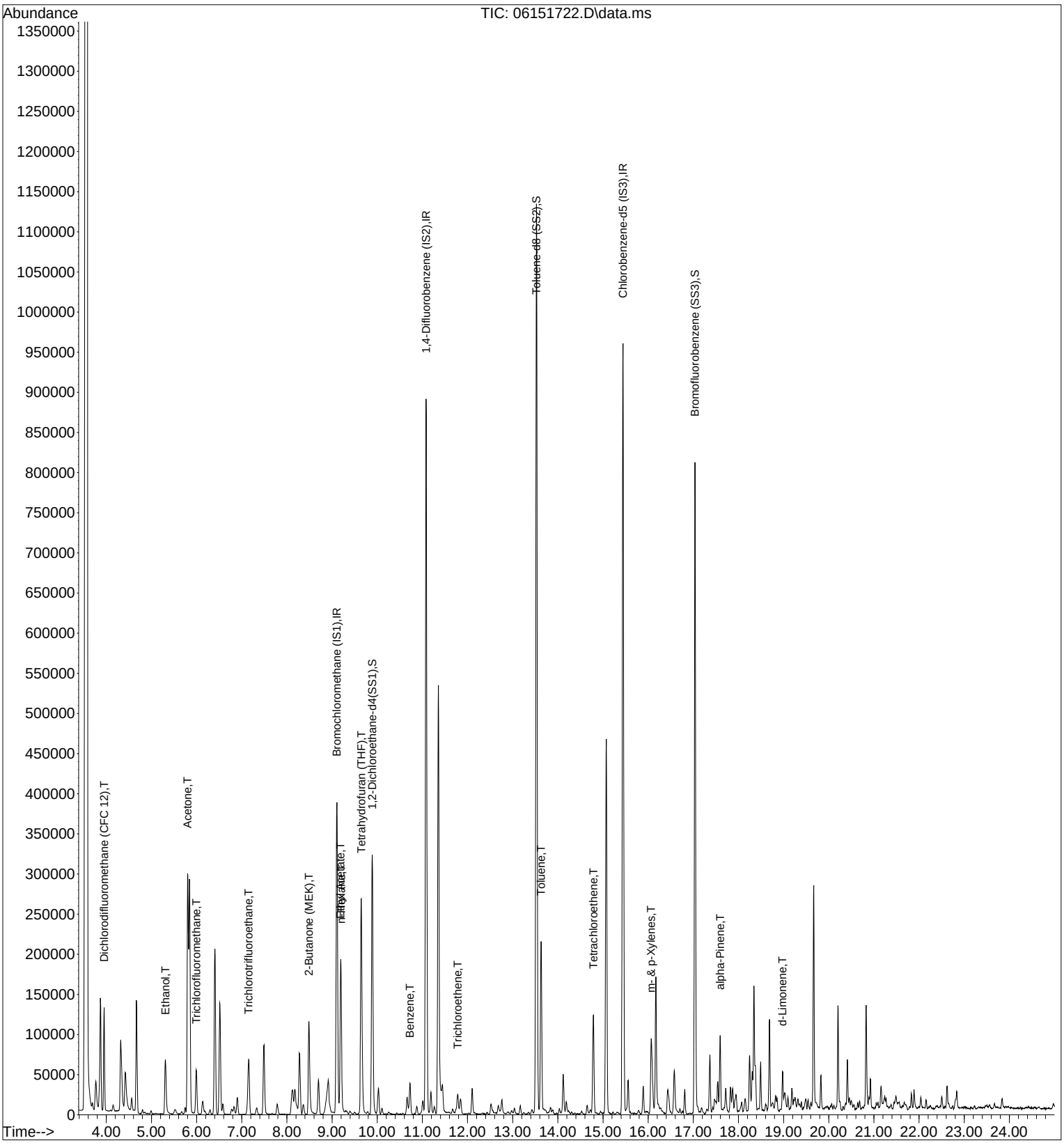
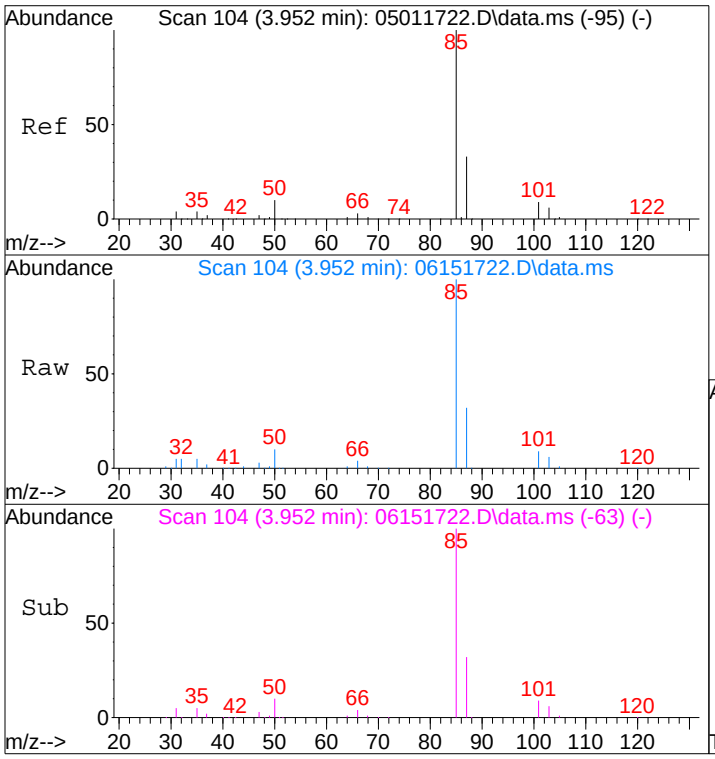
Acq On : 15 Jun 2017 20:29 Operator: SC
Sample : P1702773-004 (1000mL)
Misc : S31-06061702
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Jun 16 11:58:32 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

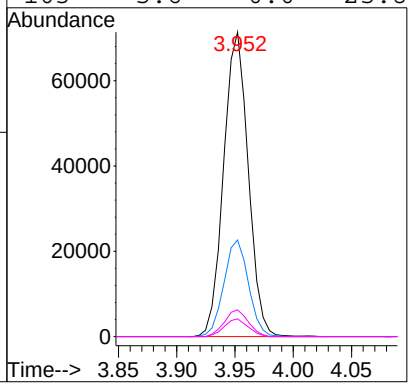


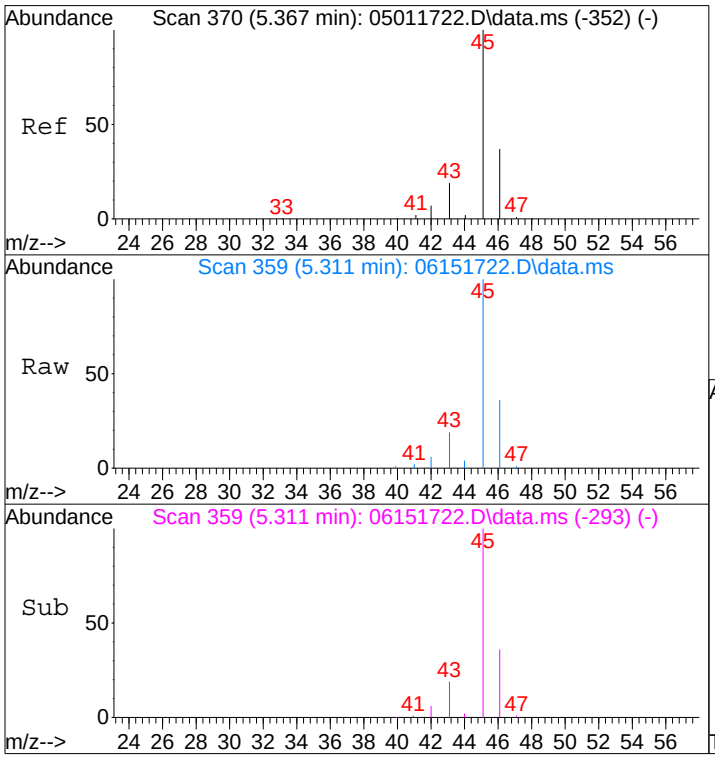


#3
Dichlorodifluoromethane (CFC 12)
Concen: 2.91 ng
RT: 3.95 min Scan# 104
Delta R.T. -0.027 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 85 Resp: 104647

Ion	Ratio	Lower	Upper
85	100		
87	31.7	12.3	52.3
101	8.5	0.0	29.1
103	5.6	0.0	25.8

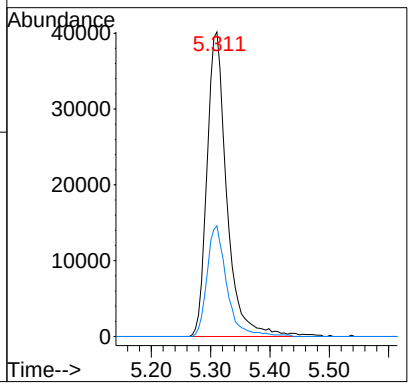


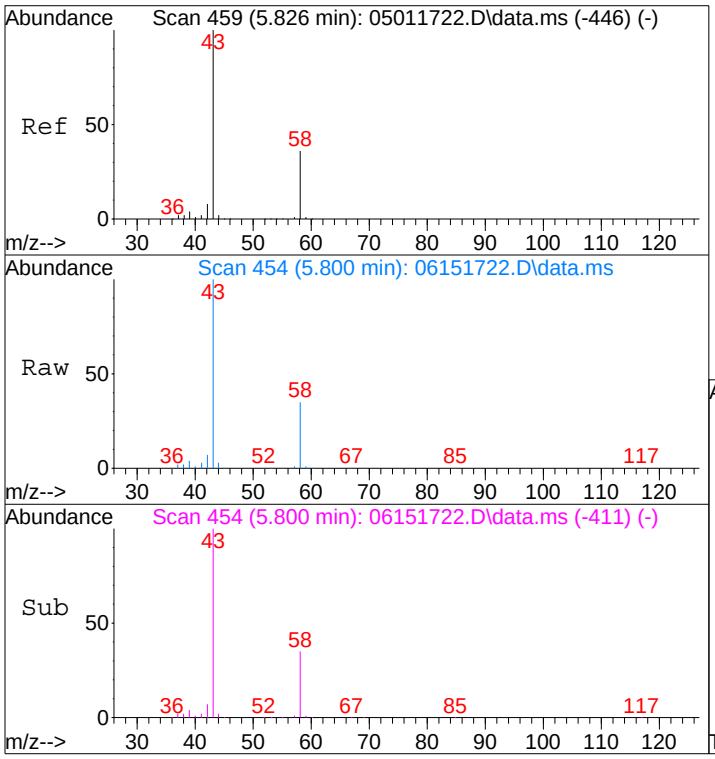


#10
Ethanol
Concen: 6.69 ng
RT: 5.31 min Scan# 359
Delta R.T. -0.010 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 45 Resp: 93535

Ion	Ratio	Lower	Upper
45	100		
46	36.2	16.6	56.6

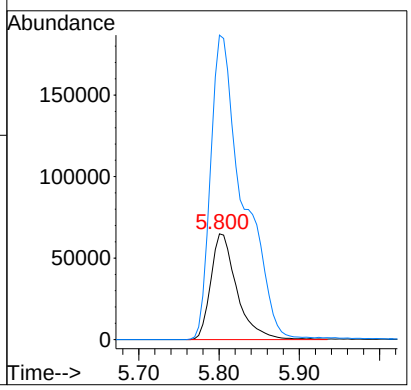


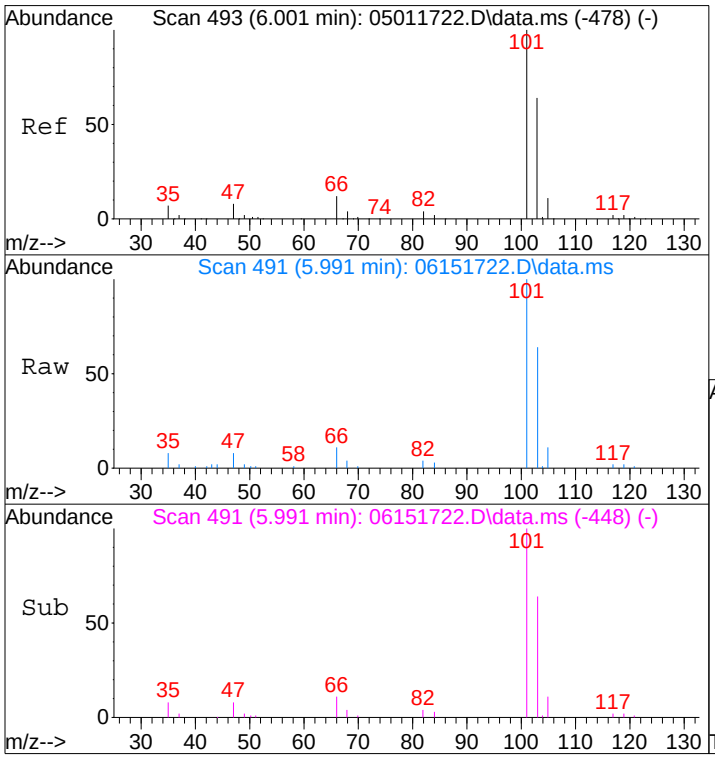


#13
Acetone
Concen: 9.98 ng
RT: 5.80 min Scan# 454
Delta R.T. -0.026 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 58 Resp: 146766

Ion	Ratio	Lower	Upper
58	100		
43	364.5	248.1	308.1#

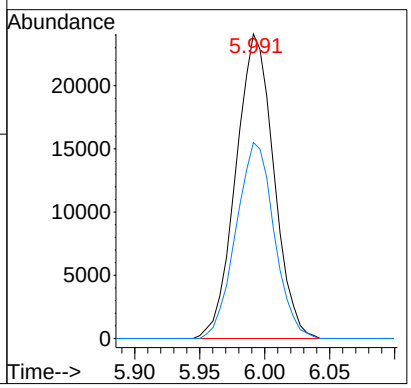


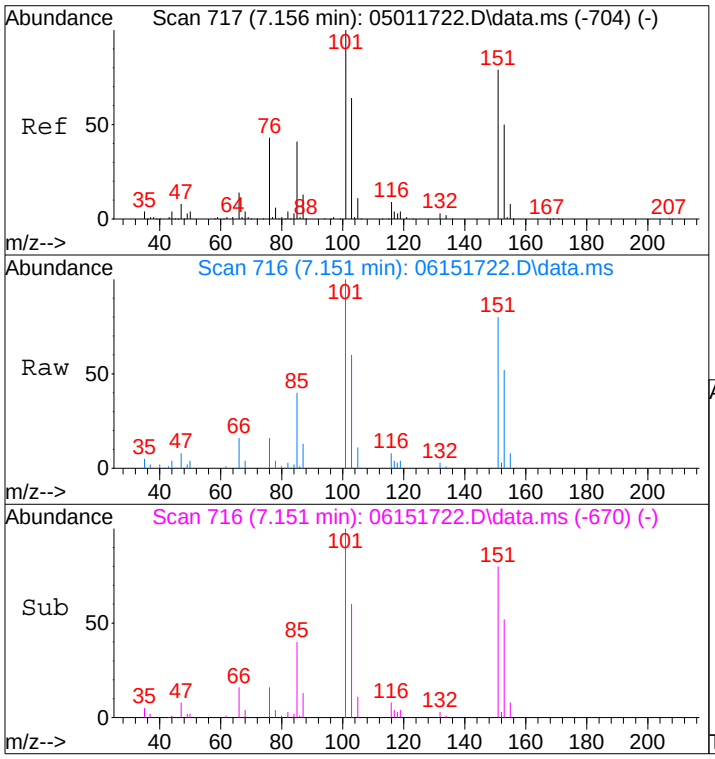


#14
Trichlorofluoromethane
Concen: 1.61 ng
RT: 5.99 min Scan# 491
Delta R.T. -0.026 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion:101 Resp: 48915

Ion	Ratio	Lower	Upper
101	100		
103	64.8	44.7	84.7

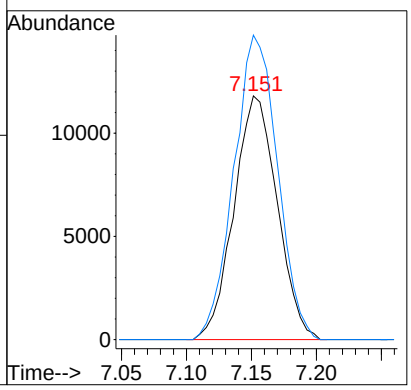


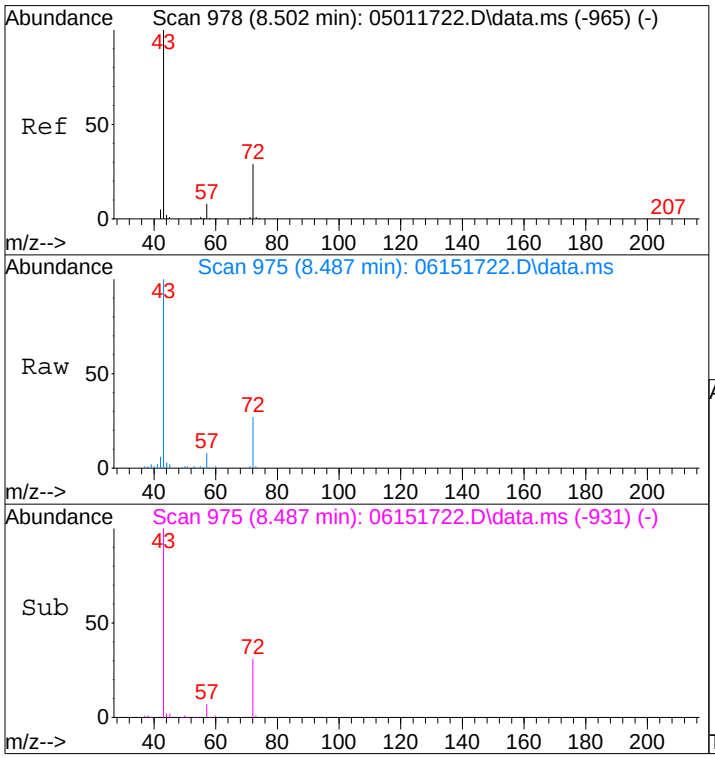


#21
Trichlorotrifluoroethane
Concen: 1.67 ng
RT: 7.15 min Scan# 716
Delta R.T. -0.010 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion:151 Resp: 27338

Ion	Ratio	Lower	Upper
151	100		
101	126.2	106.3	146.3

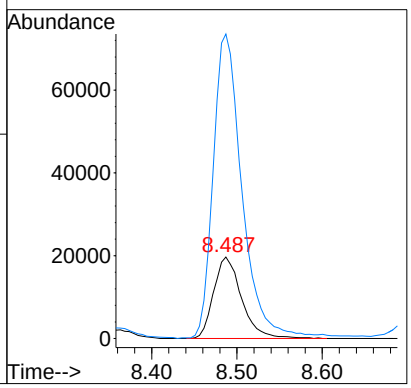


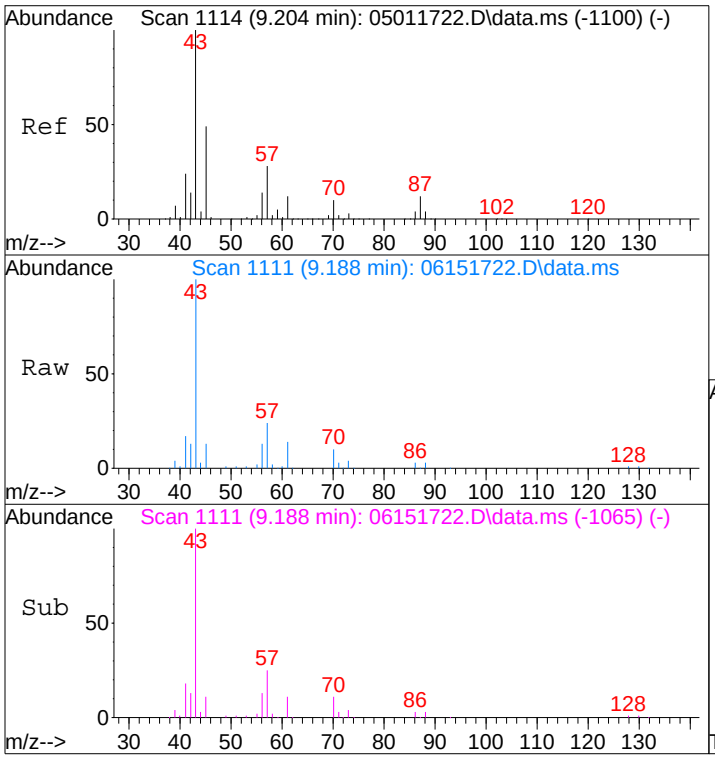


#27
2-Butanone (MEK)
Concen: 3.32 ng
RT: 8.49 min Scan# 975
Delta R.T. -0.021 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 72 Resp: 44786

Ion	Ratio	Lower	Upper
72	100		
43	390.8	326.9	366.9#

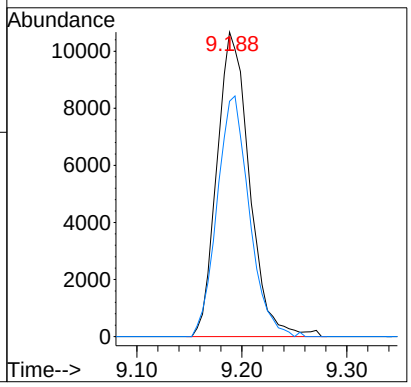


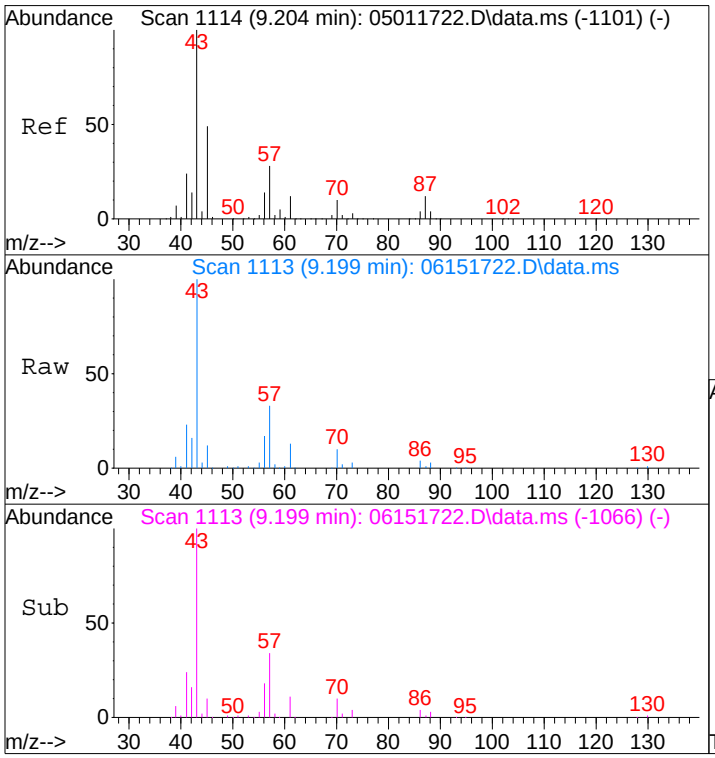


#30
Ethyl Acetate
Concen: 3.26 ng
RT: 9.19 min Scan# 1111
Delta R.T. -0.010 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 61 Resp: 22988

Ion	Ratio	Lower	Upper
61	100		
70	78.3	63.8	103.8

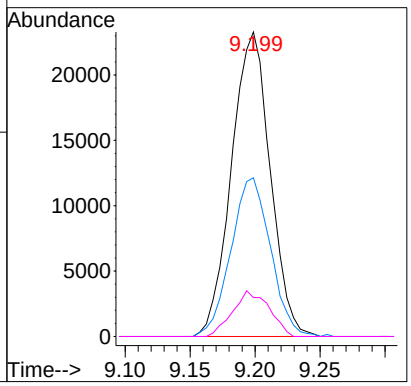


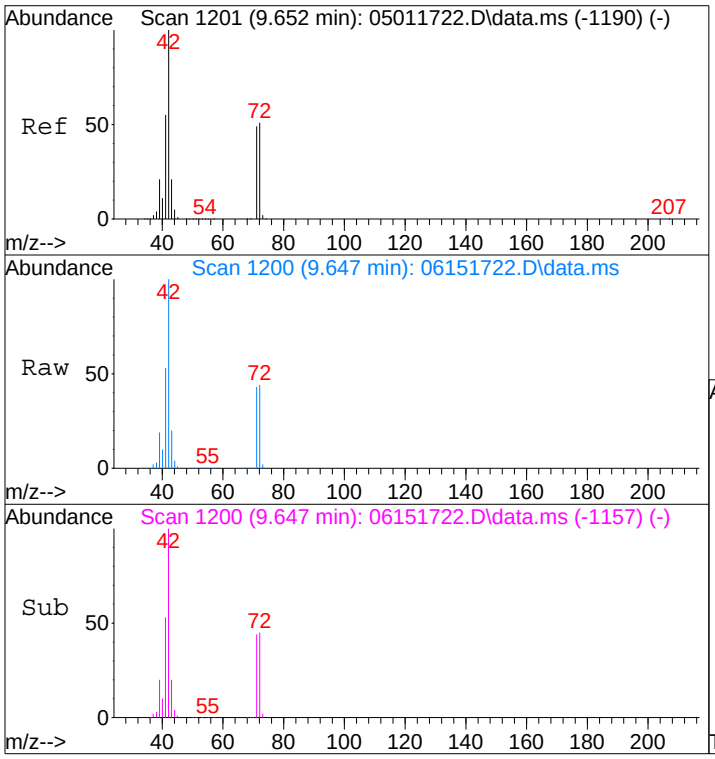


#31
n-Hexane
Concen: 1.40 ng
RT: 9.20 min Scan# 1113
Delta R.T. -0.005 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 57 Resp: 48238

Ion	Ratio	Lower	Upper
57	100		
56	53.3	41.1	61.7
86	14.1	12.1	18.1

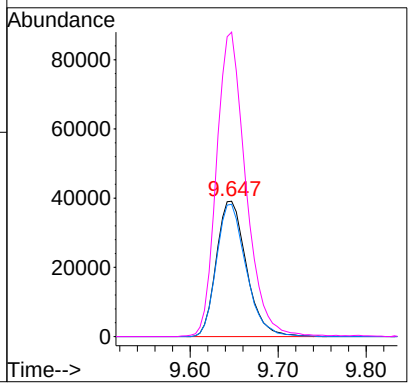


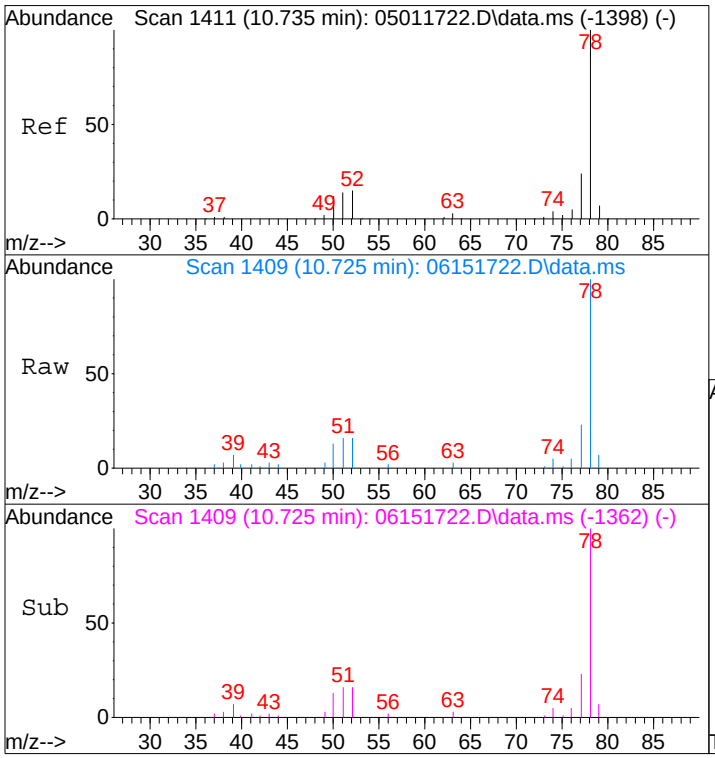


#34
Tetrahydrofuran (THF)
Concen: 6.76 ng
RT: 9.65 min Scan# 1200
Delta R.T. -0.026 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 72 Resp: 93030

Ion	Ratio	Lower	Upper
72	100		
71	96.2	77.5	117.5
42	219.5	181.0	221.0

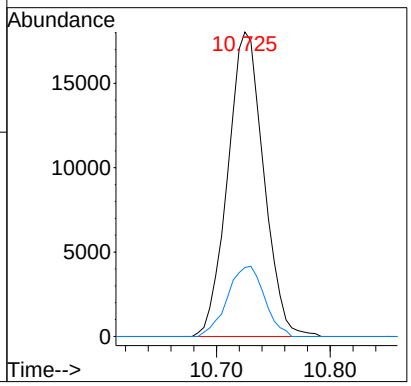


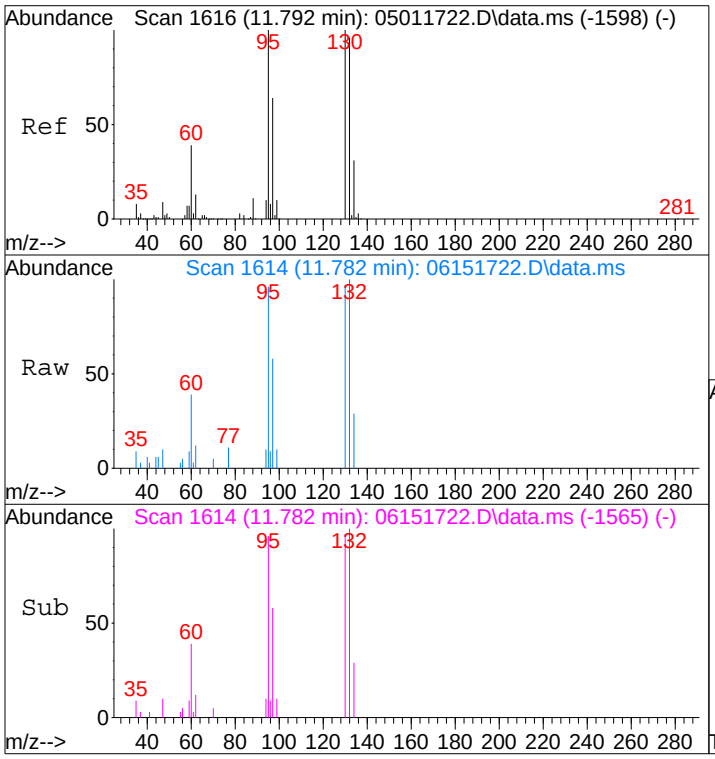


#41
Benzene
Concen: 0.45 ng
RT: 10.72 min Scan# 1409
Delta R.T. -0.005 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 78 Resp: 39622

Ion	Ratio	Lower	Upper
78	100		
77	23.7	3.8	43.8

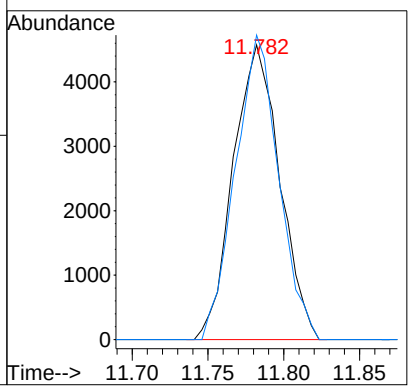


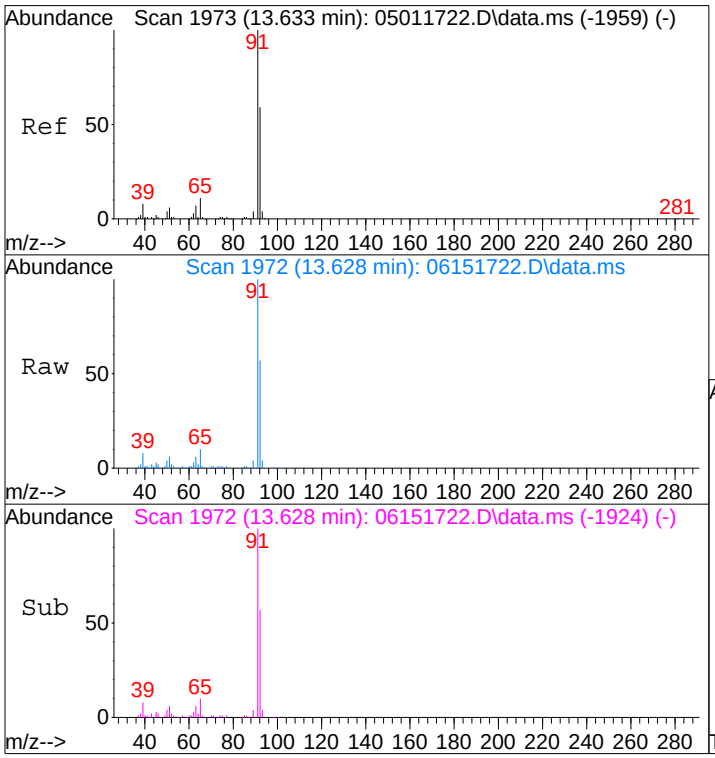


#47
Trichloroethene
Concen: 0.45 ng
RT: 11.78 min Scan# 1614
Delta R.T. 0.005 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion:130 Resp: 9771

Ion	Ratio	Lower	Upper
130	100		
132	96.0	75.1	115.1

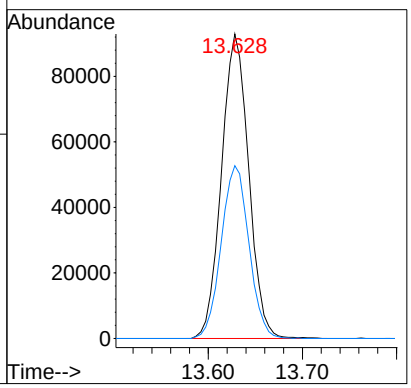


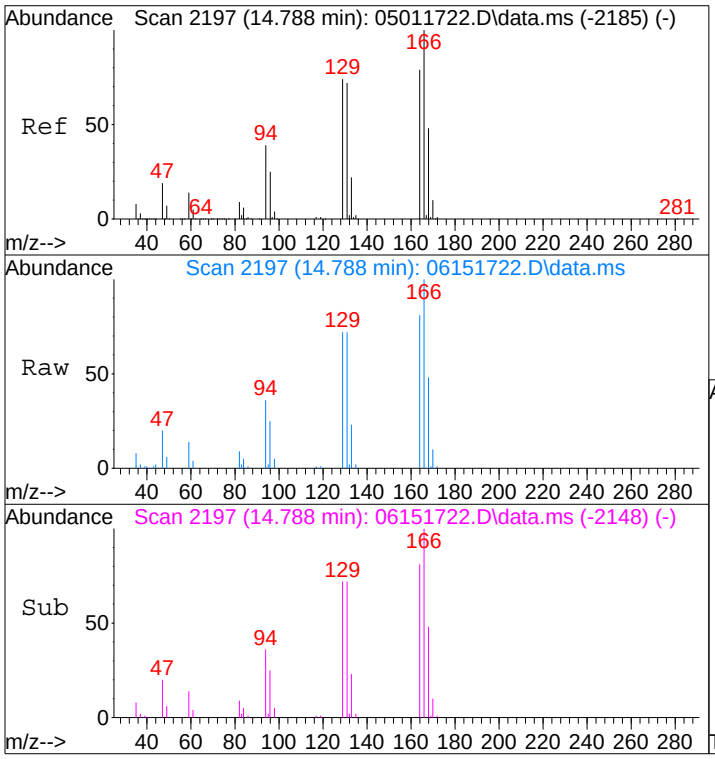


#58
Toluene
Concen: 2.11 ng
RT: 13.63 min Scan# 1972
Delta R.T. -0.000 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 91 Resp: 186511

Ion	Ratio	Lower	Upper
91	100		
92	57.8	38.5	78.5

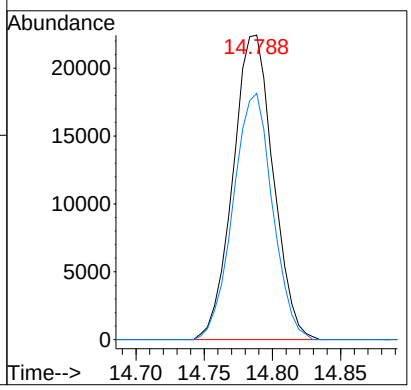


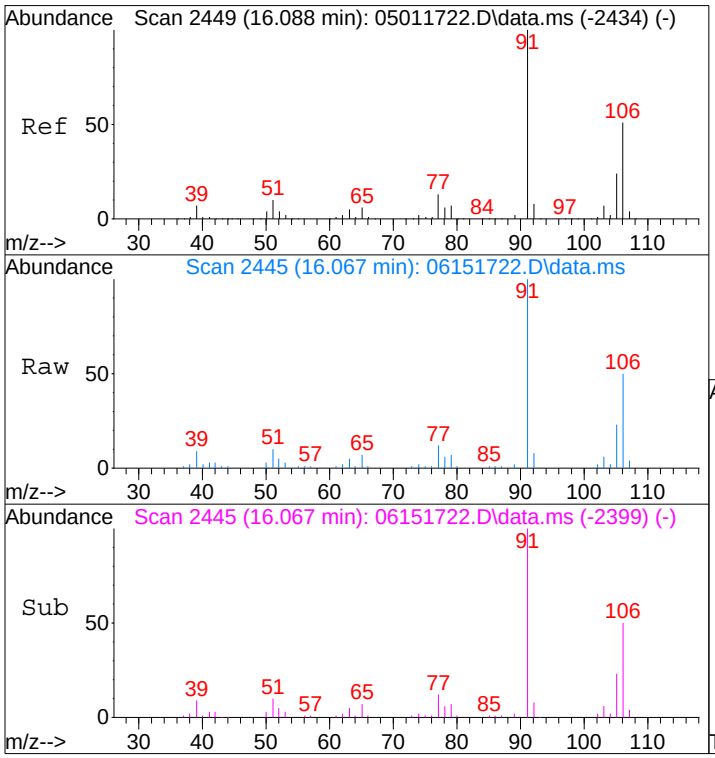


#64
Tetrachloroethene
Concen: 2.13 ng
RT: 14.79 min Scan# 2197
Delta R.T. 0.005 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion:166 Resp: 46068

Ion	Ratio	Lower	Upper
166	100		
164	79.1	58.4	98.4

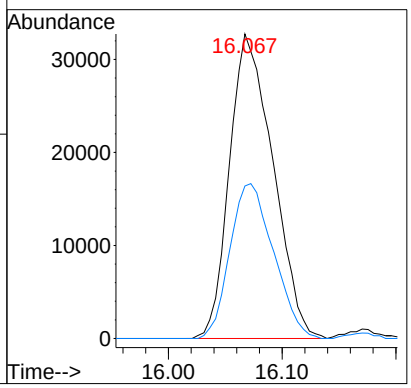


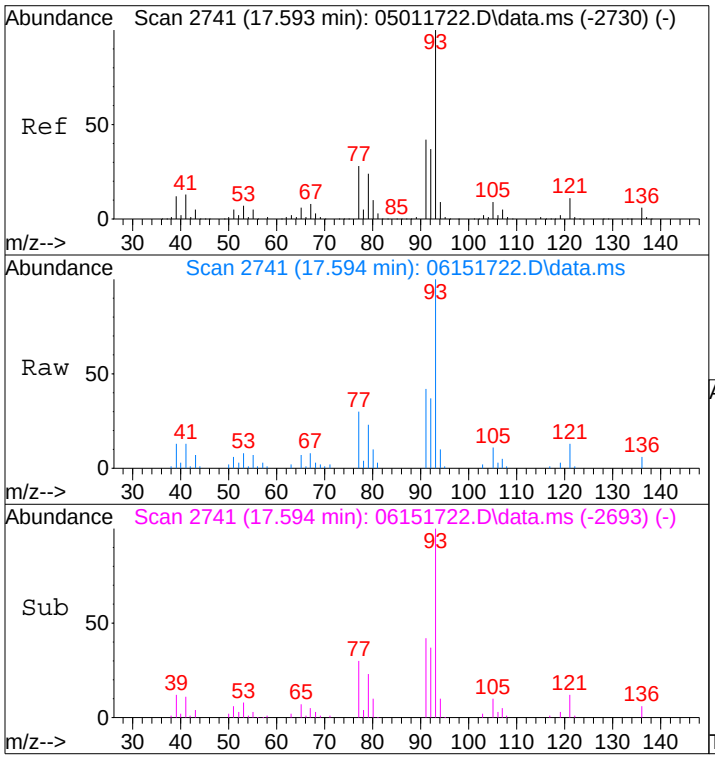


#67
m- & p-Xylenes
Concen: 1.17 ng
RT: 16.07 min Scan# 2445
Delta R.T. -0.010 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 91 Resp: 86923

Ion	Ratio	Lower	Upper
91	100		
106	51.0	30.2	70.2

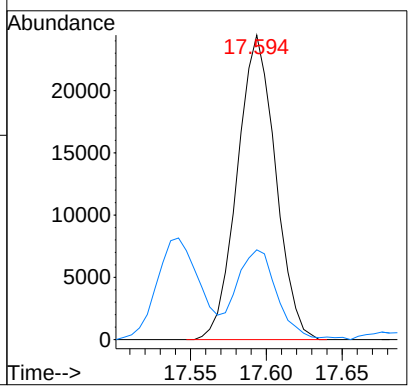


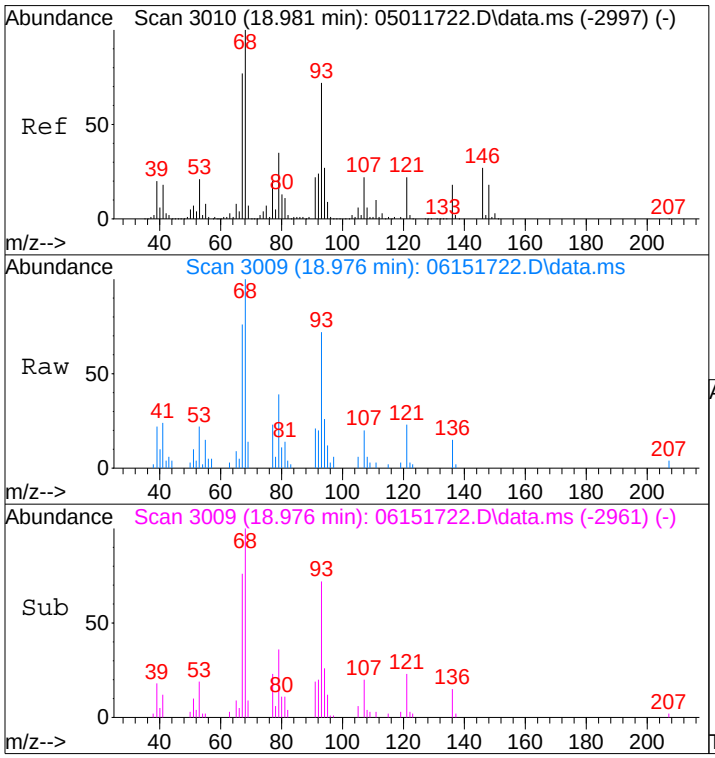


#75
alpha-Pinene
Concen: 0.93 ng
RT: 17.59 min Scan# 2741
Delta R.T. -0.000 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 93 Resp: 42900

Ion	Ratio	Lower	Upper
93	100		
77	31.6	9.4	49.4

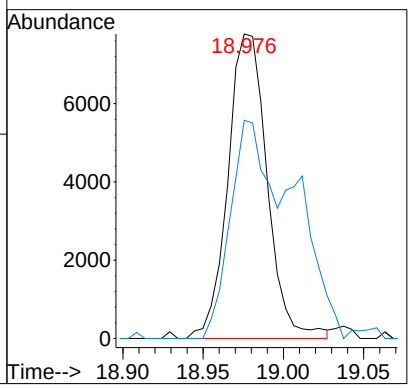




#91
d-Limonene
Concen: 0.45 ng
RT: 18.98 min Scan# 3009
Delta R.T. -0.000 min
Lab File: 06151722.D
Acq: 15 Jun 2017 20:29

Tgt Ion: 68 Resp: 13237

Ion	Ratio	Lower	Upper
68	100		
93	72.9	51.2	91.2



Data File: I:\MS09\Data\2017 06\15\06151704.D
Acq On : 15 Jun 2017 7:22 Operator: SC
Sample : MB R9061517 1000mL
Misc : S31-06061702
ALS Vial : 2 Sample Multiplier: 1

6/15/17

Quant Time: Jun 15 09:36:06 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	169408	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.08	114	844133	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	345560	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	239773	12.085	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.64%				
57) Toluene-d8 (SS2)	13.52	98	897602	12.753	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.00%				
73) Bromofluorobenzene (SS3)	17.04	174	256259	12.741	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.92%				
Target Compounds							Qvalue
2) Propene	3.89	42	1129	N.D.			
3) Dichlorodifluoromethan...	0.00	85	0	N.D.			
4) Chloromethane	0.00	50	0	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	5.35	45	871	N.D.			
11) Acetonitrile	5.57	41	341	N.D.			
12) Acrolein	5.70	56	148	N.D.			
13) Acetone	5.85	58	7644	0.539	ng		87
14) Trichlorofluoromethane	0.00	101	0	N.D.			
15) 2-Propanol (Isopropanol)	6.19	45	341	N.D.			
16) Acrylonitrile	0.00	53	0	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.			
19) Methylene Chloride	6.83	84	932	N.D.			
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.			
21) Trichlorotrifluoroethane	0.00	151	0	N.D.			
22) Carbon Disulfide	7.14	76	2192	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	8.24	86	559	0.150	ng	#	94
27) 2-Butanone (MEK)	8.39	72	556	N.D.			
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	0.00	61	0	N.D.			
31) n-Hexane	0.00	57	0	N.D.			
32) Chloroform	0.00	83	0	N.D.			
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	10.69	56	1068	N.D.			
41) Benzene	10.72	78	3945	N.D.			
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	11.07	84	607	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	0.00	130	0	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.			

Data File: I:\MS09\Data\2017 06\15\06151704.D
Acq On : 15 Jun 2017 7:22 Operator: SC
Sample : MB R9061517 1000mL
Misc : S31-06061702
ALS Vial : 2 Sample Multiplier: 1

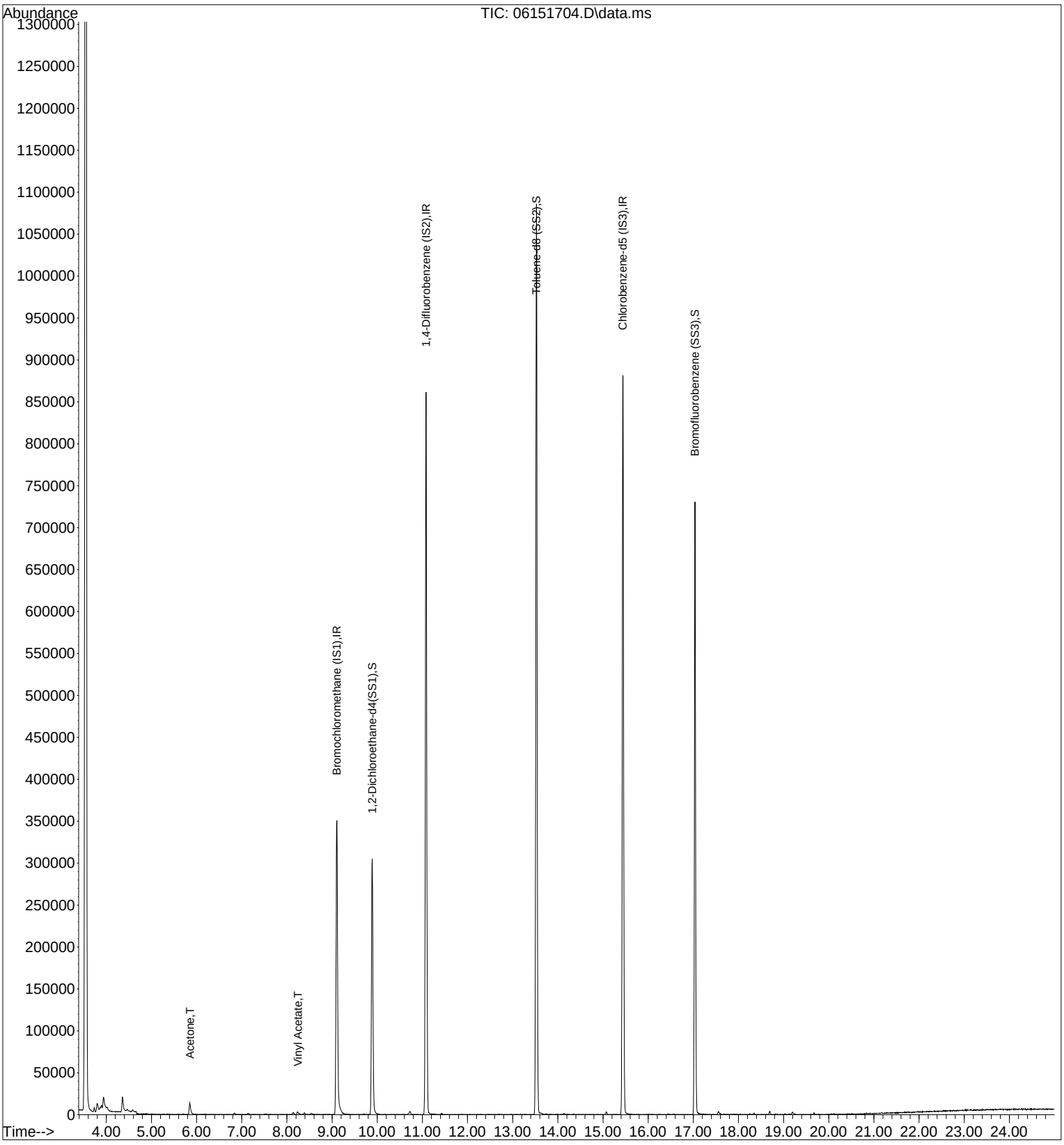
Quant Time: Jun 15 09:36:06 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	13.63	91	1251	N.D.	
59) 2-Hexanone	0.00	43	0	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	0.00	43	0	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	0.00	166	0	N.D.	
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	0.00	91	0	N.D.	
67) m- & p-Xylenes	0.00	91	0	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	0.00	91	0	N.D.	
71) n-Nonane	0.00	43	0	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	0.00	105	0	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	17.68	91	480	N.D.	
77) 3-Ethyltoluene	0.00	105	0	N.D.	
78) 4-Ethyltoluene	0.00	105	0	N.D.	
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	0.00	105	0	N.D.	
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.	
83) n-Decane	18.69	57	2079	N.D.	
84) Benzyl Chloride	0.00	91	0	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	0.00	105	0	N.D.	
88) 4-Isopropyltoluene (p-...	18.82	119	428	N.D.	
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	0.00	68	0	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	19.67	57	566	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	20.90	128	855	N.D.	
96) n-Dodecane	0.00	57	0	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D.	
99) tert-Butylbenzene	0.00	119	0	N.D.	
100) n-Butylbenzene	0.00	91	0	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151704.D
Acq On : 15 Jun 2017 7:22 Operator: SC
Sample : MB R9061517 1000mL
Misc : S31-06061702
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 15 09:36:06 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File: I:\MS09\Data\2017 06\15\06151705.D
Acq On : 15 Jun 2017 7:55 Operator: SC
Sample : LCS R9061517 25ng
Misc : S31-06061702/S31-05191701 (6/17)
ALS Vial : 2 Sample Multiplier: 1

6/15/17

Quant Time: Jun 15 09:37:52 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.13	130	179836	12.500	ng		0.02
37) 1,4-Difluorobenzene (IS2)	11.09	114	880250	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	363686	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.91	65	249824	11.861	ng		0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.88%				
57) Toluene-d8 (SS2)	13.53	98	936617	12.644	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.12%				
73) Bromofluorobenzene (SS3)	17.04	174	271680	12.835	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.64%				
Target Compounds							Qvalue
2) Propene	3.84	42	496615	20.518	ng		100
3) Dichlorodifluoromethan...	3.95	85	780146	21.144	ng		100
4) Chloromethane	4.15	50	598572	21.165	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.31	135	427760	20.972	ng		99
6) Vinyl Chloride	4.43	62	665153	21.427	ng		100
7) 1,3-Butadiene	4.61	54	459534	25.509	ng		98
8) Bromomethane	4.91	94	406394	22.578	ng		99
9) Chloroethane	5.13	64	334787	22.284	ng		99
10) Ethanol	5.36	45	1633681	113.987	ng		100
11) Acetonitrile	5.55	41	813714	22.750	ng		100
12) Acrolein	5.68	56	272925	21.362	ng		100
13) Acetone	5.82	58	1673058	111.049	ng		96
14) Trichlorofluoromethane	6.00	101	640936	20.584	ng		99
15) 2-Propanol (Isopropanol)	6.15	45	2125033	45.402	ng		100
16) Acrylonitrile	6.35	53	614345	25.831	ng		100
17) 1,1-Dichloroethene	6.70	96	436620	22.676	ng		100
18) 2-Methyl-2-Propanol (t...	6.80	59	2067936	42.424	ng		98
19) Methylene Chloride	6.85	84	467152	20.965	ng		96
20) 3-Chloro-1-propene (Al...	6.98	41	654324	24.050	ng		96
21) Trichlorotrifluoroethane	7.16	151	368157	21.957	ng		99
22) Carbon Disulfide	7.13	76	1691931	21.277	ng		100
23) trans-1,2-Dichloroethene	7.87	61	638659	22.688	ng		100
24) 1,1-Dichloroethane	8.08	63	781148	21.890	ng		100
25) Methyl tert-Butyl Ether	8.15	73	1343098	21.806	ng		99
26) Vinyl Acetate	8.27	86	521555	131.971	ng	#	92
27) 2-Butanone (MEK)	8.50	72	324469	23.474	ng		92
28) cis-1,2-Dichloroethene	8.96	61	607249	21.875	ng		98
29) Diisopropyl Ether	9.19	87	384604	21.784	ng	#	89
30) Ethyl Acetate	9.20	61	347167	48.061	ng		98
31) n-Hexane	9.20	57	770102	21.858	ng		100
32) Chloroform	9.27	83	727900	21.322	ng		99
34) Tetrahydrofuran (THF)	9.65	72	310186	21.991	ng		95
35) Ethyl tert-Butyl Ether	9.74	87	537287	22.868	ng		96
36) 1,2-Dichloroethane	10.01	62	527256	21.341	ng		100
38) 1,1,1-Trichloroethane	10.28	97	610187	20.915	ng		99
39) Isopropyl Acetate	10.65	61	582186	45.780	ng		96
40) 1-Butanol	10.66	56	882139	40.831	ng		94
41) Benzene	10.74	78	1855437	20.964	ng		100
42) Carbon Tetrachloride	10.88	117	521513	21.489	ng		100
43) Cyclohexane	11.01	84	1424447	44.831	ng		98
44) tert-Amyl Methyl Ether	11.33	73	1298408	22.791	ng		98
45) 1,2-Dichloropropane	11.56	63	453604	22.627	ng		100
46) Bromodichloromethane	11.74	83	577727	21.799	ng		100
47) Trichloroethene	11.79	130	478909	21.831	ng		99
48) 1,4-Dioxane	11.76	88	384245	23.465	ng		98
49) 2,2,4-Trimethylpentane...	11.85	57	1939121	22.355	ng		99

Data File: I:\MS09\Data\2017 06\15\06151705.D
Acq On : 15 Jun 2017 7:55 Operator: SC
Sample : LCS R9061517 25ng
Misc : S31-06061702/S31-05191701 (6/17)
ALS Vial : 2 Sample Multiplier: 1

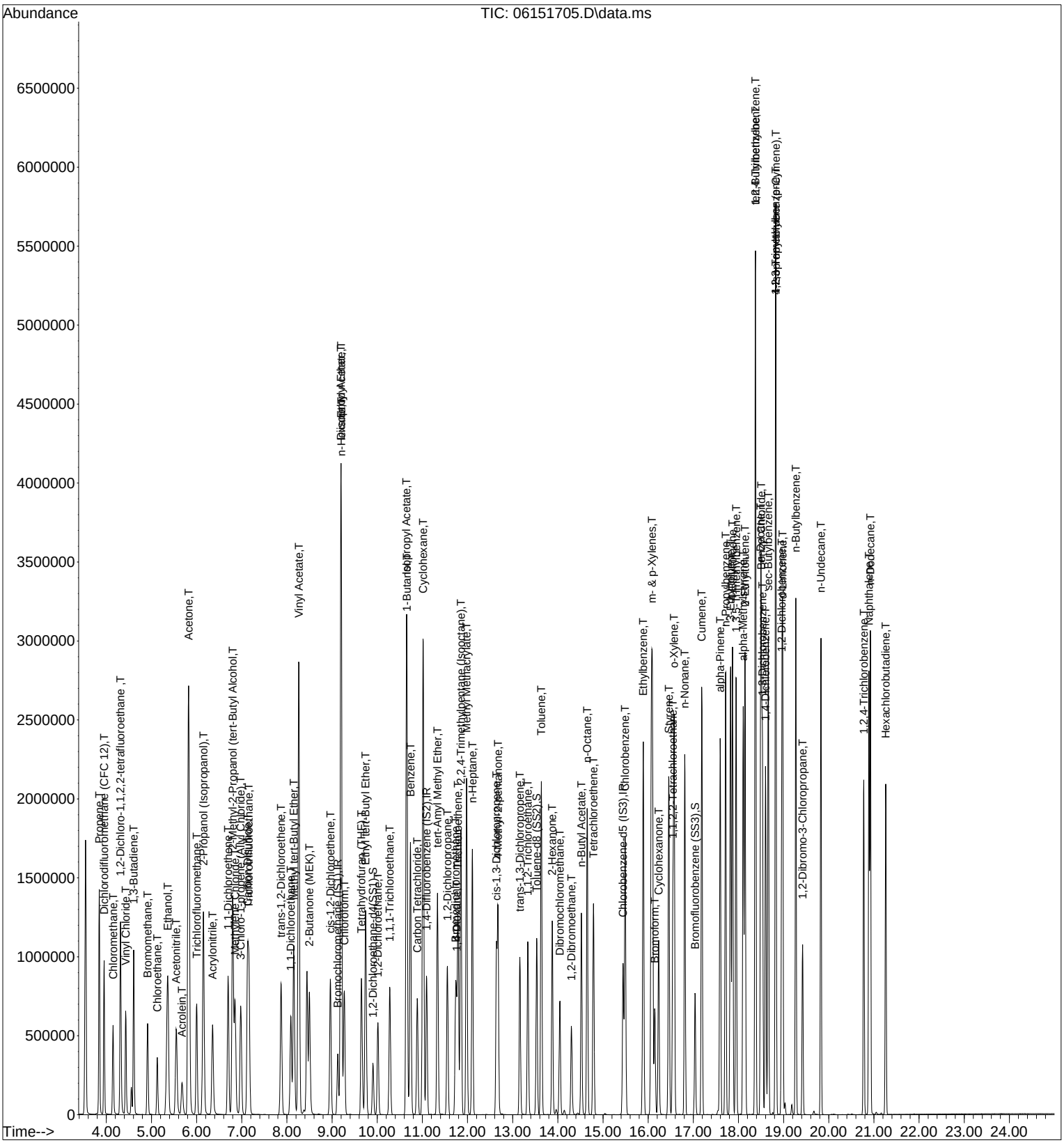
Quant Time: Jun 15 09:37:52 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.98	100	383747	48.704	ng	95
51) n-Heptane	12.11	71	473746	22.299	ng	98
52) cis-1,3-Dichloropropene	12.64	75	742092	23.519	ng	100
53) 4-Methyl-2-pentanone	12.67	58	424842	23.465	ng	95
54) trans-1,3-Dichloropropene	13.16	75	663783	25.007	ng	100
55) 1,1,2-Trichloroethane	13.33	97	445477	22.665	ng	99
58) Toluene	13.63	91	1897158	21.934	ng	100
59) 2-Hexanone	13.88	43	927120	24.665	ng	97
60) Dibromochloromethane	14.05	129	489977	24.176	ng	100
61) 1,2-Dibromoethane	14.30	107	492236	24.761	ng	100
62) n-Butyl Acetate	14.52	43	1039787	24.308	ng	99
63) n-Octane	14.65	57	402540	22.585	ng	99
64) Tetrachloroethene	14.79	166	494871	23.402	ng	100
65) Chlorobenzene	15.49	112	1232416	23.171	ng	100
66) Ethylbenzene	15.89	91	2114265	22.381	ng	100
67) m- & p-Xylenes	16.08	91	3268410	44.866	ng	99
68) Bromoform	16.14	173	410210	25.458	ng	100
69) Styrene	16.46	104	1327116	25.399	ng	99
70) o-Xylene	16.57	91	1661601	22.737	ng	100
71) n-Nonane	16.81	43	888445	23.953	ng	96
72) 1,1,2,2-Tetrachloroethane	16.55	83	799665	25.406	ng	100
74) Cumene	17.19	105	2100856	23.210	ng	100
75) alpha-Pinene	17.59	93	1095384	24.147	ng	99
76) n-Propylbenzene	17.72	91	2550578	24.108	ng	99
77) 3-Ethyltoluene	17.83	105	2087942	23.445	ng	100
78) 4-Ethyltoluene	17.87	105	2046277	24.759	ng	100
79) 1,3,5-Trimethylbenzene	17.95	105	1721187	22.994	ng	99
80) alpha-Methylstyrene	18.10	118	885810	24.438	ng	100
81) 2-Ethyltoluene	18.15	105	2066164	23.735	ng	99
82) 1,2,4-Trimethylbenzene	18.38	105	1763875	24.327	ng	100
83) n-Decane	18.49	57	988727	24.250	ng	98
84) Benzyl Chloride	18.51	91	1559002	30.537	ng	100
85) 1,3-Dichlorobenzene	18.53	146	1022515	26.007	ng	100
86) 1,4-Dichlorobenzene	18.60	146	1020133	25.971	ng	99
87) sec-Butylbenzene	18.66	105	2361944	23.942	ng	99
88) 4-Isopropyltoluene (p-...	18.83	119	2156439	23.348	ng	99
89) 1,2,3-Trimethylbenzene	18.82	105	1794403	24.678	ng	99
90) 1,2-Dichlorobenzene	18.96	146	975360	25.608	ng	100
91) d-Limonene	18.98	68	684719	23.793	ng	97
92) 1,2-Dibromo-3-Chloropr...	19.42	157	346198	29.291	ng	98
93) n-Undecane	19.83	57	1031219	26.953	ng	98
94) 1,2,4-Trichlorobenzene	20.78	180	708188	30.006	ng	99
95) Naphthalene	20.89	128	2256981	29.779	ng	100
96) n-Dodecane	20.92	57	991984	28.941	ng	98
97) Hexachlorobutadiene	21.26	225	422060	24.702	ng	99
98) Cyclohexanone	16.23	55	553113	21.202	ng	98
99) tert-Butylbenzene	18.38	119	1677397	23.492	ng	100
100) n-Butylbenzene	19.27	91	1893412	24.718	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151705.D
Acq On : 15 Jun 2017 7:55 Operator: SC
Sample : LCS R9061517 25ng
Misc : S31-06061702/S31-05191701 (6/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 15 09:37:52 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



00858794

Method Path : I:\MS09\Methods\
Method File : R9050117.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue May 02 10:34:08 2017
Response Via : Initial Calibration

5/2/17

Calibration Files
0.08=05011716.D 0.10=05011717.D 0.20=05011718.D 0.40=05011730.D 1.0 =05011728.D 5.0 =05011
50 =05011723.D 100 =05011724.D

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------	ISTD	----------								
2)	T	Propene				2.171	1.898	1.483	1.401	1.372	1.769	1.682	18.96
3)	T	Dichlorodifluo...	2.806	3.008	2.611	2.642	2.543	2.302	2.543	2.309	2.318	2.565	9.34
4)	T	Chloromethane	2.422	2.372	2.057	2.179	1.996	1.644	1.928	1.673	1.422	1.966	17.20
5)	T	1,2-Dichloro-1...	1.768	1.707	1.443	1.404	1.374	1.221	1.367	1.249	1.226	1.418	14.01
6)	T	Vinyl Chloride	2.382	2.441	2.137	2.311	2.219	1.948	2.092	1.909	1.980	2.158	8.96
7)	T	1,3-Butadiene	1.218	1.179	1.082	1.255	1.414	1.120	1.332	1.294	1.376	1.252	9.05
8)	T	Bromomethane	1.381	1.459	1.323	1.337	1.299	1.055	1.237	1.074	1.095	1.251	11.63
9)	T	Chloroethane	1.084	1.259	1.013	1.074	1.076	0.923	1.033	0.951	0.987	1.044	9.44
10)	T	Ethanol	0.997	1.166	1.019	1.105	1.089	0.861	0.980	0.848	0.900	0.996	11.19
11)	T	Acetonitrile	2.493	2.637	2.456	2.740	2.678	2.289	2.473	2.217	2.391	2.486	7.05
12)	T	Acrolein	0.735	0.985	0.919	1.080	0.930	0.811	0.890	0.795	0.849	0.888	11.83
13)	T	Acetone				1.258	1.120	0.979	1.063	0.920	0.943	1.047	12.21
14)	T	Trichlorofluor...	2.518	2.629	2.173	2.178	2.138	1.907	2.065	1.891	1.979	2.164	11.85
15)	T	2-Propanol (Is...	3.259	3.893	3.271	3.586	3.566	3.048	3.238	2.867	2.552	3.253	12.40
16)	T	Acrylonitrile	1.163	1.626	1.524	1.760	1.872	1.680	1.762	1.644	1.847	1.653	12.96
17)	T	1,1-Dichloroet...	1.339	1.609	1.271	1.379	1.306	1.193	1.330	1.324	1.293	1.338	8.51
18)	T	2-Methyl-2-Pro...	3.471	3.947	3.537	3.500	3.647	3.250	3.486	3.337	2.319	3.388	13.18
19)	T	Methylene Chlo...	1.856	1.993	1.563	1.607	1.431	1.284	1.403	1.419	1.382	1.549	15.23
20)	T	3-Chloro-1-pro...	1.661	2.309	1.831	1.814	1.936	1.725	1.843	1.968	1.934	1.891	9.84
21)	T	Trichlorotrifl...	1.299	1.366	1.162	1.126	1.149	1.017	1.166	1.121	1.084	1.165	9.12
22)	T	Carbon Disulfide	6.574	6.904	5.591	5.668	5.348	4.641	5.074	5.098	4.848	5.527	13.84
23)	T	trans-1,2-Dich...	2.117	2.075	1.864	1.993	1.948	1.767	1.936	1.975	1.933	1.957	5.33
24)	T	1,1-Dichloroet...	2.932	2.798	2.414	2.466	2.452	2.200	2.322	2.398	2.341	2.480	9.46
25)	T	Methyl tert-Bu...	4.928	4.733	4.160	4.063	4.168	3.846	4.392	4.186	4.055	4.281	8.09
26)	T	Vinyl Acetate				0.223	0.249	0.254	0.310	0.317	0.296	0.275	13.89
27)	T	2-Butanone (MEK)	1.082	1.007	0.858	0.919	0.950	0.885	0.969	0.990	0.986	0.961	7.03
28)	T	cis-1,2-Dichlo...	2.255	2.128	1.797	2.089	1.868	1.701	1.835	1.855	1.837	1.929	9.48
29)	T	Diisopropyl Ether	1.531	1.482	1.311	1.196	1.148	1.060	1.171	1.132	1.014	1.227	14.61
30)	T	Ethyl Acetate	0.544	0.490	0.478	0.535	0.523	0.480	0.514	0.506	0.447	0.502	6.18
31)	T	n-Hexane	3.171	2.840	2.552	2.462	2.400	2.194	2.272	2.220	1.930	2.449	15.18
32)	T	Chloroform	2.724	2.739	2.346	2.405	2.276	2.101	2.284	2.260	2.222	2.373	9.25
33)	S	1,2-Dichloroet...	1.451	1.478	1.459	1.511	1.507	1.475	1.430	1.367	1.499	1.464	3.09
34)	T	Tetrahydrofura...	1.212	1.128	0.890	1.022	0.966	0.875	0.920	0.872	0.939	0.980	12.16
35)	T	Ethyl tert-But...	1.741	1.736	1.677	1.582	1.618	1.505	1.645	1.551	1.643	1.633	4.85
36)	T	1,2-Dichloroet...	1.969	1.872	1.614	1.823	1.700	1.518	1.785	1.545	1.628	1.717	9.00
37)	IR	1,4-Difluorobenzen...	----------	ISTD	----------								
38)	T	1,1,1-Trichlor...	0.527	0.448	0.417	0.387	0.390	0.364	0.424	0.389	0.382	0.414	11.88
39)	T	Isopropyl Acetate	0.201	0.195	0.177	0.177	0.179	0.168	0.177	0.182	0.168	0.181	6.22
40)	T	1-Butanol	0.367	0.357	0.299	0.311	0.306	0.277	0.283	0.288	0.273	0.307	11.11
41)	T	Benzene	1.650	1.514	1.346	1.246	1.178	1.051	1.144	1.104	1.079	1.257	16.53
42)	T	Carbon Tetrach...	0.403	0.380	0.342	0.319	0.330	0.311	0.349	0.337	0.331	0.345	8.54
43)	T	Cyclohexane	0.584	0.514	0.451	0.438	0.436	0.401	0.432	0.417	0.388	0.451	13.57
44)	T	tert-Amyl Meth...	0.929	0.888	0.794	0.771	0.782	0.740	0.797	0.796	0.785	0.809	7.41
45)	T	1,2-Dichloropr...	0.319	0.329	0.288	0.281	0.276	0.256	0.275	0.266	0.272	0.285	8.53
46)	T	Bromodichlorom...	0.474	0.414	0.378	0.354	0.346	0.329	0.359	0.383	0.350	0.376	11.72
47)	T	Trichloroethene	0.374	0.359	0.312	0.310	0.298	0.269	0.299	0.304	0.278	0.312	11.00
48)	T	1,4-Dioxane	0.249	0.245	0.219	0.229	0.225	0.210	0.237	0.249	0.229	0.233	5.89
49)	T	2,2,4-Trimethy...	1.515	1.439	1.222	1.199	1.212	1.088	1.158	1.146	1.107	1.232	11.97
50)	T	Methyl Methacr...	0.122	0.110	0.101	0.106	0.111	0.106	0.119	0.118	0.114	0.112	6.14
51)	T	n-Heptane	0.403	0.326	0.305	0.292	0.289	0.263	0.280	0.278	0.279	0.302	13.92
52)	T	cis-1,3-Dichlo...	0.484	0.446	0.424	0.422	0.447	0.424	0.474	0.463	0.449	0.448	5.00
53)	T	4-Methyl-2-pen...	0.273	0.263	0.244	0.241	0.257	0.245	0.266	0.262	0.263	0.257	4.31
54)	T	trans-1,3-Dich...	0.364	0.357	0.336	0.337	0.394	0.377	0.414	0.407	0.407	0.377	8.01

55)	T	1,1,2-Trichlor...	0.323	0.309	0.261	0.276	0.263	0.247	0.281	0.289	0.263	0.279	8.80
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.570	2.571	2.576	2.534	2.553	2.530	2.536	2.572	2.473	2.546	1.29
58)	T	Toluene	3.871	3.531	3.199	2.890	2.840	2.522	2.809	2.656	2.436	2.973	16.01
59)	T	2-Hexanone	1.422	1.315	1.204	1.165	1.360	1.246	1.341	1.284	1.292	1.292	6.16
60)	T	Dibromochlorom...	0.781	0.704	0.657	0.664	0.658	0.635	0.738	0.760	0.672	0.697	7.42
61)	T	1,2-Dibromoethane	0.746	0.696	0.616	0.638	0.677	0.643	0.719	0.753	0.661	0.683	7.14
62)	T	n-Butyl Acetate	1.465	1.420	1.312	1.370	1.523	1.394	1.666	1.639	1.441	1.470	8.12
63)	T	n-Octane	0.766	0.687	0.571	0.587	0.588	0.525	0.635	0.618	0.537	0.613	12.36
64)	T	Tetrachloroethene	0.832	0.802	0.761	0.726	0.661	0.628	0.755	0.736	0.641	0.727	9.74
65)	T	Chlorobenzene	2.291	2.154	1.750	1.763	1.787	1.618	1.782	1.734	1.575	1.828	12.99
66)	T	Ethylbenzene	4.428	3.911	3.202	3.087	3.067	2.791	3.086	2.948	2.701	3.247	17.27
67)	T	m- & p-Xylenes	3.251	2.927	2.452	2.383	2.446	2.177	2.513	2.297	2.088	2.504	14.68
68)	T	Bromoform	0.596	0.566	0.505	0.476	0.531	0.512	0.622	0.609	0.567	0.554	9.15
69)	T	Styrene	2.011	1.859	1.634	1.584	1.820	1.730	1.940	1.867	1.717	1.796	7.83
70)	T	o-Xylene	3.193	2.863	2.498	2.433	2.425	2.211	2.463	2.385	2.134	2.512	13.00
71)	T	n-Nonane	1.641	1.400	1.255	1.255	1.267	1.143	1.222	1.162	1.128	1.275	12.57
72)	T	1,1,2,2-Tetrac...	1.211	1.099	0.983	1.025	1.059	1.019	1.169	1.119	1.052	1.082	6.89
73)	S	Bromofluoroben...	0.725	0.732	0.729	0.701	0.697	0.733	0.761	0.762	0.708	0.728	3.23
74)	T	Cumene	3.727	3.543	3.046	2.941	3.048	2.803	3.129	3.167	2.596	3.111	11.17
75)	T	alpha-Pinene	1.791	1.630	1.469	1.485	1.503	1.411	1.738	1.575	1.431	1.559	8.68
76)	T	n-Propylbenzene	4.405	4.054	3.542	3.453	3.672	3.360	3.694	3.467	3.080	3.636	10.77
77)	T	3-Ethyltoluene	3.590	3.449	2.986	2.881	2.950	2.902	3.112	3.093	2.585	3.061	9.91
78)	T	4-Ethyltoluene	3.417	3.219	2.750	2.565	2.930	2.559	2.917	2.707	2.502	2.841	11.02
79)	T	1,3,5-Trimethy...	3.066	2.874	2.552	2.365	2.518	2.332	2.579	2.668	2.201	2.573	10.51
80)	T	alpha-Methylst...	1.277	1.158	1.128	1.047	1.261	1.230	1.432	1.455	1.225	1.246	10.66
81)	T	2-Ethyltoluene	3.528	3.368	2.949	2.801	2.968	2.700	2.992	3.089	2.533	2.992	10.39
82)	T	1,2,4-Trimethy...	2.948	2.794	2.422	2.307	2.492	2.353	2.600	2.548	1.965	2.492	11.43
83)	T	n-Decane	1.689	1.578	1.369	1.372	1.441	1.294	1.383	1.316	1.170	1.401	10.99
84)	T	Benzyl Chloride				1.307	1.812	1.702	1.978	1.977	1.753	1.755	14.09
85)	T	1,3-Dichlorobe...	1.552	1.423	1.247	1.154	1.367	1.304	1.454	1.412	1.249	1.351	9.15
86)	T	1,4-Dichlorobe...	1.574	1.417	1.224	1.125	1.405	1.315	1.438	1.401	1.253	1.350	9.99
87)	T	sec-Butylbenzene	4.045	3.794	3.434	3.181	3.389	3.124	3.470	3.269	2.809	3.391	10.77
88)	T	4-Isopropyltol...	3.935	3.827	3.279	2.920	3.168	2.933	3.288	2.960	2.260	3.175	15.88
89)	T	1,2,3-Trimethy...	2.890	2.839	2.435	2.321	2.546	2.353	2.699	2.445	1.965	2.499	11.46
90)	T	1,2-Dichlorobe...	1.477	1.416	1.245	1.131	1.310	1.254	1.414	1.376	1.158	1.309	9.23
91)	T	d-Limonene	1.061	0.988	0.904	0.920	1.019	0.968	1.094	1.041	0.907	0.989	7.05
92)	T	1,2-Dibromo-3-...	0.375	0.325	0.328	0.349	0.410	0.421	0.494	0.503	0.450	0.406	16.54
93)	T	n-Undecane	1.397	1.307	1.163	1.344	1.328	1.209	1.421	1.402	1.265	1.315	6.78
94)	T	1,2,4-Trichlor...	0.776	0.718	0.644	0.553	0.929	0.906	0.968	0.948	0.858	0.811	18.11
95)	T	Naphthalene				1.485	3.102	2.871	2.907	2.813	2.452	2.605	22.58
96)	T	n-Dodecane				1.238	1.101	1.010	1.301	1.267	1.151	1.178	9.42
97)	T	Hexachlorobuta...	0.629	0.635	0.575	0.511	0.580	0.536	0.633	0.630	0.556	0.587	7.99
98)	T	Cyclohexanone	1.011	1.011	0.849	0.822	0.935	0.836	0.880	0.860	0.865	0.897	8.06
99)	T	tert-Butylbenzene	3.119	2.773	2.495	2.348	2.410	2.256	2.467	2.388	1.831	2.454	14.34
100)	T	n-Butylbenzene	2.924	2.724	2.539	2.351	2.777	2.556	2.755	2.778	2.292	2.633	8.07

(#) = Out of Range

R9050117.M Tue May 02 11:36:19 2017

Primary Source Standards Concentrations (Working & Initial Calibration)

5/2/17

1ng/L Std. ID:
4ng/L Std. ID: S31-04111709
20ng/L Std. ID: S31-04261705
200ng/L Std. ID: S31-04261703

Dilution Factors:		5	50	250	1000	Working STD Conc.(ng/L):	4	4	4	4	20	20	200	200	200
	Source Std.	Primary Working Standards				Injection (L):	0.020	0.025	0.050	0.100	0.050	0.25	0.125	0.25	0.50
Compounds	mg/m³	200ng/L	20ng/L	4ng/L	1ng/L	ICAL Points:	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
Propene	1.036	207.2	20.72	4.144	1.036		0.08288	0.1036	0.2072	0.4144	1.036	5.180	25.900	51.80	103.6
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047		0.08376	0.1047	0.2094	0.4188	1.047	5.235	26.175	52.35	104.7
Chloromethane	1.005	201.0	20.10	4.020	1.005		0.08040	0.1005	0.2010	0.4020	1.005	5.025	25.125	50.25	100.5
Freon-114	1.005	201.0	20.10	4.020	1.005		0.08040	0.1005	0.2010	0.4020	1.005	5.025	25.125	50.25	100.5
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023		0.08184	0.1023	0.2046	0.4092	1.023	5.115	25.575	51.15	102.3
1,3-Butadiene	1.057	211.4	21.14	4.228	1.057		0.08456	0.1057	0.2114	0.4228	1.057	5.285	26.425	52.85	105.7
Bromomethane	0.993	198.6	19.86	3.972	0.993		0.07944	0.0993	0.1986	0.3972	0.993	4.965	24.825	49.65	99.3
Chloroethane	1.009	201.8	20.18	4.036	1.009		0.08072	0.1009	0.2018	0.4036	1.009	5.045	25.225	50.45	100.9
Ethanol	5.207	1041.4	104.14	20.828	5.207		0.41656	0.5207	1.0414	2.0828	5.207	26.035	130.175	260.35	520.7
Acetonitrile	1.046	209.2	20.92	4.184	1.046		0.08368	0.1046	0.2092	0.4184	1.046	5.230	26.150	52.30	104.6
Acrolein	1.041	208.2	20.82	4.164	1.041		0.08328	0.1041	0.2082	0.4164	1.041	5.205	26.025	52.05	104.1
Acetone	5.313	1062.6	106.26	21.252	5.313		0.42504	0.5313	1.0626	2.1252	5.313	26.565	132.825	265.65	531.3
Trichlorofluoromethane	1.049	209.8	20.98	4.196	1.049		0.08392	0.1049	0.2098	0.4196	1.049	5.245	26.225	52.45	104.9
Isopropanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Acrylonitrile	1.055	211.0	21.10	4.220	1.055		0.08440	0.1055	0.2110	0.4220	1.055	5.275	26.375	52.75	105.5
1,1-Dichloroethene	1.059	211.8	21.18	4.236	1.059		0.08472	0.1059	0.2118	0.4236	1.059	5.295	26.475	52.95	105.9
tert-Butanol	2.114	422.8	42.28	8.456	2.114		0.16912	0.2114	0.4228	0.8456	2.114	10.570	52.850	105.70	211.4
Methylene Chloride	1.057	211.4	21.14	4.228	1.057		0.08456	0.1057	0.2114	0.4228	1.057	5.285	26.425	52.85	105.7
Allyl Chloride	1.052	210.4	21.04	4.208	1.052		0.08416	0.1052	0.2104	0.4208	1.052	5.260	26.300	52.60	105.2
Trichlorotrifluoroethane	1.049	209.8	20.98	4.196	1.049		0.08392	0.1049	0.2098	0.4196	1.049	5.245	26.225	52.45	104.9
Carbon Disulfide	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
trans-1,2-Dichloroethene	1.067	213.4	21.34	4.268	1.067		0.08536	0.1067	0.2134	0.4268	1.067	5.335	26.675	53.35	106.7
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020		0.08160	0.1020	0.2040	0.4080	1.020	5.100	25.500	51.00	102.0
Methyl tert-Butyl Ether	1.066	213.2	21.32	4.264	1.066		0.08528	0.1066	0.2132	0.4264	1.066	5.330	26.650	53.30	106.6
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265		0.42120	0.5265	1.0530	2.1060	5.265	26.325	131.625	263.25	526.5
2-Butanone	1.049	209.8	20.98	4.196	1.049		0.08392	0.1049	0.2098	0.4196	1.049	5.245	26.225	52.45	104.9
cis-1,2-Dichloroethene	1.064	212.8	21.28	4.256	1.064		0.08512	0.1064	0.2128	0.4256	1.064	5.320	26.600	53.20	106.4
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129		0.17032	0.2129	0.4258	0.8516	2.129	10.645	53.225	106.45	212.9
n-Hexane	1.063	212.6	21.26	4.252	1.063		0.08504	0.1063	0.2126	0.4252	1.063	5.315	26.575	53.15	106.3
Chloroform	1.058	211.6	21.16	4.232	1.058		0.08464	0.1058	0.2116	0.4232	1.058	5.290	26.450	52.90	105.8
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl tert-Butyl Ether	1.057	211.4	21.14	4.228	1.057		0.08456	0.1057	0.2114	0.4228	1.057	5.285	26.425	52.85	105.7
1,2-Dichloroethane	1.052	210.4	21.04	4.208	1.052		0.08416	0.1052	0.2104	0.4208	1.052	5.260	26.300	52.60	105.2
1,1,1-Trichloroethane	1.074	214.8	21.48	4.296	1.074		0.08592	0.1074	0.2148	0.4296	1.074	5.370	26.850	53.70	107.4
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104		0.16832	0.2104	0.4208	0.8416	2.104	10.520	52.600	105.20	210.4
1-Butanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Benzene	1.052	210.4	21.04	4.208	1.052		0.08416	0.1052	0.2104	0.4208	1.052	5.260	26.300	52.60	105.2
Carbon Tetrachloride	1.055	211.0	21.10	4.220	1.055		0.08440	0.1055	0.2110	0.4220	1.055	5.275	26.375	52.75	105.5
Cyclohexane	2.130	426.0	42.60	8.520	2.130		0.17040	0.2130	0.4260	0.8520	2.130	10.650	53.250	106.50	213.0
tert-Amyl Methyl Ether	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Bromodichloromethane	1.066	213.2	21.32	4.264	1.066		0.08528	0.1066	0.2132	0.4264	1.066	5.330	26.650	53.30	106.6
Trichloroethene	1.060	212.0	21.20	4.240	1.060		0.08480	0.1060	0.2120	0.4240	1.060	5.300	26.500	53.00	106.0
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Isooctane	1.059	211.8	21.18	4.236	1.059		0.08472	0.1059	0.2118	0.4236	1.059	5.295	26.475	52.95	105.9
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110		0.16880	0.2110	0.4220	0.8440	2.110	10.550	52.750	105.50	211.0
n-Heptane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116		0.08928	0.1116	0.2232	0.4464	1.116	5.580	27.900	55.80	111.6
4-Methyl-2-pentanone	1.058	211.6	21.16	4.232	1.058		0.08464	0.1058	0.2116	0.4232	1.058	5.290	26.450	52.90	105.8
trans-1,3-Dichloropropene	1.064	212.8	21.28	4.256	1.064		0.08512	0.1064	0.2128	0.4256	1.064	5.320	26.600	53.20	106.4
1,1,2-Trichloroethane	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
Toluene	1.053	210.6	21.06	4.212	1.053		0.08424	0.1053	0.2106	0.4212	1.053	5.265	26.325	52.65	105.3
2-Hexanone	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S31-04111709
20ng/L Std. ID: S31-04261705
200ng/L Std. ID: S31-04261703

Dilution Factors:		5	50	250	1000	Working STD Conc.(ng/L):	4	4	4	4	20	20	200	200	200
	Source Std.	Primary Working Standards				Injection (L):	0.020	0.025	0.050	0.100	0.050	0.25	0.125	0.25	0.50
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	ICAL Points:	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2-Dibromoethane	1.056	211.2	21.12	4.224	1.056		0.08448	0.1056	0.2112	0.4224	1.056	5.280	26.400	52.80	105.6
n-Butyl Acetate	1.064	212.8	21.28	4.256	1.064		0.08512	0.1064	0.2128	0.4256	1.064	5.320	26.600	53.20	106.4
n-Octane	1.057	211.4	21.14	4.228	1.057		0.08456	0.1057	0.2114	0.4228	1.057	5.285	26.425	52.85	105.7
Tetrachloroethene	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
Chlorobenzene	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
Ethylbenzene	1.055	211.0	21.10	4.220	1.055		0.08440	0.1055	0.2110	0.4220	1.055	5.275	26.375	52.75	105.5
m-&p-Xylene	2.123	424.6	42.46	8.492	2.123		0.16984	0.2123	0.4246	0.8492	2.123	10.615	53.075	106.15	212.3
Bromoform	1.063	212.6	21.26	4.252	1.063		0.08504	0.1063	0.2126	0.4252	1.063	5.315	26.575	53.15	106.3
Styrene	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
o-Xylene	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
n-Nonane	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
1,1,2,2-Tetrachloroethane	1.056	211.2	21.12	4.224	1.056		0.08448	0.1056	0.2112	0.4224	1.056	5.280	26.400	52.80	105.6
Cumene	1.050	210.0	21.00	4.200	1.050		0.08400	0.1050	0.2100	0.4200	1.050	5.250	26.250	52.50	105.0
alpha-Pinene	1.044	208.8	20.88	4.176	1.044		0.08352	0.1044	0.2088	0.4176	1.044	5.220	26.100	52.20	104.4
n-Propylbenzene	1.063	212.6	21.26	4.252	1.063		0.08504	0.1063	0.2126	0.4252	1.063	5.315	26.575	53.15	106.3
3-Ethyltoluene	1.050	210.0	21.00	4.200	1.050		0.08400	0.1050	0.2100	0.4200	1.050	5.250	26.250	52.50	105.0
4-Ethyltoluene	1.049	209.8	20.98	4.196	1.049		0.08392	0.1049	0.2098	0.4196	1.049	5.245	26.225	52.45	104.9
1,3,5-Trimethylbenzene	1.049	209.8	20.98	4.196	1.049		0.08392	0.1049	0.2098	0.4196	1.049	5.245	26.225	52.45	104.9
alpha-Methylstyrene	1.050	210.0	21.00	4.200	1.050		0.08400	0.1050	0.2100	0.4200	1.050	5.250	26.250	52.50	105.0
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2,4-Trimethylbenzene	1.052	210.4	21.04	4.208	1.052		0.08416	0.1052	0.2104	0.4208	1.052	5.260	26.300	52.60	105.2
n-Decane	1.053	210.6	21.06	4.212	1.053		0.08424	0.1053	0.2106	0.4212	1.053	5.265	26.325	52.65	105.3
Benzyl Chloride	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
1,3-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058		0.08464	0.1058	0.2116	0.4232	1.058	5.290	26.450	52.90	105.8
1,4-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058		0.08464	0.1058	0.2116	0.4232	1.058	5.290	26.450	52.90	105.8
sec-Butylbenzene	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058		0.08464	0.1058	0.2116	0.4232	1.058	5.290	26.450	52.90	105.8
d-Limonene	1.005	201.0	20.10	4.020	1.005		0.08040	0.1005	0.2010	0.4020	1.005	5.025	25.125	50.25	100.5
1,2-Dibromo-3-chloropropane	1.053	210.6	21.06	4.212	1.053		0.08424	0.1053	0.2106	0.4212	1.053	5.265	26.325	52.65	105.3
n-Undecane	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043		0.08344	0.1043	0.2086	0.4172	1.043	5.215	26.075	52.15	104.3
Naphthalene	1.083	216.6	21.66	4.332	1.083		0.08664	0.1083	0.2166	0.4332	1.083	5.415	27.075	54.15	108.3
n-Dodecane	1.045	209.0	20.90	4.180	1.045		0.08360	0.1045	0.2090	0.4180	1.045	5.225	26.125	52.25	104.5
Hexachloro-1,3-butadiene	1.059	211.8	21.18	4.236	1.059		0.08472	0.1059	0.2118	0.4236	1.059	5.295	26.475	52.95	105.9
Methacrylonitrile	1.065	213.0	21.30	4.260	1.065		0.08520	0.1065	0.2130	0.4260	1.065	5.325	26.625	53.25	106.5
Cyclohexanone	1.056	211.2	21.12	4.224	1.056		0.08448	0.1056	0.2112	0.4224	1.056	5.280	26.400	52.80	105.6
tert-Butylbenzene	1.051	210.2	21.02	4.204	1.051		0.08408	0.1051	0.2102	0.4204	1.051	5.255	26.275	52.55	105.1
n-Butylbenzene	1.056	211.2	21.12	4.224	1.056		0.08448	0.1056	0.2112	0.4224	1.056	5.280	26.400	52.80	105.6

Calibration Status Report MS09

Method : I:\MS09\Methods\R9050117.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration

5/2/17

#	ID	Conc	ISTD Conc	Path\File
1	0.08	0	13	I:\MS09\Data\2017_05\01\05011716.D
2	0.10	0	13	I:\MS09\Data\2017_05\01\05011717.D
3	0.20	0	13	I:\MS09\Data\2017_05\01\05011718.D
4	0.40	0	13	I:\MS09\Data\2017_05\01\05011730.D
5	1.0	1	13	I:\MS09\Data\2017_05\01\05011728.D
6	5.0	5	13	I:\MS09\Data\2017_05\01\05011721.D
7	25	26	13	I:\MS09\Data\2017_05\01\05011722.D
8	50	52	13	I:\MS09\Data\2017_05\01\05011723.D
9	100	104	13	I:\MS09\Data\2017_05\01\05011724.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.08	May 02 09:24 2017	May 02 08:51 2017	1 May 2017 18:17
2	0.10	May 02 09:24 2017	May 02 08:50 2017	1 May 2017 18:50
3	0.20	May 02 09:25 2017	May 02 08:48 2017	1 May 2017 19:24
4	0.40	May 02 10:34 2017	May 02 10:31 2017	2 May 2017 10:04
5	1.0	May 02 09:25 2017	May 02 09:23 2017	2 May 2017 8:57
6	5.0	May 02 09:26 2017	May 02 08:39 2017	1 May 2017 21:06
7	25	May 02 09:26 2017	May 02 08:36 2017	1 May 2017 21:40
8	50	May 02 09:26 2017	May 02 08:53 2017	1 May 2017 22:14
9	100	May 02 09:26 2017	May 02 08:54 2017	1 May 2017 22:48

R9050117.M Tue May 02 10:37:24 2017

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 05\01\05011716.D
Acq On : 1 May 2017 18:17 Operator: SC
Sample : 0.08ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: May 02 08:51:21 2017 5/2/17
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.10	130	204653	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.08	114	1013951	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	15.44	82	423789	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.88	65	296872	10.962	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 87.68%				
57) Toluene-d8 (SS2)	13.52	98	1088927	13.208	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.68%				
73) Bromofluorobenzene (SS3)	17.04	174	307191	13.967	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 111.76%				
Target Compounds							Qvalue
2) Propene	3.86	42	8494	0.212	ng		100
3) Dichlorodifluoromethan...	3.97	85	3848	0.077	ng	#	93
4) Chloromethane	4.16	50	3188	0.055	ng		94
5) 1,2-Dichloro-1,1,2,2-t...	4.34	135	2327	0.102	ng		97
6) Vinyl Chloride	4.45	62	3191	0.060	ng		99
7) 1,3-Butadiene	4.63	54	1686	0.045	ng		92
8) Bromomethane	4.93	94	1796	0.074	ng		83
9) Chloroethane	5.15	64	1433	0.062	ng		93
10) Ethanol	5.33	45	6800	0.267	ng		86
11) Acetonitrile	5.56	41	3415	0.053	ng	#	55
12) Acrolein	5.69	56	1002	0.054	ng	#	52
13) Acetone	5.83	58	11714	0.476	ng		99
14) Trichlorofluoromethane	6.01	101	3460	0.091	ng		90
15) 2-Propanol (Isopropanol)	6.15	45	8984	0.110	ng		99
16) Acrylonitrile	6.36	53	1607	0.038	ng		92
17) 1,1-Dichloroethene	6.71	96	1857	0.076	ng		98
18) 2-Methyl-2-Propanol (t...	6.84	59	9611	0.135	ng		90
19) Methylene Chloride	6.84	84	2570	0.086	ng		95
20) 3-Chloro-1-propene (Al...	6.98	41	2288	0.049	ng		86
21) Trichlorotrifluoroethane	7.16	151	1785	0.097	ng		98
22) Carbon Disulfide	7.14	76	9136	0.082	ng		97
23) trans-1,2-Dichloroethene	7.86	61	2959	0.074	ng		100
24) 1,1-Dichloroethane	8.07	63	3917	0.076	ng		94
25) Methyl tert-Butyl Ether	8.19	73	6881	0.089	ng		94
26) Vinyl Acetate	8.27	86	1205	0.212	ng	#	68
27) 2-Butanone (MEK)	8.53	72	1487	0.083	ng	#	51
28) cis-1,2-Dichloroethene	8.94	61	3143	0.082	ng		89
29) Diisopropyl Ether	9.21	87	2129	0.096	ng	#	88
30) Ethyl Acetate	9.21	61	1518	0.149	ng		90
31) n-Hexane	9.19	57	4415	0.088	ng	#	86
32) Chloroform	9.24	83	3775	0.090	ng		98
34) Tetrahydrofuran (THF)	9.69	72	1686	0.091	ng		94
35) Ethyl tert-Butyl Ether	9.77	87	2410	0.085	ng	#	84
36) 1,2-Dichloroethane	10.00	62	2713	0.085	ng		94
38) 1,1,1-Trichloroethane	10.27	97	3670	0.113	ng		92
39) Isopropyl Acetate	10.66	61	2750	0.160	ng	#	85
40) 1-Butanol	10.68	56	5020	0.179	ng		99
41) Benzene	10.72	78	11264	0.101	ng		99
42) Carbon Tetrachloride	10.88	117	2759	0.101	ng		92
43) Cyclohexane	11.01	84	8069	0.204	ng		99
44) tert-Amyl Methyl Ether	11.35	73	6353	0.088	ng		87
45) 1,2-Dichloropropane	11.54	63	2200	0.077	ng		93
46) Bromodichloromethane	11.72	83	3276	0.105	ng		85
47) Trichloroethene	11.78	130	2571	0.104	ng		99
48) 1,4-Dioxane	11.79	88	1716	0.085	ng		87
49) 2,2,4-Trimethylpentane...	11.85	57	10414	0.086	ng		97

Data File: I:\MS09\Data\2017 05\01\05011716.D
Acq On : 1 May 2017 18:17 Operator: SC
Sample : 0.08ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

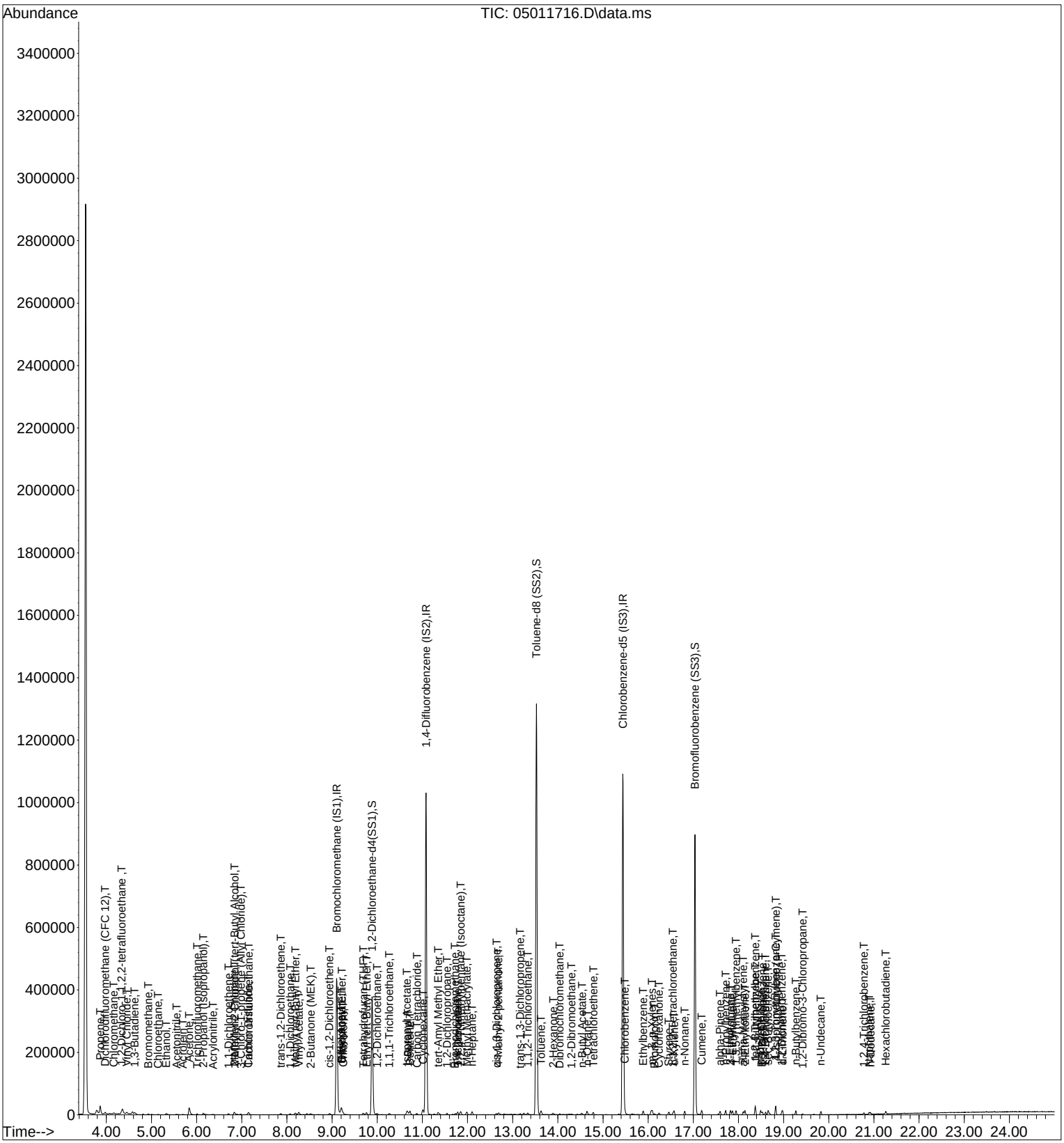
Quant Time: May 02 08:51:21 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
50) Methyl Methacrylate	11.98	100	1669	0.183	ng		92
51) n-Heptane	12.10	71	2776	0.103	ng		95
52) cis-1,3-Dichloropropene	12.64	75	3503	0.087	ng		94
53) 4-Methyl-2-pentanone	12.68	58	1871	0.074	ng	#	76
54) trans-1,3-Dichloropropene	13.16	75	2511	0.078	ng		98
55) 1,1,2-Trichloroethane	13.33	97	2223	0.098	ng		100
58) Toluene	13.63	91	11055	0.117	ng		98
59) 2-Hexanone	13.90	43	4092	0.077	ng		87
60) Dibromochloromethane	14.04	129	2249	0.106	ng		97
61) 1,2-Dibromoethane	14.30	107	2137	0.098	ng		96
62) n-Butyl Acetate	14.54	43	4229	0.070	ng		97
63) n-Octane	14.65	57	2195	0.098	ng		95
64) Tetrachloroethene	14.79	166	2394	0.110	ng		98
65) Chlorobenzene	15.48	112	6592	0.113	ng		99
66) Ethylbenzene	15.89	91	12669	0.126	ng		91
67) m- & p-Xylenes	16.08	91	18719	0.237	ng		94
68) Bromoform	16.14	173	1719	0.105	ng		92
69) Styrene	16.45	104	5788	0.096	ng		97
70) o-Xylene	16.58	91	9128	0.114	ng		98
71) n-Nonane	16.81	43	4692	0.086	ng		90
72) 1,1,2,2-Tetrachloroethane	16.55	83	3468	0.086	ng		91
74) Cumene	17.19	105	10613	0.109	ng		97
75) alpha-Pinene	17.59	93	5072	0.101	ng		90
76) n-Propylbenzene	17.72	91	12700	0.106	ng		96
77) 3-Ethyltoluene	17.82	105	10224	0.105	ng		96
78) 4-Ethyltoluene	17.87	105	9721	0.106	ng		100
79) 1,3,5-Trimethylbenzene	17.94	105	8722	0.109	ng		96
80) alpha-Methylstyrene	18.10	118	3636	0.089	ng		94
81) 2-Ethyltoluene	18.15	105	10163	0.107	ng		99
82) 1,2,4-Trimethylbenzene	18.37	105	8411	0.106	ng		98
83) n-Decane	18.49	57	4823	0.089	ng		91
84) Benzyl Chloride	18.51	91	3817	0.053	ng		90
85) 1,3-Dichlorobenzene	18.53	146	4453	0.100	ng		94
86) 1,4-Dichlorobenzene	18.60	146	4516	0.101	ng		97
87) sec-Butylbenzene	18.66	105	11563	0.107	ng		99
88) 4-Isopropyltoluene (p-...	18.83	119	10961	0.111	ng		99
89) 1,2,3-Trimethylbenzene	18.82	105	8050	0.101	ng		99
90) 1,2-Dichlorobenzene	18.96	146	4239	0.099	ng		98
91) d-Limonene	18.98	68	2892	0.079	ng		99
92) 1,2-Dibromo-3-Chloropr...	19.42	157	1071	0.082	ng		94
93) n-Undecane	19.82	57	3995	0.074	ng		95
94) 1,2,4-Trichlorobenzene	20.78	180	2196	0.077	ng		90
95) Naphthalene	20.89	128	5542	0.056	ng		100
96) n-Dodecane	20.92	57	1954	0.038	ng		90
97) Hexachlorobutadiene	21.26	225	1808	0.108	ng		92
98) Cyclohexanone	16.24	55	2895	0.081	ng		95
99) tert-Butylbenzene	18.37	119	8892	0.118	ng		96
100) n-Butylbenzene	19.27	91	8376	0.093	ng		98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011716.D
Acq On : 1 May 2017 18:17 Operator: SC
Sample : 0.08ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: May 02 08:51:21 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File: I:\MS09\Data\2017 05\01\05011717.D
Acq On : 1 May 2017 18:50 Operator: SC
Sample : 0.10ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

5/2/17

Quant Time: May 02 08:50:08 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	201219	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.08	114	1006524	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	15.44	82	423750	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.88	65	297347	11.167	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 89.36%				
57) Toluene-d8 (SS2)	13.53	98	1089371	13.215	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.68%				
73) Bromofluorobenzene (SS3)	17.04	174	310122	14.101	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 112.80%				
Target Compounds							Qvalue
2) Propene	3.87	42	8052	0.204	ng		100
3) Dichlorodifluoromethan...	3.98	85	5069	0.103	ng	#	92
4) Chloromethane	4.17	50	3838	0.068	ng		95
5) 1,2-Dichloro-1,1,2,2-t...	4.34	135	2762	0.123	ng		92
6) Vinyl Chloride	4.46	62	4019	0.077	ng		98
7) 1,3-Butadiene	4.63	54	2006	0.054	ng		87
8) Bromomethane	4.94	94	2332	0.098	ng		99
9) Chloroethane	5.15	64	2045	0.089	ng		91
10) Ethanol	5.33	45	9775	0.391	ng		77
11) Acetonitrile	5.55	41	4441	0.070	ng		78
12) Acrolein	5.69	56	1650	0.090	ng		93
13) Acetone	5.84	58	14811	0.613	ng		96
14) Trichlorofluoromethane	6.01	101	4439	0.119	ng		97
15) 2-Propanol (Isopropanol)	6.15	45	13192	0.165	ng		83
16) Acrylonitrile	6.35	53	2762	0.067	ng		87
17) 1,1-Dichloroethene	6.71	96	2743	0.114	ng		98
18) 2-Methyl-2-Propanol (t...	6.84	59	13431	0.192	ng	#	68
19) Methylene Chloride	6.83	84	3391	0.115	ng		97
20) 3-Chloro-1-propene (Al...	6.97	41	3910	0.086	ng		88
21) Trichlorotrifluoroethane	7.16	151	2306	0.127	ng		98
22) Carbon Disulfide	7.14	76	11791	0.107	ng		94
23) trans-1,2-Dichloroethene	7.86	61	3564	0.091	ng		97
24) 1,1-Dichloroethane	8.07	63	4594	0.091	ng		97
25) Methyl tert-Butyl Ether	8.19	73	8121	0.107	ng		98
26) Vinyl Acetate	8.26	86	1515	0.272	ng	#	61
27) 2-Butanone (MEK)	8.52	72	1701	0.096	ng	#	58
28) cis-1,2-Dichloroethene	8.95	61	3644	0.097	ng		98
29) Diisopropyl Ether	9.21	87	2534	0.116	ng	#	90
30) Ethyl Acetate	9.21	61	1681	0.168	ng		84
31) n-Hexane	9.20	57	4859	0.099	ng		97
32) Chloroform	9.25	83	4664	0.113	ng		97
34) Tetrahydrofuran (THF)	9.69	72	1928	0.105	ng		91
35) Ethyl tert-Butyl Ether	9.77	87	2953	0.106	ng		92
36) 1,2-Dichloroethane	10.00	62	3171	0.101	ng		95
38) 1,1,1-Trichloroethane	10.28	97	3878	0.120	ng		96
39) Isopropyl Acetate	10.66	61	3308	0.194	ng		94
40) 1-Butanol	10.68	56	6053	0.217	ng		99
41) Benzene	10.73	78	12828	0.116	ng		98
42) Carbon Tetrachloride	10.88	117	3227	0.119	ng		99
43) Cyclohexane	11.01	84	8817	0.224	ng		95
44) tert-Amyl Methyl Ether	11.35	73	7536	0.105	ng		90
45) 1,2-Dichloropropane	11.54	63	2815	0.100	ng		92
46) Bromodichloromethane	11.73	83	3554	0.115	ng		94
47) Trichloroethene	11.78	130	3062	0.125	ng		99
48) 1,4-Dioxane	11.78	88	2098	0.104	ng		93
49) 2,2,4-Trimethylpentane...	11.85	57	12269	0.103	ng		99

Data File: I:\MS09\Data\2017 05\01\05011717.D
Acq On : 1 May 2017 18:50 Operator: SC
Sample : 0.10ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

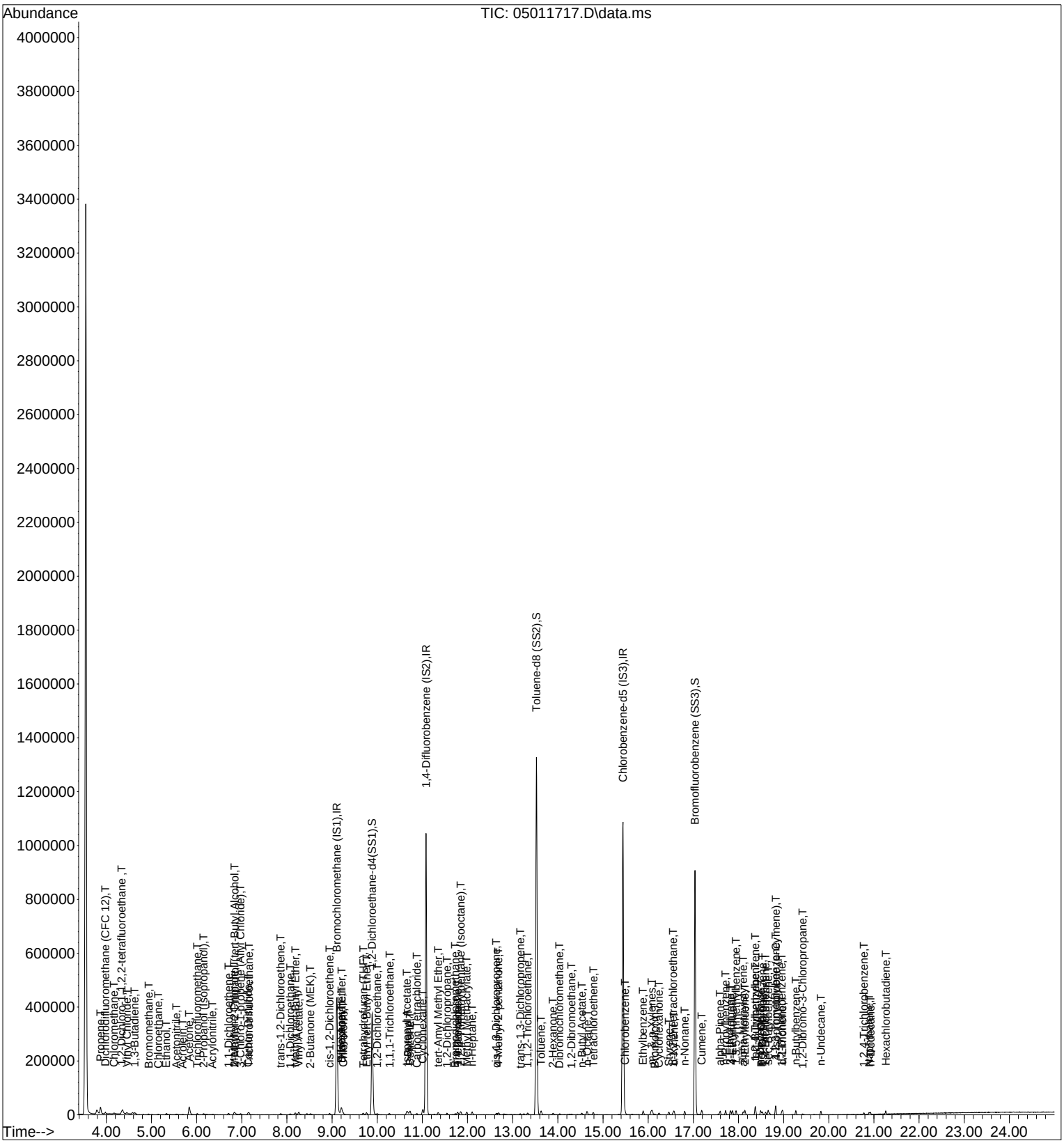
Quant Time: May 02 08:50:08 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
50) Methyl Methacrylate	11.98	100	1866	0.206	ng	#	85
51) n-Heptane	12.10	71	2788	0.104	ng		93
52) cis-1,3-Dichloropropene	12.63	75	4010	0.100	ng		98
53) 4-Methyl-2-pentanone	12.68	58	2241	0.089	ng		87
54) trans-1,3-Dichloropropene	13.17	75	3058	0.096	ng		95
55) 1,1,2-Trichloroethane	13.33	97	2644	0.118	ng		99
58) Toluene	13.63	91	12606	0.134	ng		98
59) 2-Hexanone	13.89	43	4730	0.089	ng		89
60) Dibromochloromethane	14.04	129	2534	0.119	ng		100
61) 1,2-Dibromoethane	14.30	107	2492	0.115	ng		99
62) n-Butyl Acetate	14.53	43	5123	0.085	ng		97
63) n-Octane	14.65	57	2460	0.110	ng		94
64) Tetrachloroethene	14.79	166	2883	0.132	ng		94
65) Chlorobenzene	15.49	112	7746	0.132	ng		99
66) Ethylbenzene	15.89	91	13989	0.140	ng		94
67) m- & p-Xylenes	16.08	91	21064	0.266	ng		96
68) Bromoform	16.14	173	2039	0.125	ng		88
69) Styrene	16.46	104	6686	0.111	ng		98
70) o-Xylene	16.57	91	10230	0.127	ng		98
71) n-Nonane	16.81	43	5004	0.092	ng		98
72) 1,1,2,2-Tetrachloroethane	16.55	83	3936	0.097	ng		100
74) Cumene	17.19	105	12610	0.129	ng		99
75) alpha-Pinene	17.59	93	5768	0.114	ng		72
76) n-Propylbenzene	17.71	91	14609	0.122	ng		99
77) 3-Ethyltoluene	17.82	105	12276	0.127	ng		98
78) 4-Ethyltoluene	17.87	105	11446	0.125	ng		99
79) 1,3,5-Trimethylbenzene	17.94	105	10220	0.127	ng		100
80) alpha-Methylstyrene	18.10	118	4121	0.101	ng		94
81) 2-Ethyltoluene	18.14	105	12125	0.128	ng		98
82) 1,2,4-Trimethylbenzene	18.37	105	9963	0.126	ng		99
83) n-Decane	18.49	57	5633	0.104	ng		94
84) Benzyl Chloride	18.51	91	4185	0.059	ng		92
85) 1,3-Dichlorobenzene	18.53	146	5102	0.114	ng		95
86) 1,4-Dichlorobenzene	18.60	146	5082	0.113	ng		95
87) sec-Butylbenzene	18.66	105	13557	0.125	ng		97
88) 4-Isopropyltoluene (p-...	18.83	119	13323	0.135	ng		99
89) 1,2,3-Trimethylbenzene	18.82	105	9883	0.124	ng		97
90) 1,2-Dichlorobenzene	18.95	146	5079	0.118	ng		100
91) d-Limonene	18.98	68	3365	0.091	ng		96
92) 1,2-Dibromo-3-Chloropr...	19.42	157	1160	0.089	ng		80
93) n-Undecane	19.83	57	4670	0.087	ng		97
94) 1,2,4-Trichlorobenzene	20.78	180	2538	0.089	ng		97
95) Naphthalene	20.89	128	6710	0.068	ng		98
96) n-Dodecane	20.92	57	2165	0.042	ng		97
97) Hexachlorobutadiene	21.27	225	2278	0.136	ng		98
98) Cyclohexanone	16.24	55	3621	0.102	ng		93
99) tert-Butylbenzene	18.37	119	9880	0.131	ng		99
100) n-Butylbenzene	19.27	91	9751	0.109	ng		99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011717.D
Acq On : 1 May 2017 18:50 Operator: SC
Sample : 0.10ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: May 02 08:50:08 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File: I:\MS09\Data\2017 05\01\05011718.D
Acq On : 1 May 2017 19:24 Operator: SC
Sample : 0.20ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

5/2/17

Quant Time: May 02 08:48:45 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	204200	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.08	114	1017478	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	15.44	82	427849	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	297869	11.023	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 88.16%				
57) Toluene-d8 (SS2)	13.53	98	1102122	13.242	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.92%				
73) Bromofluorobenzene (SS3)	17.04	174	311853	14.044	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 112.32%				
Target Compounds							Qvalue
2) Propene	3.85	42	14840	0.371	ng		98
3) Dichlorodifluoromethan...	3.97	85	8932	0.178	ng		99
4) Chloromethane	4.16	50	6755	0.118	ng		94
5) 1,2-Dichloro-1,1,2,2-t...	4.34	135	4739	0.208	ng		97
6) Vinyl Chloride	4.45	62	7144	0.136	ng		98
7) 1,3-Butadiene	4.62	54	3736	0.100	ng		100
8) Bromomethane	4.93	94	4293	0.178	ng		99
9) Chloroethane	5.15	64	3338	0.144	ng		98
10) Ethanol	5.32	45	17337	0.683	ng		96
11) Acetonitrile	5.55	41	8394	0.130	ng		83
12) Acrolein	5.69	56	3124	0.168	ng		98
13) Acetone	5.83	58	25254	1.029	ng		99
14) Trichlorofluoromethane	6.01	101	7446	0.196	ng		99
15) 2-Propanol (Isopropanol)	6.13	45	22498	0.277	ng		95
16) Acrylonitrile	6.35	53	5253	0.125	ng		98
17) 1,1-Dichloroethene	6.70	96	4399	0.180	ng		94
18) 2-Methyl-2-Propanol (t...	6.81	59	24427	0.344	ng		97
19) Methylene Chloride	6.84	84	5399	0.180	ng		94
20) 3-Chloro-1-propene (Al...	6.97	41	6295	0.136	ng		91
21) Trichlorotrifluoroethane	7.16	151	3981	0.216	ng		99
22) Carbon Disulfide	7.14	76	19382	0.174	ng		97
23) trans-1,2-Dichloroethene	7.86	61	6497	0.163	ng		100
24) 1,1-Dichloroethane	8.07	63	8045	0.157	ng		98
25) Methyl tert-Butyl Ether	8.18	73	14488	0.188	ng		98
26) Vinyl Acetate	8.25	86	3242	0.573	ng	#	94
27) 2-Butanone (MEK)	8.52	72	2942	0.164	ng	#	56
28) cis-1,2-Dichloroethene	8.94	61	6247	0.164	ng		100
29) Diisopropyl Ether	9.20	87	4548	0.206	ng	#	89
30) Ethyl Acetate	9.20	61	3327	0.328	ng		95
31) n-Hexane	9.20	57	8863	0.178	ng		99
32) Chloroform	9.25	83	8108	0.194	ng		99
34) Tetrahydrofuran (THF)	9.68	72	3088	0.166	ng	#	81
35) Ethyl tert-Butyl Ether	9.76	87	5791	0.206	ng		99
36) 1,2-Dichloroethane	10.00	62	5549	0.174	ng		98
38) 1,1,1-Trichloroethane	10.27	97	7287	0.223	ng		96
39) Isopropyl Acetate	10.65	61	6053	0.352	ng		99
40) 1-Butanol	10.67	56	10247	0.363	ng		98
41) Benzene	10.73	78	23045	0.206	ng		99
42) Carbon Tetrachloride	10.88	117	5876	0.214	ng		100
43) Cyclohexane	11.01	84	15633	0.394	ng		97
44) tert-Amyl Methyl Ether	11.34	73	13628	0.187	ng		92
45) 1,2-Dichloropropane	11.55	63	4979	0.175	ng		97
46) Bromodichloromethane	11.72	83	6568	0.210	ng		93
47) Trichloroethene	11.78	130	5389	0.217	ng		98
48) 1,4-Dioxane	11.78	88	3783	0.186	ng		94
49) 2,2,4-Trimethylpentane...	11.85	57	21067	0.174	ng		97

Data File: I:\MS09\Data\2017 05\01\05011718.D
Acq On : 1 May 2017 19:24 Operator: SC
Sample : 0.20ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

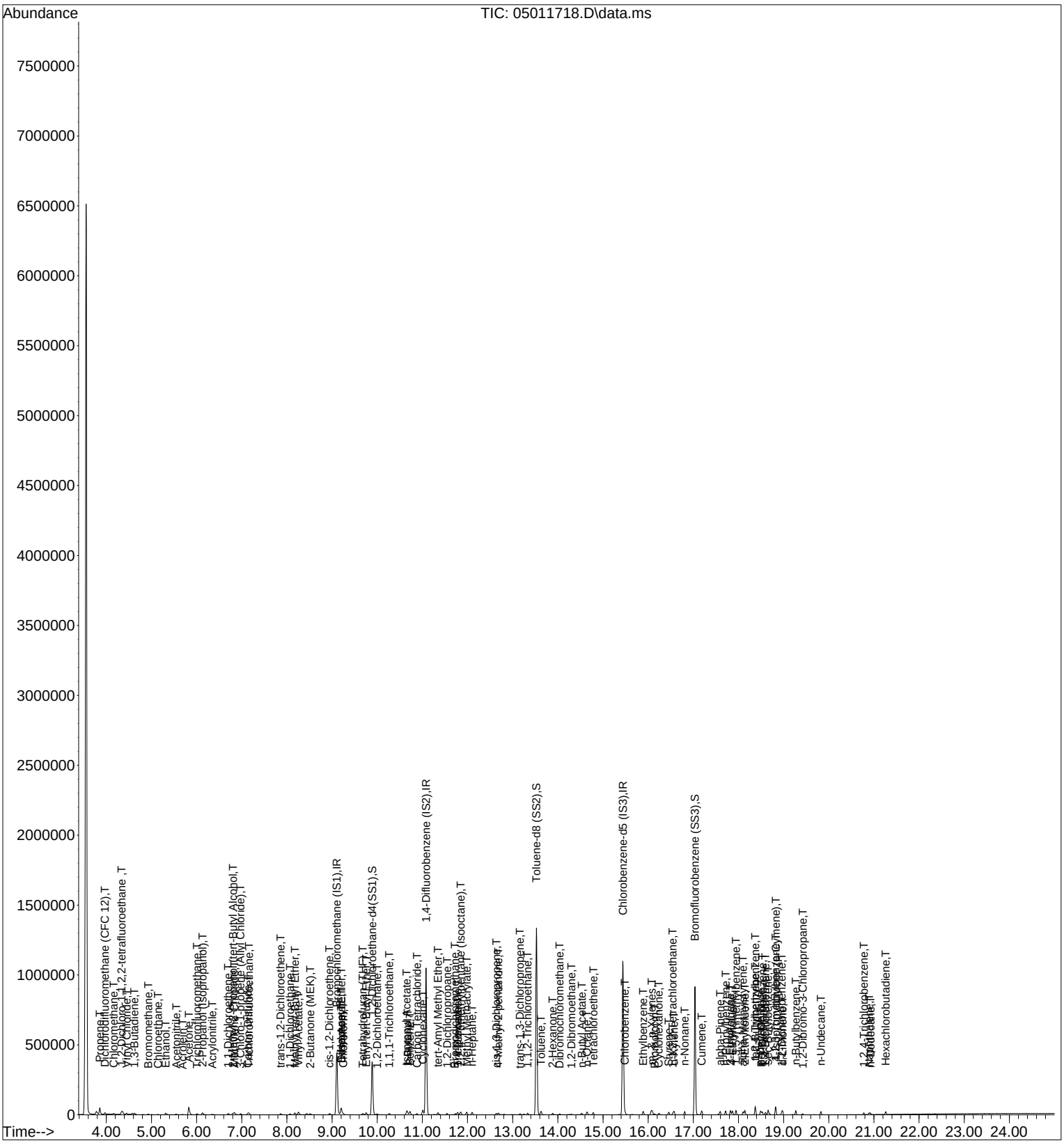
Quant Time: May 02 08:48:45 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
50) Methyl Methacrylate	11.98	100	3476	0.379	ng	#	85
51) n-Heptane	12.10	71	5271	0.194	ng		96
52) cis-1,3-Dichloropropene	12.64	75	7702	0.191	ng		99
53) 4-Methyl-2-pentanone	12.68	58	4202	0.165	ng		93
54) trans-1,3-Dichloropropene	13.16	75	5820	0.180	ng		98
55) 1,1,2-Trichloroethane	13.33	97	4502	0.198	ng		95
58) Toluene	13.63	91	23058	0.243	ng		95
59) 2-Hexanone	13.89	43	8742	0.163	ng		93
60) Dibromochloromethane	14.04	129	4777	0.223	ng		95
61) 1,2-Dibromoethane	14.30	107	4451	0.203	ng		99
62) n-Butyl Acetate	14.53	43	9557	0.156	ng		99
63) n-Octane	14.64	57	4135	0.183	ng		97
64) Tetrachloroethene	14.79	166	5525	0.251	ng		96
65) Chlorobenzene	15.48	112	12709	0.215	ng		96
66) Ethylbenzene	15.89	91	23127	0.228	ng		95
67) m- & p-Xylenes	16.08	91	35634	0.446	ng		97
68) Bromoform	16.14	173	3672	0.222	ng		96
69) Styrene	16.45	104	11869	0.196	ng		100
70) o-Xylene	16.57	91	18027	0.222	ng		96
71) n-Nonane	16.81	43	9052	0.165	ng		96
72) 1,1,2,2-Tetrachloroethane	16.54	83	7103	0.174	ng		100
74) Cumene	17.19	105	21896	0.222	ng		99
75) alpha-Pinene	17.59	93	10500	0.206	ng		87
76) n-Propylbenzene	17.72	91	25777	0.213	ng		99
77) 3-Ethyltoluene	17.82	105	21466	0.219	ng		99
78) 4-Ethyltoluene	17.87	105	19750	0.214	ng		99
79) 1,3,5-Trimethylbenzene	17.94	105	18323	0.226	ng		95
80) alpha-Methylstyrene	18.10	118	8111	0.196	ng		97
81) 2-Ethyltoluene	18.14	105	21437	0.224	ng		99
82) 1,2,4-Trimethylbenzene	18.37	105	17442	0.218	ng		100
83) n-Decane	18.49	57	9868	0.181	ng		93
84) Benzyl Chloride	18.51	91	7630	0.106	ng		99
85) 1,3-Dichlorobenzene	18.53	146	9031	0.200	ng		99
86) 1,4-Dichlorobenzene	18.60	146	8862	0.195	ng		97
87) sec-Butylbenzene	18.66	105	24779	0.227	ng		98
88) 4-Isopropyltoluene (p-...	18.83	119	23056	0.232	ng		97
89) 1,2,3-Trimethylbenzene	18.82	105	17116	0.212	ng		99
90) 1,2-Dichlorobenzene	18.95	146	9019	0.208	ng		98
91) d-Limonene	18.98	68	6218	0.167	ng		99
92) 1,2-Dibromo-3-Chloropr...	19.42	157	2365	0.179	ng		84
93) n-Undecane	19.83	57	8391	0.154	ng		99
94) 1,2,4-Trichlorobenzene	20.78	180	4601	0.160	ng		99
95) Naphthalene	20.89	128	11973	0.120	ng		99
96) n-Dodecane	20.92	57	3649	0.070	ng		97
97) Hexachlorobutadiene	21.26	225	4171	0.247	ng		95
98) Cyclohexanone	16.23	55	6138	0.171	ng		98
99) tert-Butylbenzene	18.37	119	17948	0.235	ng		98
100) n-Butylbenzene	19.27	91	18353	0.203	ng		97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011718.D
Acq On : 1 May 2017 19:24 Operator: SC
Sample : 0.20ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111709 (5/10)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: May 02 08:48:45 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 05\01\05011730.D
Acq On : 2 May 2017 10:04 Operator: SC
Sample : 0.40ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111708 (5/10)
ALS Vial : 6 Sample Multiplier: 1

5/2/17

Quant Time: May 02 10:31:58 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 09:26:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	206392	12.500	ng		-0.04
37) 1,4-Difluorobenzene (IS2)	11.09	114	1034246	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	15.44	82	442257	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	311767	12.937	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.52%				
57) Toluene-d8 (SS2)	13.53	98	1120900	12.433	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.44%				
73) Bromofluorobenzene (SS3)	17.04	174	310122	11.987	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.92%				
Target Compounds							Qvalue
2) Propene	3.87	42	14857	0.438	ng		97
3) Dichlorodifluoromethan...	3.98	85	18272	0.434	ng		99
4) Chloromethane	4.17	50	14462	0.451	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.34	135	9320	0.400	ng		98
6) Vinyl Chloride	4.45	62	15615	0.444	ng		99
7) 1,3-Butadiene	4.63	54	8758	0.429	ng		97
8) Bromomethane	4.93	94	8766	0.430	ng		99
9) Chloroethane	5.15	64	7155	0.418	ng		98
10) Ethanol	5.32	45	37986	2.350	ng		97
11) Acetonitrile	5.54	41	18932	0.467	ng		82
12) Acrolein	5.68	56	7423	0.519	ng		96
13) Acetone	5.83	58	44132	2.521	ng		96
14) Trichlorofluoromethane	6.02	101	15087	0.423	ng		98
15) 2-Propanol (Isopropanol)	6.13	45	49849	0.940	ng		97
16) Acrylonitrile	6.35	53	12261	0.455	ng		96
17) 1,1-Dichloroethene	6.71	96	9647	0.440	ng		94
18) 2-Methyl-2-Propanol (t...	6.80	59	48869	0.875	ng		96
19) Methylene Chloride	6.84	84	11215	0.443	ng		93
20) 3-Chloro-1-propene (Al...	6.98	41	12601	0.403	ng		98
21) Trichlorotrifluoroethane	7.16	151	7798	0.405	ng		95
22) Carbon Disulfide	7.14	76	39718	0.440	ng		99
23) trans-1,2-Dichloroethene	7.86	61	14048	0.441	ng		99
24) 1,1-Dichloroethane	8.07	63	16612	0.408	ng		98
25) Methyl tert-Butyl Ether	8.17	73	28608	0.404	ng		100
26) Vinyl Acetate	8.26	86	7737	1.752	ng	#	60
27) 2-Butanone (MEK)	8.51	72	6369	0.402	ng	#	80
28) cis-1,2-Dichloroethene	8.95	61	14683	0.470	ng		98
29) Diisopropyl Ether	9.20	87	8391	0.415	ng	#	83
30) Ethyl Acetate	9.20	61	7522	0.920	ng		99
31) n-Hexane	9.20	57	17283	0.430	ng		100
32) Chloroform	9.25	83	16804	0.432	ng		96
34) Tetrahydrofuran (THF)	9.67	72	7165	0.449	ng		96
35) Ethyl tert-Butyl Ether	9.76	87	11045	0.409	ng		91
36) 1,2-Dichloroethane	10.00	62	12667	0.453	ng		94
38) 1,1,1-Trichloroethane	10.27	97	13749	0.401	ng		98
39) Isopropyl Acetate	10.65	61	12351	0.831	ng	#	89
40) 1-Butanol	10.67	56	21695	0.863	ng		98
41) Benzene	10.73	78	43386	0.416	ng		100
42) Carbon Tetrachloride	10.88	117	11150	0.390	ng		96
43) Cyclohexane	11.01	84	30887	0.831	ng		95
44) tert-Amyl Methyl Ether	11.34	73	26888	0.401	ng		95
45) 1,2-Dichloropropane	11.55	63	9880	0.421	ng		98
46) Bromodichloromethane	11.73	83	12494	0.401	ng		99
47) Trichloroethene	11.78	130	10874	0.424	ng		99
48) 1,4-Dioxane	11.78	88	8039	0.418	ng		100
49) 2,2,4-Trimethylpentane...	11.85	57	42019	0.413	ng		98

Data File: I:\MS09\Data\2017 05\01\05011730.D
Acq On : 2 May 2017 10:04 Operator: SC
Sample : 0.40ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111708 (5/10)
ALS Vial : 6 Sample Multiplier: 1

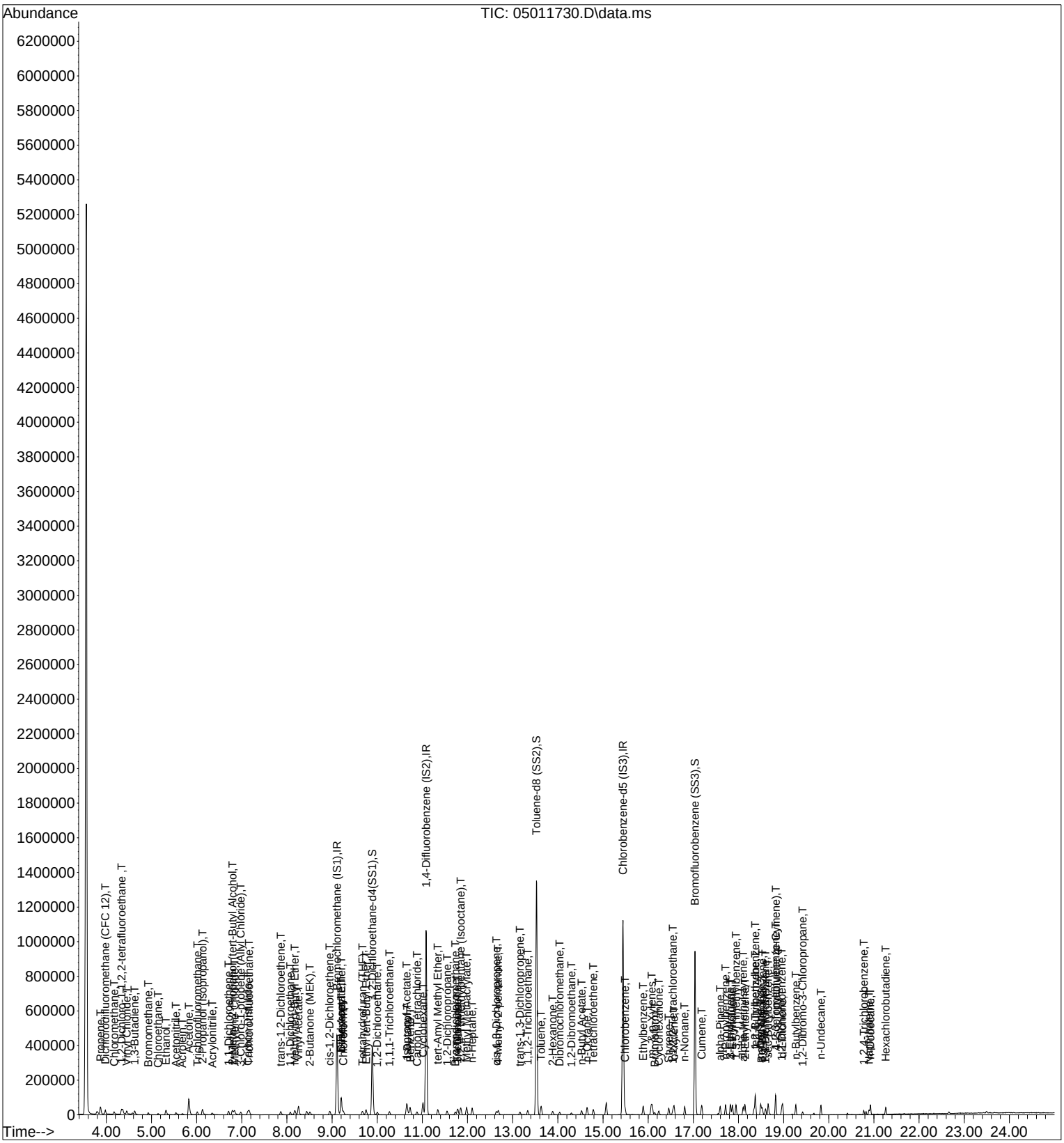
Quant Time: May 02 10:31:58 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 09:26:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
50) Methyl Methacrylate	11.98	100	7404	0.801	ng	#	85
51) n-Heptane	12.10	71	10261	0.414	ng		98
52) cis-1,3-Dichloropropene	12.64	75	15590	0.422	ng		99
53) 4-Methyl-2-pentanone	12.68	58	8443	0.397	ng		89
54) trans-1,3-Dichloropropene	13.16	75	11879	0.380	ng		97
55) 1,1,2-Trichloroethane	13.33	97	9698	0.424	ng		100
58) Toluene	13.63	91	43072	0.411	ng		98
59) 2-Hexanone	13.89	43	17488	0.382	ng		94
60) Dibromochloromethane	14.04	129	9986	0.407	ng		98
61) 1,2-Dibromoethane	14.30	107	9542	0.393	ng		96
62) n-Butyl Acetate	14.53	43	20629	0.398	ng		100
63) n-Octane	14.64	57	8780	0.408	ng		97
64) Tetrachloroethene	14.78	166	10900	0.427	ng		99
65) Chlorobenzene	15.49	112	26466	0.411	ng		98
66) Ethylbenzene	15.89	91	46088	0.402	ng		98
67) m- & p-Xylenes	16.08	91	71609	0.814	ng		97
68) Bromoform	16.14	173	7164	0.364	ng		97
69) Styrene	16.45	104	23791	0.373	ng		100
70) o-Xylene	16.57	91	36295	0.409	ng		96
71) n-Nonane	16.80	43	18721	0.419	ng		94
72) 1,1,2,2-Tetrachloroethane	16.55	83	15323	0.403	ng		98
74) Cumene	17.19	105	43705	0.398	ng		99
75) alpha-Pinene	17.59	93	21934	0.399	ng		94
76) n-Propylbenzene	17.71	91	51950	0.404	ng		98
77) 3-Ethyltoluene	17.82	105	42804	0.395	ng		100
78) 4-Ethyltoluene	17.86	105	38072	0.379	ng		98
79) 1,3,5-Trimethylbenzene	17.94	105	35109	0.386	ng		97
80) alpha-Methylstyrene	18.10	118	15559	0.352	ng		97
81) 2-Ethyltoluene	18.15	105	42097	0.398	ng		99
82) 1,2,4-Trimethylbenzene	18.37	105	34341	0.389	ng		100
83) n-Decane	18.49	57	20453	0.416	ng		95
84) Benzyl Chloride	18.51	91	19624	0.319	ng		97
85) 1,3-Dichlorobenzene	18.53	146	17278	0.360	ng		99
86) 1,4-Dichlorobenzene	18.60	146	16839	0.350	ng		97
87) sec-Butylbenzene	18.66	105	47454	0.395	ng		99
88) 4-Isopropyltoluene (p-...	18.83	119	42444	0.377	ng		99
89) 1,2,3-Trimethylbenzene	18.82	105	33729	0.381	ng		99
90) 1,2-Dichlorobenzene	18.96	146	16933	0.364	ng		96
91) d-Limonene	18.98	68	13087	0.375	ng		95
92) 1,2-Dibromo-3-Chloropr...	19.42	157	5207	0.364	ng		89
93) n-Undecane	19.83	57	20043	0.443	ng		96
94) 1,2,4-Trichlorobenzene	20.78	180	8164	0.282	ng		96
95) Naphthalene	20.89	128	22762	0.248	ng		99
96) n-Dodecane	20.92	57	18303	0.495	ng		96
97) Hexachlorobutadiene	21.26	225	7652	0.368	ng		98
98) Cyclohexanone	16.24	55	12283	0.388	ng		97
99) tert-Butylbenzene	18.37	119	34930	0.402	ng		99
100) n-Butylbenzene	19.27	91	35131	0.376	ng		98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011730.D
Acq On : 2 May 2017 10:04 Operator: SC
Sample : 0.40ng TO-15 ICAL STD
Misc : S31-04191701/S31-04111708 (5/10)
ALS Vial : 6 Sample Multiplier: 1

Quant Time: May 02 10:31:58 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 09:26:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File: I:\MS09\Data\2017 05\01\05011728.D
Acq On : 2 May 2017 8:57 Operator: SC
Sample : 1.0ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261705 (5/25)
ALS Vial : 3 Sample Multiplier: 1

5/2/17

Quant Time: May 02 09:23:08 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	212234	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.08	114	1057978	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	15.44	82	442311	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	319886	11.390	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 91.12%				
57) Toluene-d8 (SS2)	13.52	98	1129184	13.123	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.96%				
73) Bromofluorobenzene (SS3)	17.04	174	308113	13.422	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 107.36%				
Target Compounds							Qvalue
2) Propene	3.85	42	33389	0.803	ng		99
3) Dichlorodifluoromethan...	3.96	85	45202	0.867	ng		100
4) Chloromethane	4.16	50	34054	0.571	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.32	135	23442	0.989	ng		99
6) Vinyl Chloride	4.43	62	38538	0.704	ng		99
7) 1,3-Butadiene	4.61	54	25372	0.652	ng		98
8) Bromomethane	4.91	94	21907	0.872	ng		100
9) Chloroethane	5.13	64	18438	0.764	ng		100
10) Ethanol	5.32	45	96305	3.651	ng		98
11) Acetonitrile	5.53	41	47568	0.709	ng		96
12) Acrolein	5.67	56	16430	0.852	ng		100
13) Acetone	5.81	58	101075	3.963	ng		95
14) Trichlorofluoromethane	6.00	101	38074	0.966	ng		100
15) 2-Propanol (Isopropanol)	6.12	45	127446	1.508	ng		97
16) Acrylonitrile	6.34	53	33539	0.769	ng		99
17) 1,1-Dichloroethene	6.69	96	23489	0.925	ng		91
18) 2-Methyl-2-Propanol (t...	6.77	59	130902	1.772	ng		99
19) Methylene Chloride	6.83	84	25688	0.825	ng		92
20) 3-Chloro-1-propene (Al...	6.97	41	34582	0.721	ng		94
21) Trichlorotrifluoroethane	7.16	151	20473	1.071	ng		100
22) Carbon Disulfide	7.13	76	96344	0.833	ng		100
23) trans-1,2-Dichloroethene	7.85	61	35297	0.853	ng		96
24) 1,1-Dichloroethane	8.06	63	42471	0.799	ng		99
25) Methyl tert-Butyl Ether	8.16	73	75435	0.943	ng		99
26) Vinyl Acetate	8.24	86	22233	3.778	ng	#	81
27) 2-Butanone (MEK)	8.49	72	16914	0.910	ng	#	87
28) cis-1,2-Dichloroethene	8.95	61	33745	0.854	ng		98
29) Diisopropyl Ether	9.19	87	20700	0.902	ng	#	78
30) Ethyl Acetate	9.19	61	18915	1.795	ng		99
31) n-Hexane	9.19	57	43311	0.837	ng		99
32) Chloroform	9.24	83	40887	0.941	ng		100
34) Tetrahydrofuran (THF)	9.65	72	17419	0.903	ng		94
35) Ethyl tert-Butyl Ether	9.75	87	29031	0.992	ng		94
36) 1,2-Dichloroethane	10.00	62	30372	0.918	ng		100
38) 1,1,1-Trichloroethane	10.26	97	35447	1.042	ng		99
39) Isopropyl Acetate	10.64	61	31930	1.785	ng	#	85
40) 1-Butanol	10.65	56	54508	1.860	ng		99
41) Benzene	10.72	78	104887	0.903	ng		100
42) Carbon Tetrachloride	10.88	117	29462	1.030	ng		100
43) Cyclohexane	11.01	84	78650	1.904	ng		95
44) tert-Amyl Methyl Ether	11.33	73	69734	0.922	ng		98
45) 1,2-Dichloropropane	11.54	63	24787	0.836	ng		99
46) Bromodichloromethane	11.73	83	31239	0.960	ng		99
47) Trichloroethene	11.78	130	26746	1.037	ng		98
48) 1,4-Dioxane	11.77	88	20203	0.956	ng		94
49) 2,2,4-Trimethylpentane...	11.84	57	108597	0.864	ng		99

Data File: I:\MS09\Data\2017 05\01\05011728.D
Acq On : 2 May 2017 8:57 Operator: SC
Sample : 1.0ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261705 (5/25)
ALS Vial : 3 Sample Multiplier: 1

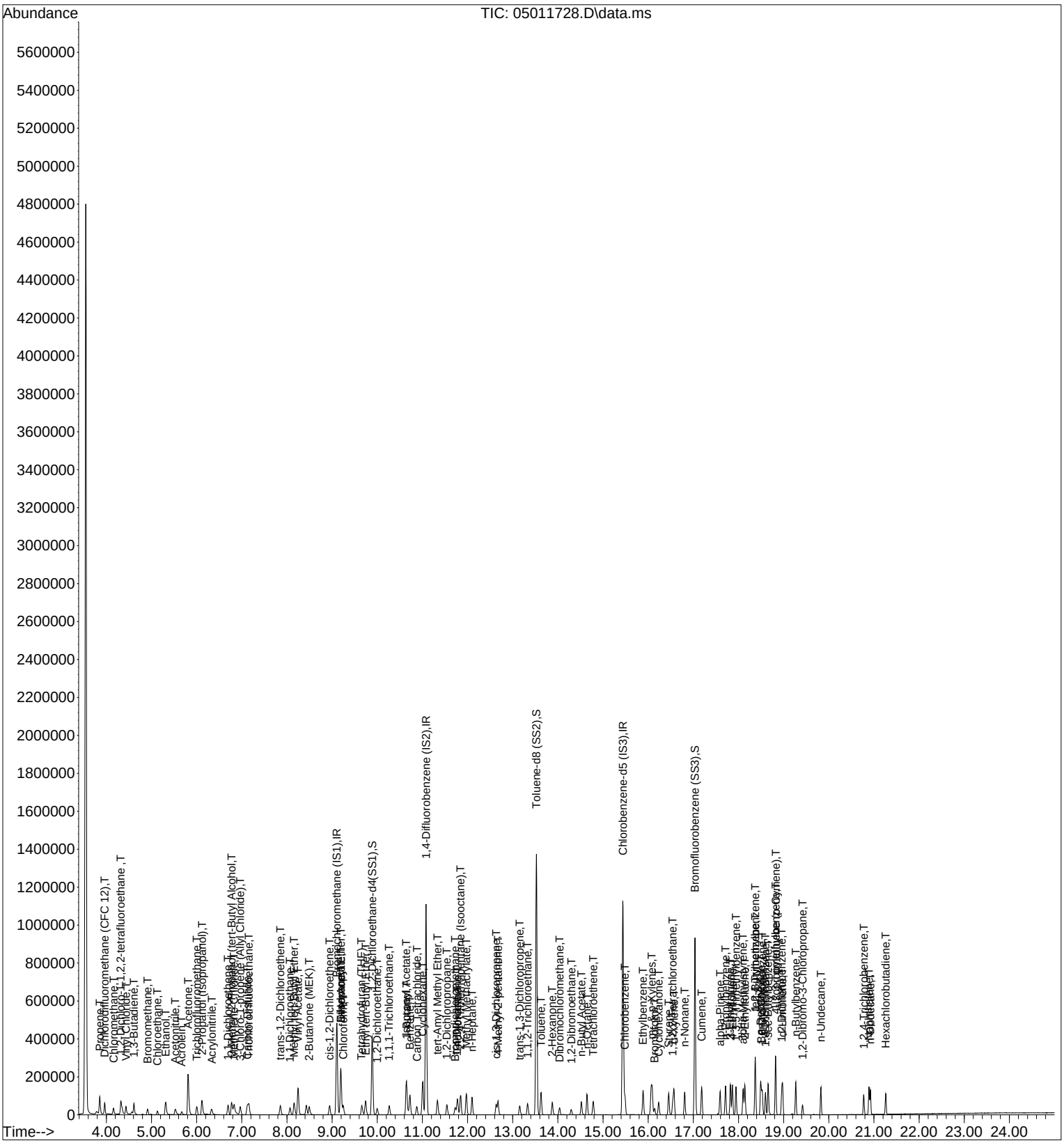
Quant Time: May 02 09:23:08 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.97	100	19775	2.073	ng	93
51) n-Heptane	12.10	71	25982	0.922	ng	97
52) cis-1,3-Dichloropropene	12.63	75	42225	1.005	ng	100
53) 4-Methyl-2-pentanone	12.67	58	22990	0.866	ng	90
54) trans-1,3-Dichloropropene	13.15	75	35445	1.056	ng	100
55) 1,1,2-Trichloroethane	13.33	97	23602	0.998	ng	99
58) Toluene	13.63	91	105826	1.077	ng	98
59) 2-Hexanone	13.88	43	51058	0.920	ng	98
60) Dibromochloromethane	14.04	129	24745	1.117	ng	99
61) 1,2-Dibromoethane	14.30	107	25287	1.115	ng	100
62) n-Butyl Acetate	14.52	43	57355	0.908	ng	100
63) n-Octane	14.64	57	21974	0.942	ng	100
64) Tetrachloroethene	14.78	166	24825	1.091	ng	99
65) Chlorobenzene	15.48	112	67075	1.097	ng	100
66) Ethylbenzene	15.89	91	114491	1.094	ng	97
67) m- & p-Xylenes	16.08	91	183757	2.227	ng	97
68) Bromoform	16.14	173	19957	1.169	ng	99
69) Styrene	16.45	104	68314	1.089	ng	99
70) o-Xylene	16.57	91	90434	1.080	ng	98
71) n-Nonane	16.81	43	47249	0.832	ng	97
72) 1,1,2,2-Tetrachloroethane	16.54	83	39569	0.938	ng	99
74) Cumene	17.19	105	113241	1.111	ng	98
75) alpha-Pinene	17.59	93	55509	1.054	ng	99
76) n-Propylbenzene	17.71	91	138109	1.104	ng	97
77) 3-Ethyltoluene	17.82	105	109588	1.082	ng	99
78) 4-Ethyltoluene	17.87	105	108757	1.141	ng	100
79) 1,3,5-Trimethylbenzene	17.94	105	93461	1.115	ng	97
80) alpha-Methylstyrene	18.10	118	46839	1.096	ng	97
81) 2-Ethyltoluene	18.14	105	111542	1.125	ng	97
82) 1,2,4-Trimethylbenzene	18.37	105	92754	1.123	ng	99
83) n-Decane	18.49	57	53676	0.950	ng	97
84) Benzyl Chloride	18.51	91	68037	0.912	ng	98
85) 1,3-Dichlorobenzene	18.53	146	51189	1.098	ng	99
86) 1,4-Dichlorobenzene	18.60	146	52598	1.122	ng	100
87) sec-Butylbenzene	18.66	105	126412	1.119	ng	98
88) 4-Isopropyltoluene (p-...	18.83	119	115135	1.122	ng	99
89) 1,2,3-Trimethylbenzene	18.82	105	92516	1.108	ng	100
90) 1,2-Dichlorobenzene	18.96	146	49043	1.094	ng	100
91) d-Limonene	18.98	68	36255	0.944	ng	96
92) 1,2-Dibromo-3-Chloropr...	19.42	157	15288	1.120	ng	88
93) n-Undecane	19.83	57	49514	0.882	ng	99
94) 1,2,4-Trichlorobenzene	20.78	180	34273	1.152	ng	99
95) Naphthalene	20.89	128	118891	1.149	ng	99
96) n-Dodecane	20.92	57	40727	0.758	ng	98
97) Hexachlorobutadiene	21.26	225	21725	1.242	ng	100
98) Cyclohexanone	16.23	55	34935	0.941	ng	97
99) tert-Butylbenzene	18.37	119	89638	1.136	ng	99
100) n-Butylbenzene	19.27	91	103754	1.110	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011728.D
Acq On : 2 May 2017 8:57 Operator: SC
Sample : 1.0ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261705 (5/25)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: May 02 09:23:08 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 05\01\05011721.D
Acq On : 1 May 2017 21:06 Operator: SC
Sample : 5.0ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261705 (5/)25
ALS Vial : 3 Sample Multiplier: 1

5/2/17

Quant Time: May 02 08:39:56 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	208107	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.09	114	1029164	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.44	82	443349	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	306952	11.146	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 89.20%				
57) Toluene-d8 (SS2)	13.53	98	1121743	13.006	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.08%				
73) Bromofluorobenzene (SS3)	17.04	174	325045	14.127	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 113.04%				
Target Compounds							Qvalue
2) Propene	3.84	42	127878	3.136	ng		99
3) Dichlorodifluoromethan...	3.95	85	200596	3.922	ng		99
4) Chloromethane	4.14	50	137541	2.352	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.31	135	102130	4.394	ng		99
6) Vinyl Chloride	4.42	62	165918	3.092	ng		100
7) 1,3-Butadiene	4.60	54	98528	2.583	ng		98
8) Bromomethane	4.90	94	87179	3.540	ng		98
9) Chloroethane	5.12	64	77489	3.275	ng		100
10) Ethanol	5.33	45	373278	14.432	ng		100
11) Acetonitrile	5.53	41	199349	3.028	ng		99
12) Acrolein	5.67	56	70311	3.717	ng		98
13) Acetone	5.81	58	433089	17.318	ng		98
14) Trichlorofluoromethane	6.00	101	166559	4.308	ng		100
15) 2-Propanol (Isopropanol)	6.13	45	534066	6.444	ng		99
16) Acrylonitrile	6.33	53	147497	3.450	ng		99
17) 1,1-Dichloroethene	6.69	96	105198	4.226	ng		97
18) 2-Methyl-2-Propanol (t...	6.77	59	571894	7.895	ng		100
19) Methylene Chloride	6.83	84	112975	3.699	ng		96
20) 3-Chloro-1-propene (Al...	6.97	41	151018	3.212	ng		97
21) Trichlorotrifluoroethane	7.15	151	88821	4.739	ng		98
22) Carbon Disulfide	7.12	76	409930	3.613	ng		99
23) trans-1,2-Dichloroethene	7.86	61	156973	3.867	ng		99
24) 1,1-Dichloroethane	8.07	63	186793	3.585	ng		99
25) Methyl tert-Butyl Ether	8.15	73	341263	4.351	ng		99
26) Vinyl Acetate	8.25	86	111434	19.312	ng	#	82
27) 2-Butanone (MEK)	8.49	72	77295	4.240	ng		94
28) cis-1,2-Dichloroethene	8.95	61	150670	3.886	ng		98
29) Diisopropyl Ether	9.19	87	93673	4.161	ng	#	85
30) Ethyl Acetate	9.19	61	85080	8.232	ng		99
31) n-Hexane	9.20	57	194156	3.826	ng		99
32) Chloroform	9.26	83	185005	4.342	ng		99
34) Tetrahydrofuran (THF)	9.65	72	77318	4.089	ng		97
35) Ethyl tert-Butyl Ether	9.74	87	132444	4.615	ng		96
36) 1,2-Dichloroethane	10.00	62	132977	4.097	ng		100
38) 1,1,1-Trichloroethane	10.27	97	161126	4.868	ng		100
39) Isopropyl Acetate	10.64	61	145356	8.351	ng		94
40) 1-Butanol	10.65	56	239790	8.410	ng		99
41) Benzene	10.73	78	455084	4.029	ng		100
42) Carbon Tetrachloride	10.88	117	135014	4.854	ng		99
43) Cyclohexane	11.01	84	351909	8.759	ng		97
44) tert-Amyl Methyl Ether	11.33	73	320910	4.362	ng		99
45) 1,2-Dichloropropane	11.54	63	111769	3.876	ng		99
46) Bromodichloromethane	11.73	83	144255	4.555	ng		99
47) Trichloroethene	11.78	130	117401	4.681	ng		100
48) 1,4-Dioxane	11.76	88	91958	4.471	ng		98
49) 2,2,4-Trimethylpentane...	11.85	57	474360	3.878	ng		100

Data File: I:\MS09\Data\2017 05\01\05011721.D
Acq On : 1 May 2017 21:06 Operator: SC
Sample : 5.0ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261705 (5/)25
ALS Vial : 3 Sample Multiplier: 1

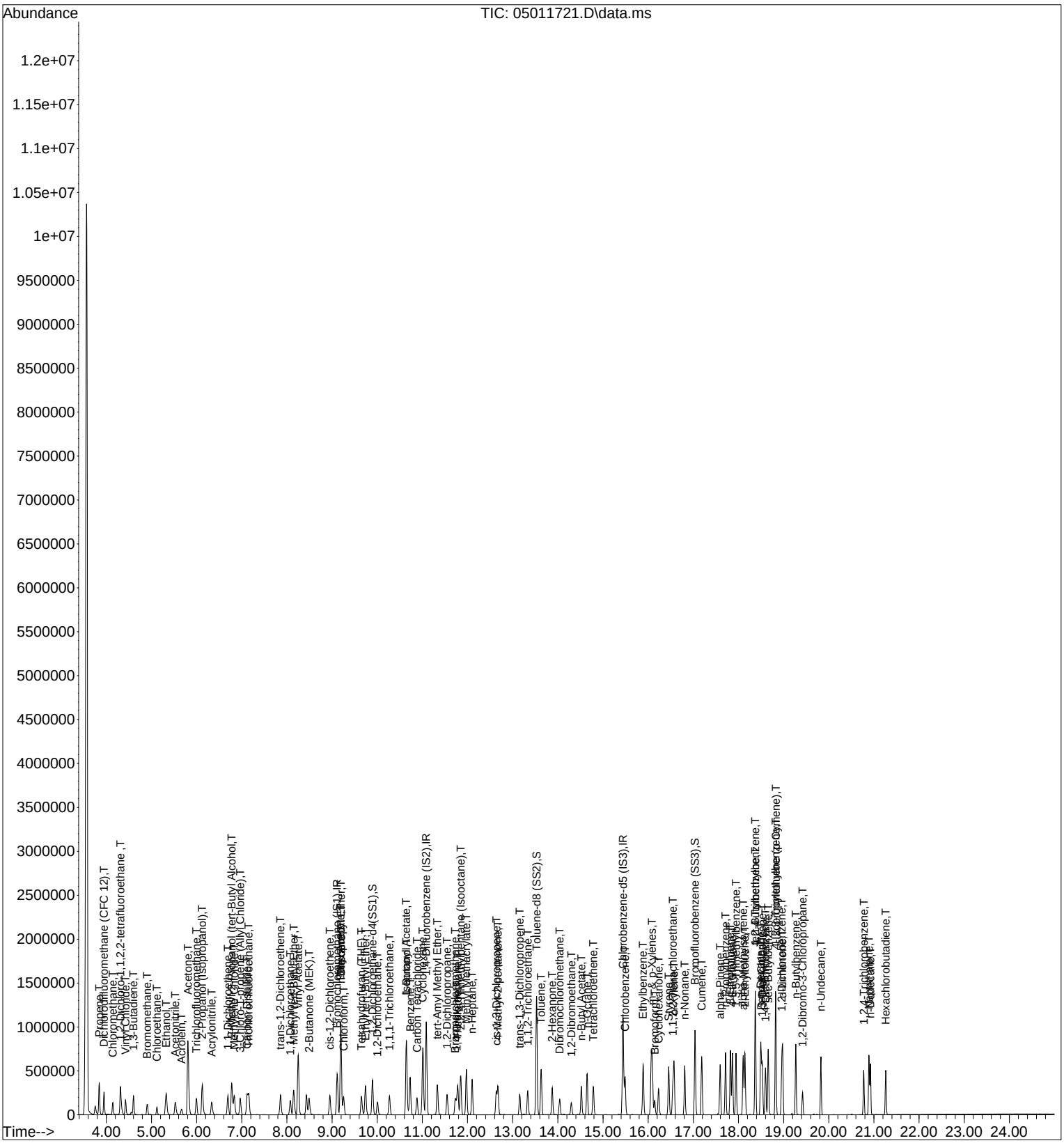
Quant Time: May 02 08:39:56 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	11.97	100	92486	9.966 ng	94
51) n-Heptane	12.10	71	114956	4.191 ng	98
52) cis-1,3-Dichloropropene	12.64	75	194681	4.761 ng	99
53) 4-Methyl-2-pentanone	12.67	58	106823	4.138 ng	97
54) trans-1,3-Dichloropropene	13.15	75	164997	5.055 ng	99
55) 1,1,2-Trichloroethane	13.33	97	108057	4.699 ng	100
58) Toluene	13.63	91	470994	4.783 ng	99
59) 2-Hexanone	13.88	43	234422	4.212 ng	99
60) Dibromochloromethane	14.04	129	119572	5.386 ng	99
61) 1,2-Dibromoethane	14.30	107	120399	5.297 ng	100
62) n-Butyl Acetate	14.52	43	263028	4.156 ng	100
63) n-Octane	14.65	57	98413	4.209 ng	99
64) Tetrachloroethene	14.78	166	118139	5.182 ng	99
65) Chlorobenzene	15.49	112	304453	4.969 ng	99
66) Ethylbenzene	15.89	91	522245	4.978 ng	99
67) m- & p-Xylenes	16.08	91	819754	9.910 ng	99
68) Bromoform	16.14	173	96595	5.644 ng	99
69) Styrene	16.45	104	325442	5.177 ng	100
70) o-Xylene	16.57	91	413215	4.921 ng	99
71) n-Nonane	16.81	43	213606	3.754 ng	98
72) 1,1,2,2-Tetrachloroethane	16.55	83	190833	4.511 ng	99
74) Cumene	17.19	105	521912	5.109 ng	99
75) alpha-Pinene	17.59	93	261194	4.949 ng	99
76) n-Propylbenzene	17.71	91	633340	5.051 ng	99
77) 3-Ethyltoluene	17.82	105	540347	5.324 ng	99
78) 4-Ethyltoluene	17.87	105	476121	4.982 ng	99
79) 1,3,5-Trimethylbenzene	17.94	105	433902	5.166 ng	99
80) alpha-Methylstyrene	18.10	118	229110	5.350 ng	100
81) 2-Ethyltoluene	18.14	105	508506	5.117 ng	99
82) 1,2,4-Trimethylbenzene	18.37	105	439007	5.305 ng	99
83) n-Decane	18.49	57	241645	4.266 ng	98
84) Benzyl Chloride	18.51	91	320224	4.282 ng	98
85) 1,3-Dichlorobenzene	18.53	146	244700	5.238 ng	99
86) 1,4-Dichlorobenzene	18.60	146	246679	5.248 ng	100
87) sec-Butylbenzene	18.66	105	583966	5.156 ng	99
88) 4-Isopropyltoluene (p-...	18.83	119	534227	5.193 ng	99
89) 1,2,3-Trimethylbenzene	18.82	105	428594	5.120 ng	99
90) 1,2-Dichlorobenzene	18.96	146	235319	5.235 ng	100
91) d-Limonene	18.98	68	172577	4.484 ng	98
92) 1,2-Dibromo-3-Chloropr...	19.42	157	78631	5.747 ng	94
93) n-Undecane	19.83	57	225912	4.014 ng	98
94) 1,2,4-Trichlorobenzene	20.78	180	167528	5.619 ng	99
95) Naphthalene	20.89	128	551324	5.315 ng	99
96) n-Dodecane	20.92	57	187148	3.474 ng	99
97) Hexachlorobutadiene	21.26	225	100752	5.748 ng	100
98) Cyclohexanone	16.23	55	156543	4.206 ng	98
99) tert-Butylbenzene	18.37	119	420445	5.318 ng	98
100) n-Butylbenzene	19.27	91	478717	5.108 ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011721.D
Acq On : 1 May 2017 21:06 Operator: SC
Sample : 5.0ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261705 (5/)25
ALS Vial : 3 Sample Multiplier: 1

Quant Time: May 02 08:39:56 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 05\01\05011722.D
Acq On : 1 May 2017 21:40 Operator: SC
Sample : 25ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: May 02 08:36:38 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Apr 27 08:40:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

5/2/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.13	130	199580	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.10	114	979349	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.44	82	418249	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.90	65	285479	10.809	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 86.48%				
57) Toluene-d8 (SS2)	13.53	98	1060752	13.037	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.32%				
73) Bromofluorobenzene (SS3)	17.04	174	318231	14.661	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 117.28%				
Target Compounds							Qvalue
2) Propene	3.84	42	579242	14.814	ng		100
3) Dichlorodifluoromethan...	3.95	85	1062838	21.671	ng		99
4) Chloromethane	4.15	50	773228	13.786	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.31	135	548576	24.610	ng		99
6) Vinyl Chloride	4.43	62	854448	16.601	ng		99
7) 1,3-Butadiene	4.61	54	562014	15.363	ng		93
8) Bromomethane	4.91	94	490491	20.770	ng		99
9) Chloroethane	5.13	64	415857	18.329	ng		99
10) Ethanol	5.37	45	2036973	82.119	ng		99
11) Acetonitrile	5.56	41	1032511	16.354	ng		100
12) Acrolein	5.68	56	369843	20.387	ng		99
13) Acetone	5.83	58	2255304	94.037	ng		92
14) Trichlorofluoromethane	6.00	101	864861	23.326	ng		99
15) 2-Propanol (Isopropanol)	6.16	45	2720899	34.235	ng		100
16) Acrylonitrile	6.36	53	741998	18.098	ng		100
17) 1,1-Dichloroethene	6.70	96	562280	23.555	ng		90
18) 2-Methyl-2-Propanol (t...	6.81	59	2941311	42.341	ng		97
19) Methylene Chloride	6.85	84	592079	20.215	ng		85
20) 3-Chloro-1-propene (Al...	6.98	41	773965	17.165	ng		89
21) Trichlorotrifluoroethane	7.16	151	488085	27.157	ng		92
22) Carbon Disulfide	7.13	76	2148865	19.749	ng		100
23) trans-1,2-Dichloroethene	7.87	61	824453	21.179	ng		92
24) 1,1-Dichloroethane	8.09	63	945344	18.918	ng		99
25) Methyl tert-Butyl Ether	8.15	73	1868944	24.845	ng		97
26) Vinyl Acetate	8.27	86	651280	117.695	ng	#	64
27) 2-Butanone (MEK)	8.50	72	405586	23.197	ng	#	78
28) cis-1,2-Dichloroethene	8.97	61	779409	20.964	ng		92
29) Diisopropyl Ether	9.20	87	496451	22.995	ng	#	65
30) Ethyl Acetate	9.20	61	436818	44.073	ng		93
31) n-Hexane	9.20	57	963856	19.804	ng		99
32) Chloroform	9.27	83	964704	23.607	ng		100
34) Tetrahydrofuran (THF)	9.65	72	390191	21.519	ng	#	86
35) Ethyl tert-Butyl Ether	9.75	87	694083	25.221	ng	#	87
36) 1,2-Dichloroethane	10.01	62	749517	24.081	ng		100
38) 1,1,1-Trichloroethane	10.28	97	892612	28.338	ng		97
39) Isopropyl Acetate	10.65	61	731343	44.157	ng	#	84
40) 1-Butanol	10.66	56	1167626	43.032	ng		95
41) Benzene	10.74	78	2356305	21.923	ng		100
42) Carbon Tetrachloride	10.88	117	722166	27.286	ng		100
43) Cyclohexane	11.02	84	1802004	47.135	ng		92
44) tert-Amyl Methyl Ether	11.33	73	1644785	23.494	ng		95
45) 1,2-Dichloropropane	11.56	63	571280	20.818	ng		100
46) Bromodichloromethane	11.74	83	750234	24.897	ng		100
47) Trichloroethene	11.79	130	620902	26.017	ng		100
48) 1,4-Dioxane	11.76	88	494002	25.240	ng		93
49) 2,2,4-Trimethylpentane...	11.85	57	2402894	20.641	ng		97

Data File: I:\MS09\Data\2017 05\01\05011722.D
Acq On : 1 May 2017 21:40 Operator: SC
Sample : 25ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

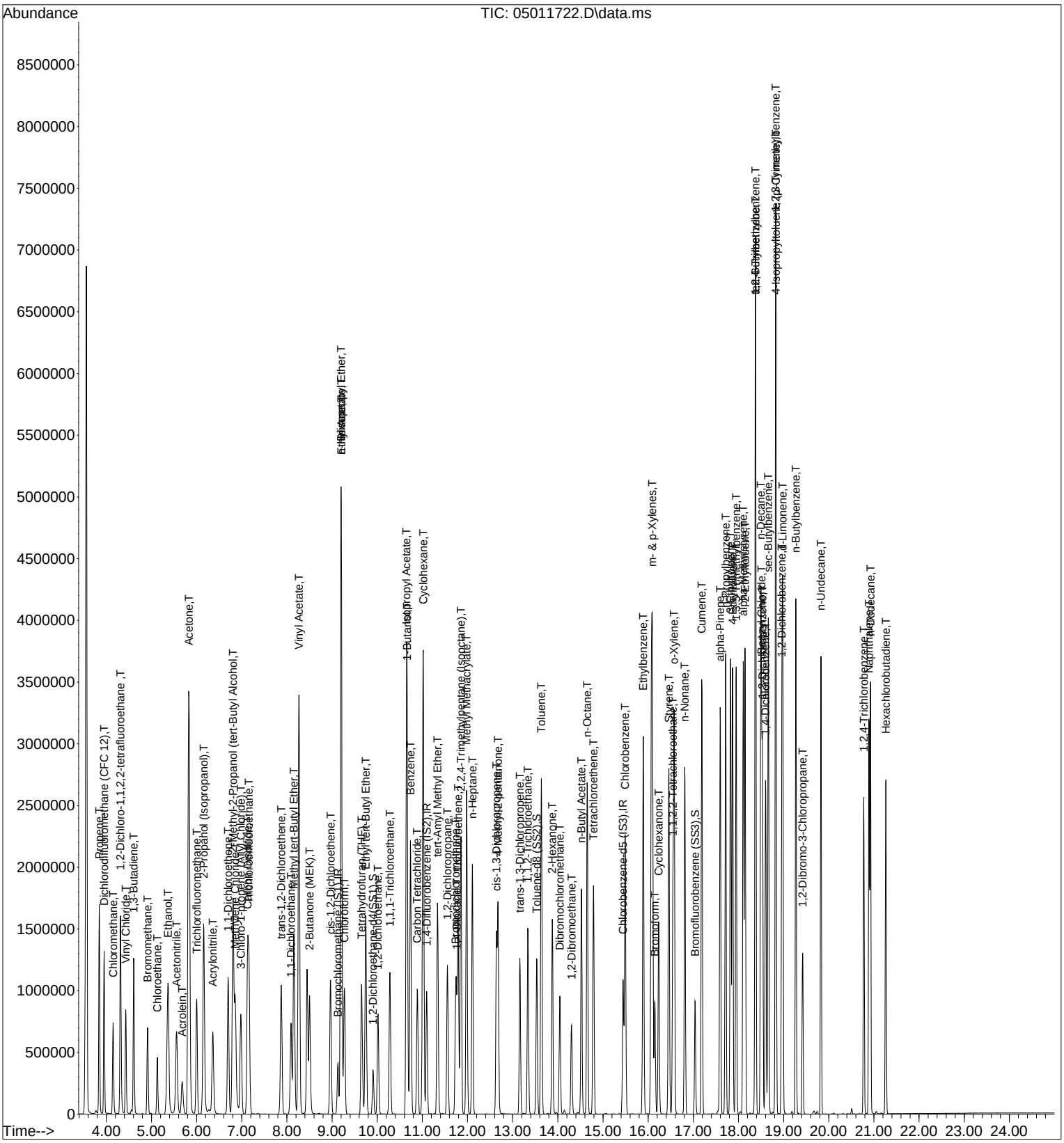
Quant Time: May 02 08:36:38 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Apr 27 08:40:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
50) Methyl Methacrylate	11.98	100	492585	55.778	ng	#	86
51) n-Heptane	12.11	71	583090	22.341	ng		94
52) cis-1,3-Dichloropropene	12.64	75	1036208	26.632	ng		99
53) 4-Methyl-2-pentanone	12.67	58	550425	22.407	ng		89
54) trans-1,3-Dichloropropene	13.16	75	862962	27.784	ng		99
55) 1,1,2-Trichloroethane	13.33	97	583710	26.676	ng		96
58) Toluene	13.63	91	2474209	26.636	ng		100
59) 2-Hexanone	13.88	43	1189739	22.661	ng		94
60) Dibromochloromethane	14.05	129	655628	31.307	ng		100
61) 1,2-Dibromoethane	14.30	107	635255	29.625	ng		99
62) n-Butyl Acetate	14.52	43	1482884	24.836	ng		96
63) n-Octane	14.65	57	561613	25.459	ng		93
64) Tetrachloroethene	14.79	166	670294	31.164	ng		100
65) Chlorobenzene	15.49	112	1581932	27.369	ng		100
66) Ethylbenzene	15.89	91	2723160	27.515	ng		98
67) m- & p-Xylenes	16.09	91	4463452	57.198	ng		99
68) Bromoform	16.14	173	553142	34.258	ng		100
69) Styrene	16.46	104	1721621	29.029	ng		99
70) o-Xylene	16.57	91	2171562	27.414	ng		99
71) n-Nonane	16.81	43	1077808	20.076	ng		90
72) 1,1,2,2-Tetrachloroethane	16.55	83	1032925	25.884	ng		100
74) Cumene	17.19	105	2748691	28.520	ng		99
75) alpha-Pinene	17.59	93	1518157	30.494	ng		98
76) n-Propylbenzene	17.72	91	3284892	27.770	ng		97
77) 3-Ethyltoluene	17.83	105	2733458	28.547	ng		99
78) 4-Ethyltoluene	17.87	105	2559576	28.389	ng		98
79) 1,3,5-Trimethylbenzene	17.95	105	2263089	28.559	ng		99
80) alpha-Methylstyrene	18.10	118	1257685	31.133	ng		98
81) 2-Ethyltoluene	18.15	105	2657817	28.352	ng		98
82) 1,2,4-Trimethylbenzene	18.38	105	2287710	29.303	ng		98
83) n-Decane	18.50	57	1217833	22.790	ng		96
84) Benzyl Chloride	18.51	91	1755288	24.878	ng		98
85) 1,3-Dichlorobenzene	18.53	146	1286700	29.196	ng		100
86) 1,4-Dichlorobenzene	18.60	146	1272499	28.699	ng		99
87) sec-Butylbenzene	18.66	105	3059643	28.637	ng		98
88) 4-Isopropyltoluene (p-...	18.83	119	2824283	29.100	ng		99
89) 1,2,3-Trimethylbenzene	18.82	105	2318886	29.365	ng		99
90) 1,2-Dichlorobenzene	18.96	146	1251544	29.512	ng		100
91) d-Limonene	18.98	68	919398	25.323	ng		91
92) 1,2-Dibromo-3-Chloropr...	19.42	157	435132	33.712	ng		86
93) n-Undecane	19.83	57	1252937	23.599	ng		95
94) 1,2,4-Trichlorobenzene	20.78	180	844414	30.023	ng		99
95) Naphthalene	20.89	128	2633264	26.912	ng		100
96) n-Dodecane	20.92	57	1137597	22.383	ng		95
97) Hexachlorobutadiene	21.27	225	560634	33.906	ng		100
98) Cyclohexanone	16.23	55	777332	22.141	ng		93
99) tert-Butylbenzene	18.38	119	2168929	29.078	ng		100
100) n-Butylbenzene	19.27	91	2433495	27.522	ng		99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011722.D
Acq On : 1 May 2017 21:40 Operator: SC
Sample : 25ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: May 02 08:36:38 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Apr 27 08:40:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



00858820

Data File: I:\MS09\Data\2017 05\01\05011723.D
Acq On : 1 May 2017 22:14 Operator: SC
Sample : 50ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

5/2/17

Quant Time: May 02 08:53:18 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.14	130	211781	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	11.10	114	986155	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	423335	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	9.92	65	289410	10.327	ng	0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 82.64%			
57) Toluene-d8 (SS2)	13.54	98	1088895	13.222	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.76%			
73) Bromofluorobenzene (SS3)	17.04	174	322723	14.689	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 117.52%			
Target Compounds						Qvalue
2) Propene	3.84	42	1203829	29.014	ng	100
3) Dichlorodifluoromethan...	3.95	85	2048122	39.354	ng	99
4) Chloromethane	4.15	50	1423933	23.925	ng	99
5) 1,2-Dichloro-1,1,2,2-t...	4.31	135	1063426	44.959	ng	100
6) Vinyl Chloride	4.43	62	1654547	30.294	ng	100
7) 1,3-Butadiene	4.61	54	1159066	29.859	ng	98
8) Bromomethane	4.91	94	903204	36.044	ng	100
9) Chloroethane	5.13	64	812554	33.750	ng	100
10) Ethanol	5.39	45	3742435	142.182	ng	100
11) Acetonitrile	5.57	41	1964645	29.325	ng	100
12) Acrolein	5.69	56	700998	36.415	ng	100
13) Acetone	5.84	58	4138520	162.618	ng	100
14) Trichlorofluoromethane	6.00	101	1680583	42.715	ng	100
15) 2-Propanol (Isopropanol)	6.18	45	5111912	60.614	ng	100
16) Acrylonitrile	6.37	53	1469661	33.781	ng	99
17) 1,1-Dichloroethene	6.70	96	1187906	46.897	ng	97
18) 2-Methyl-2-Propanol (t...	6.83	59	5975855	81.068	ng	99
19) Methylene Chloride	6.86	84	1270555	40.880	ng	96
20) 3-Chloro-1-propene (Al...	6.99	41	1753903	36.657	ng	98
21) Trichlorotrifluoroethane	7.16	151	995736	52.210	ng	98
22) Carbon Disulfide	7.13	76	4581899	39.684	ng	100
23) trans-1,2-Dichloroethene	7.88	61	1785537	43.226	ng	98
24) 1,1-Dichloroethane	8.10	63	2071907	39.073	ng	100
25) Methyl tert-Butyl Ether	8.16	73	3780491	47.361	ng	99
26) Vinyl Acetate	8.28	86	1411984	240.463	ng	99
27) 2-Butanone (MEK)	8.51	72	879461	47.401	ng	95
28) cis-1,2-Dichloroethene	8.97	61	1671681	42.373	ng	98
29) Diisopropyl Ether	9.20	87	1018799	44.471	ng	96
30) Ethyl Acetate	9.21	61	913140	86.824	ng	99
31) n-Hexane	9.20	57	1998972	38.707	ng	99
32) Chloroform	9.28	83	2025283	46.705	ng	100
34) Tetrahydrofuran (THF)	9.66	72	784470	40.771	ng	99
35) Ethyl tert-Butyl Ether	9.75	87	1389142	47.569	ng	100
36) 1,2-Dichloroethane	10.02	62	1376855	41.687	ng	100
38) 1,1,1-Trichloroethane	10.29	97	1648484	51.974	ng	100
39) Isopropyl Acetate	10.65	61	1509954	90.538	ng	99
40) 1-Butanol	10.68	56	2389105	87.441	ng	99
41) Benzene	10.74	78	4582538	42.341	ng	100
42) Carbon Tetrachloride	10.90	117	1400377	52.545	ng	100
43) Cyclohexane	11.02	84	3501983	90.969	ng	100
44) tert-Amyl Methyl Ether	11.34	73	3310172	46.957	ng	99
45) 1,2-Dichloropropane	11.56	63	1114799	40.343	ng	99
46) Bromodichloromethane	11.74	83	1608405	53.007	ng	100
47) Trichloroethene	11.80	130	1271954	52.929	ng	99
48) 1,4-Dioxane	11.77	88	1043556	52.950	ng	98
49) 2,2,4-Trimethylpentane...	11.85	57	4785427	40.823	ng	99

Data File: I:\MS09\Data\2017 05\01\05011723.D
Acq On : 1 May 2017 22:14 Operator: SC
Sample : 50ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: May 02 08:53:18 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

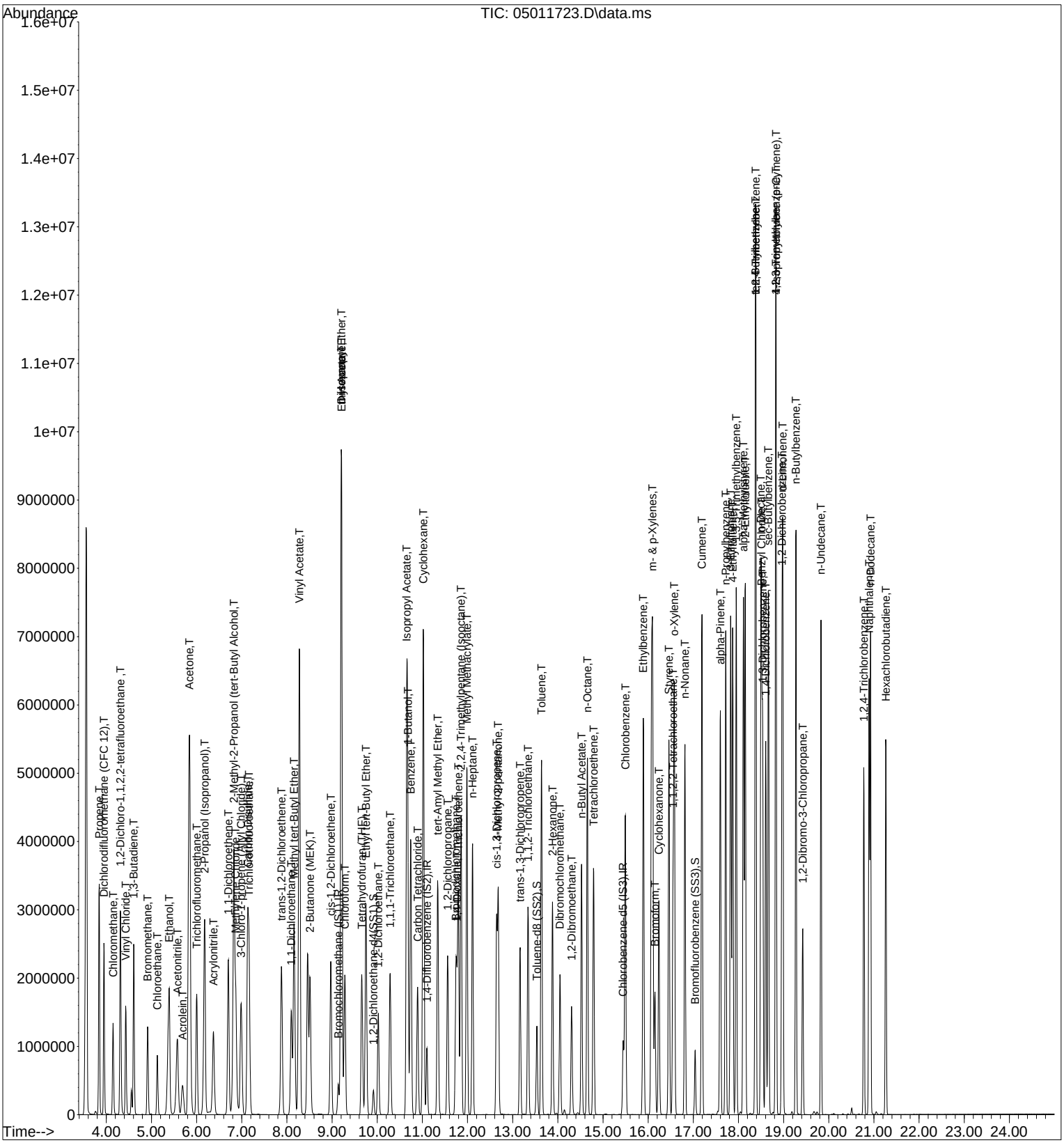
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.99	100	982267	110.459	ng	99
51) n-Heptane	12.11	71	1165231	44.338	ng	100
52) cis-1,3-Dichloropropene	12.64	75	2038157	52.022	ng	100
53) 4-Methyl-2-pentanone	12.68	58	1095025	44.269	ng	99
54) trans-1,3-Dichloropropene	13.16	75	1707868	54.607	ng	100
55) 1,1,2-Trichloroethane	13.34	97	1209740	54.905	ng	98
58) Toluene	13.64	91	4736737	50.381	ng	100
59) 2-Hexanone	13.88	43	2306705	43.408	ng	100
60) Dibromochloromethane	14.05	129	1367276	64.504	ng	100
61) 1,2-Dibromoethane	14.30	107	1347162	62.069	ng	99
62) n-Butyl Acetate	14.53	43	2953582	48.874	ng	100
63) n-Octane	14.65	57	1106853	49.572	ng	100
64) Tetrachloroethene	14.79	166	1321959	60.724	ng	100
65) Chlorobenzene	15.49	112	3115076	53.246	ng	99
66) Ethylbenzene	15.89	91	5266341	52.572	ng	100
67) m- & p-Xylenes	16.09	91	8256858	104.537	ng	100
68) Bromoform	16.15	173	1096234	67.077	ng	100
69) Styrene	16.46	104	3355171	55.892	ng	100
70) o-Xylene	16.58	91	4257251	53.097	ng	100
71) n-Nonane	16.81	43	2073164	38.153	ng	99
72) 1,1,2,2-Tetrachloroethane	16.55	83	2001352	49.549	ng	100
74) Cumene	17.19	105	5630476	57.720	ng	100
75) alpha-Pinene	17.60	93	2784384	55.257	ng	100
76) n-Propylbenzene	17.72	91	6241440	52.131	ng	99
77) 3-Ethyltoluene	17.83	105	5500081	56.750	ng	99
78) 4-Ethyltoluene	17.87	105	4808760	52.695	ng	99
79) 1,3,5-Trimethylbenzene	17.95	105	4738878	59.083	ng	100
80) alpha-Methylstyrene	18.11	118	2586514	63.258	ng	99
81) 2-Ethyltoluene	18.15	105	5555209	58.548	ng	100
82) 1,2,4-Trimethylbenzene	18.38	105	4539494	57.447	ng	99
83) n-Decane	18.50	57	2347259	43.397	ng	98
84) Benzyl Chloride	18.51	91	3551215	49.728	ng	99
85) 1,3-Dichlorobenzene	18.54	146	2530449	56.727	ng	100
86) 1,4-Dichlorobenzene	18.60	146	2510685	55.944	ng	100
87) sec-Butylbenzene	18.66	105	5834945	53.956	ng	99
88) 4-Isopropyltoluene (p-...	18.83	119	5147938	52.405	ng	99
89) 1,2,3-Trimethylbenzene	18.83	105	4252212	53.201	ng	99
90) 1,2-Dichlorobenzene	18.97	146	2464310	57.411	ng	100
91) d-Limonene	18.98	68	1771115	48.197	ng	99
92) 1,2-Dibromo-3-Chloropr...	19.42	157	896474	68.619	ng	97
93) n-Undecane	19.83	57	2502533	46.569	ng	100
94) 1,2,4-Trichlorobenzene	20.78	180	1674924	58.836	ng	99
95) Naphthalene	20.89	128	5159255	52.094	ng	100
96) n-Dodecane	20.92	57	2242130	43.585	ng	99
97) Hexachlorobutadiene	21.27	225	1130330	67.538	ng	100
98) Cyclohexanone	16.24	55	1538388	43.292	ng	100
99) tert-Butylbenzene	18.38	119	4249445	56.287	ng	99
100) n-Butylbenzene	19.27	91	4967882	55.511	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2017 05\01\05011723.D
Acq On : 1 May 2017 22:14 Operator: SC
Sample : 50ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: May 02 08:53:18 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



00858823

Data File: I:\MS09\Data\2017 05\01\05011724.D
Acq On : 1 May 2017 22:48 Operator: SC
Sample : 100ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

5/2/17

Quant Time: May 02 08:54:31 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.15	130	219835	12.500	ng		0.02
37) 1,4-Difluorobenzene (IS2)	11.11	114	1095118	12.500	ng		0.01
56) Chlorobenzene-d5 (IS3)	15.45	82	485181	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.92	65	329572	11.329	ng		0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 90.64%				
57) Toluene-d8 (SS2)	13.54	98	1199636	12.710	ng		0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.68%				
73) Bromofluorobenzene (SS3)	17.04	174	343490	13.641	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.12%				
Target Compounds							Qvalue
2) Propene	3.84	42	3223800	74.851	ng		100
3) Dichlorodifluoromethan...	3.95	85	4268286	79.009	ng		99
4) Chloromethane	4.16	50	2513426	40.684	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.31	135	2167008	88.258	ng		100
6) Vinyl Chloride	4.43	62	3562541	62.839	ng		100
7) 1,3-Butadiene	4.61	54	2558014	63.483	ng		99
8) Bromomethane	4.92	94	1912091	73.509	ng		100
9) Chloroethane	5.14	64	1750641	70.051	ng		100
10) Ethanol	5.41	45	8240354	301.596	ng		100
11) Acetonitrile	5.59	41	4397989	63.242	ng		99
12) Acrolein	5.70	56	1554007	77.770	ng		94
13) Acetone	5.86	58	8809551	333.479	ng		100
14) Trichlorofluoromethane	6.01	101	3651787	89.417	ng		100
15) 2-Propanol (Isopropanol)	6.19	45	9449358	107.941	ng		100
16) Acrylonitrile	6.39	53	3426235	75.868	ng		100
17) 1,1-Dichloroethene	6.70	96	2407316	91.557	ng		97
18) 2-Methyl-2-Propanol (t...	6.84	59	8620755	112.664	ng		98
19) Methylene Chloride	6.87	84	2569509	79.645	ng		96
20) 3-Chloro-1-propene (Al...	6.99	41	3577704	72.035	ng		97
21) Trichlorotrifluoroethane	7.17	151	2000151	101.033	ng		98
22) Carbon Disulfide	7.13	76	9045528	75.474	ng		99
23) trans-1,2-Dichloroethene	7.88	61	3627995	84.613	ng		98
24) 1,1-Dichloroethane	8.11	63	4199677	76.298	ng		99
25) Methyl tert-Butyl Ether	8.16	73	7601355	91.739	ng		99
26) Vinyl Acetate	8.29	86	2742979	450.020	ng	#	92
27) 2-Butanone (MEK)	8.52	72	1819889	94.494	ng		95
28) cis-1,2-Dichloroethene	8.98	61	3437881	83.948	ng		97
29) Diisopropyl Ether	9.20	87	1893120	79.608	ng		98
30) Ethyl Acetate	9.22	61	1673539	153.295	ng		98
31) n-Hexane	9.20	57	3608944	67.321	ng		99
32) Chloroform	9.30	83	4134452	91.852	ng		100
34) Tetrahydrofuran (THF)	9.66	72	1754364	87.838	ng		96
35) Ethyl tert-Butyl Ether	9.76	87	3054032	100.748	ng		98
36) 1,2-Dichloroethane	10.03	62	3011331	87.834	ng		99
38) 1,1,1-Trichloroethane	10.29	97	3595906	102.092	ng		99
39) Isopropyl Acetate	10.66	61	3096955	167.220	ng		99
40) 1-Butanol	10.69	56	5025929	165.646	ng		98
41) Benzene	10.75	78	9941742	82.718	ng		99
42) Carbon Tetrachloride	10.90	117	3055565	103.244	ng		99
43) Cyclohexane	11.03	84	7233664	169.208	ng		98
44) tert-Amyl Methyl Ether	11.34	73	7248043	92.588	ng		98
45) 1,2-Dichloropropane	11.57	63	2534297	82.587	ng		100
46) Bromodichloromethane	11.75	83	3269772	97.037	ng		100
47) Trichloroethene	11.80	130	2586272	96.912	ng		100
48) 1,4-Dioxane	11.77	88	2133064	97.463	ng		97
49) 2,2,4-Trimethylpentane...	11.86	57	10272013	78.908	ng		97

Data File: I:\MS09\Data\2017 05\01\05011724.D
Acq On : 1 May 2017 22:48 Operator: SC
Sample : 100ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

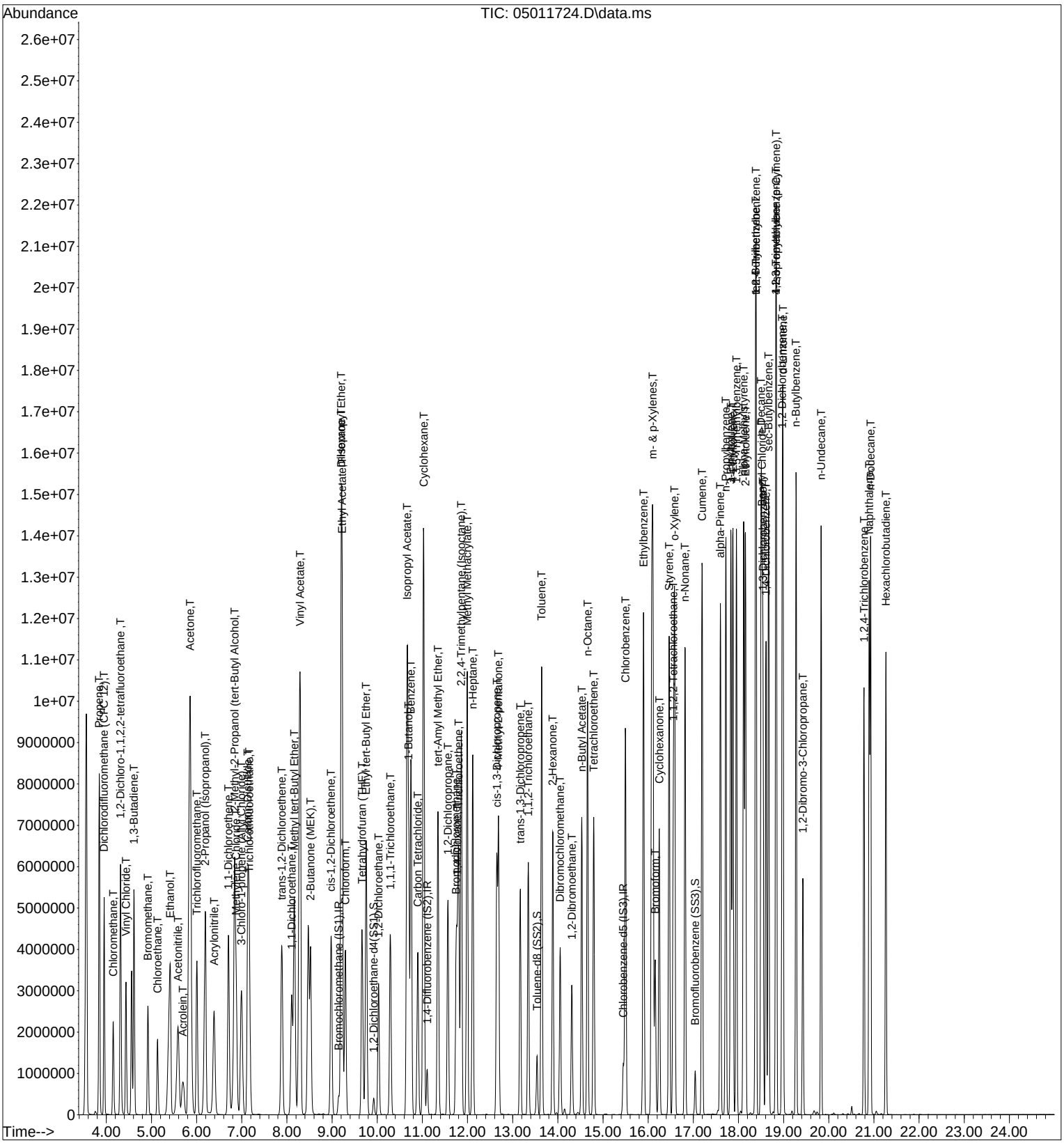
Quant Time: May 02 08:54:31 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.99	100	2100891	212.745	ng	97
51) n-Heptane	12.12	71	2596570	88.971	ng	98
52) cis-1,3-Dichloropropene	12.65	75	4388996	100.878	ng	99
53) 4-Methyl-2-pentanone	12.68	58	2440797	88.856	ng	99
54) trans-1,3-Dichloropropene	13.17	75	3796470	109.310	ng	100
55) 1,1,2-Trichloroethane	13.34	97	2441323	99.776	ng	98
58) Toluene	13.64	91	9957199	92.406	ng	99
59) 2-Hexanone	13.89	43	5319140	87.337	ng	99
60) Dibromochloromethane	14.05	129	2768177	113.948	ng	99
61) 1,2-Dibromoethane	14.31	107	2708610	108.889	ng	99
62) n-Butyl Acetate	14.53	43	5952970	85.950	ng	100
63) n-Octane	14.66	57	2201478	86.028	ng	100
64) Tetrachloroethene	14.79	166	2640326	105.823	ng	99
65) Chlorobenzene	15.49	112	6487723	96.758	ng	99
66) Ethylbenzene	15.90	91	11062197	96.354	ng	99
67) m- & p-Xylenes	16.10	91	17202999	190.039	ng	99
68) Bromoform	16.15	173	2341203	124.995	ng	99
69) Styrene	16.46	104	7072977	102.806	ng	98
70) o-Xylene	16.58	91	8731138	95.016	ng	100
71) n-Nonane	16.81	43	4615564	74.114	ng	98
72) 1,1,2,2-Tetrachloroethane	16.56	83	4310180	93.109	ng	100
74) Cumene	17.20	105	10579998	94.633	ng	98
75) alpha-Pinene	17.60	93	5797137	100.380	ng	98
76) n-Propylbenzene	17.72	91	12706878	92.605	ng	97
77) 3-Ethyltoluene	17.83	105	10536878	94.861	ng	98
78) 4-Ethyltoluene	17.88	105	10187276	97.403	ng	98
79) 1,3,5-Trimethylbenzene	17.95	105	8962396	97.498	ng	100
80) alpha-Methylstyrene	18.11	118	4990776	106.500	ng	98
81) 2-Ethyltoluene	18.16	105	10442733	96.030	ng	98
82) 1,2,4-Trimethylbenzene	18.39	105	8025499	88.616	ng	98
83) n-Decane	18.50	57	4782775	77.155	ng	98
84) Benzyl Chloride	18.52	91	7218924	88.202	ng	99
85) 1,3-Dichlorobenzene	18.54	146	5129571	100.335	ng	100
86) 1,4-Dichlorobenzene	18.61	146	5144208	100.013	ng	100
87) sec-Butylbenzene	18.67	105	11492767	92.728	ng	97
88) 4-Isopropyltoluene (p-...	18.84	119	9008730	80.017	ng	96
89) 1,2,3-Trimethylbenzene	18.83	105	7832435	85.503	ng	98
90) 1,2-Dichlorobenzene	18.97	146	4757250	96.703	ng	100
91) d-Limonene	18.99	68	3538889	84.027	ng	99
92) 1,2-Dibromo-3-Chloropr...	19.42	157	1841023	122.956	ng	94
93) n-Undecane	19.83	57	5173133	83.994	ng	100
94) 1,2,4-Trichlorobenzene	20.78	180	3475429	106.522	ng	99
95) Naphthalene	20.89	128	10306585	90.802	ng	98
96) n-Dodecane	20.92	57	4669640	79.202	ng	99
97) Hexachlorobutadiene	21.27	225	2285068	119.131	ng	100
98) Cyclohexanone	16.25	55	3546693	87.086	ng	98
99) tert-Butylbenzene	18.38	119	7468461	86.315	ng	99
100) n-Butylbenzene	19.27	91	9392752	91.575	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011724.D
Acq On : 1 May 2017 22:48 Operator: SC
Sample : 100ng TO-15 ICAL STD
Misc : S31-04191701/S31-04261703 (5/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: May 02 08:54:31 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 08:39:42 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File: I:\MS09\Data\2017 05\01\05011731.D
Acq On : 2 May 2017 10:52 Operator: SC
Sample : 25ng TO-15 ICV STD
Misc : S31-04191701/S31-04251705 (5/24)
ALS Vial : 2 Sample Multiplier: 1

5/2/17

Quant Time: May 02 11:17:57 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.13	130	230010	12.500	ng		0.02
37) 1,4-Difluorobenzene (IS2)	11.10	114	1140281	12.500	ng		0.01
56) Chlorobenzene-d5 (IS3)	15.44	82	493577	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.91	65	342071	12.698	ng		0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.60%				
57) Toluene-d8 (SS2)	13.53	98	1235435	12.289	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.32%				
73) Bromofluorobenzene (SS3)	17.04	174	348966	12.148	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.20%				
Target Compounds							Qvalue
2) Propene	3.84	42	658671	21.277	ng		100
3) Dichlorodifluoromethan...	3.95	85	1139972	24.156	ng		100
4) Chloromethane	4.15	50	824096	22.783	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.31	135	596170	22.853	ng		100
6) Vinyl Chloride	4.43	62	984304	24.791	ng		100
7) 1,3-Butadiene	4.61	54	642166	27.871	ng		99
8) Bromomethane	4.91	94	566777	24.620	ng		100
9) Chloroethane	5.13	64	475520	24.748	ng		100
10) Ethanol	5.38	45	2349177	128.155	ng		100
11) Acetonitrile	5.56	41	1168000	25.531	ng		100
12) Acrolein	5.68	56	411234	25.166	ng		100
13) Acetone	5.83	58	2468221	128.091	ng		99
14) Trichlorofluoromethane	6.00	101	957320	24.039	ng		99
15) 2-Propanol (Isopropanol)	6.17	45	3292510	55.000	ng		100
16) Acrylonitrile	6.36	53	879298	28.907	ng		99
17) 1,1-Dichloroethene	6.70	96	617412	25.071	ng		95
18) 2-Methyl-2-Propanol (t...	6.81	59	3402996	54.584	ng		99
19) Methylene Chloride	6.86	84	661460	23.210	ng		94
20) 3-Chloro-1-propene (Al...	6.98	41	954851	27.440	ng		96
21) Trichlorotrifluoroethane	7.16	151	509931	23.779	ng		97
22) Carbon Disulfide	7.13	76	2405137	23.648	ng		100
23) trans-1,2-Dichloroethene	7.87	61	929065	25.805	ng		97
24) 1,1-Dichloroethane	8.09	63	1130737	24.775	ng		100
25) Methyl tert-Butyl Ether	8.16	73	1974540	25.065	ng		99
26) Vinyl Acetate	8.27	86	745521	147.492	ng	#	85
27) 2-Butanone (MEK)	8.50	72	467362	26.436	ng		92
28) cis-1,2-Dichloroethene	8.97	61	879279	24.765	ng		96
29) Diisopropyl Ether	9.20	87	548387	24.285	ng	#	85
30) Ethyl Acetate	9.20	61	505895	54.758	ng		98
31) n-Hexane	9.20	57	1120660	24.869	ng		100
32) Chloroform	9.28	83	1067097	24.439	ng		100
34) Tetrahydrofuran (THF)	9.65	72	448944	24.885	ng		95
35) Ethyl tert-Butyl Ether	9.75	87	780318	25.968	ng		95
36) 1,2-Dichloroethane	10.02	62	782579	24.766	ng		100
38) 1,1,1-Trichloroethane	10.28	97	914920	24.209	ng		100
39) Isopropyl Acetate	10.65	61	862826	52.376	ng		94
40) 1-Butanol	10.66	56	1484215	53.033	ng		99
41) Benzene	10.74	78	2649330	23.108	ng		100
42) Carbon Tetrachloride	10.89	117	784705	24.960	ng		100
43) Cyclohexane	11.02	84	2021470	49.113	ng		97
44) tert-Amyl Methyl Ether	11.33	73	1898636	25.727	ng		99
45) 1,2-Dichloropropane	11.56	63	653335	25.159	ng		100
46) Bromodichloromethane	11.74	83	856266	24.941	ng		99
47) Trichloroethene	11.79	130	671235	23.620	ng		100
48) 1,4-Dioxane	11.76	88	551889	26.017	ng		96
49) 2,2,4-Trimethylpentane...	11.85	57	2794717	24.872	ng		100

Data File: I:\MS09\Data\2017 05\01\05011731.D
Acq On : 2 May 2017 10:52 Operator: SC
Sample : 25ng TO-15 ICV STD
Misc : S31-04191701/S31-04251705 (5/24)
ALS Vial : 2 Sample Multiplier: 1

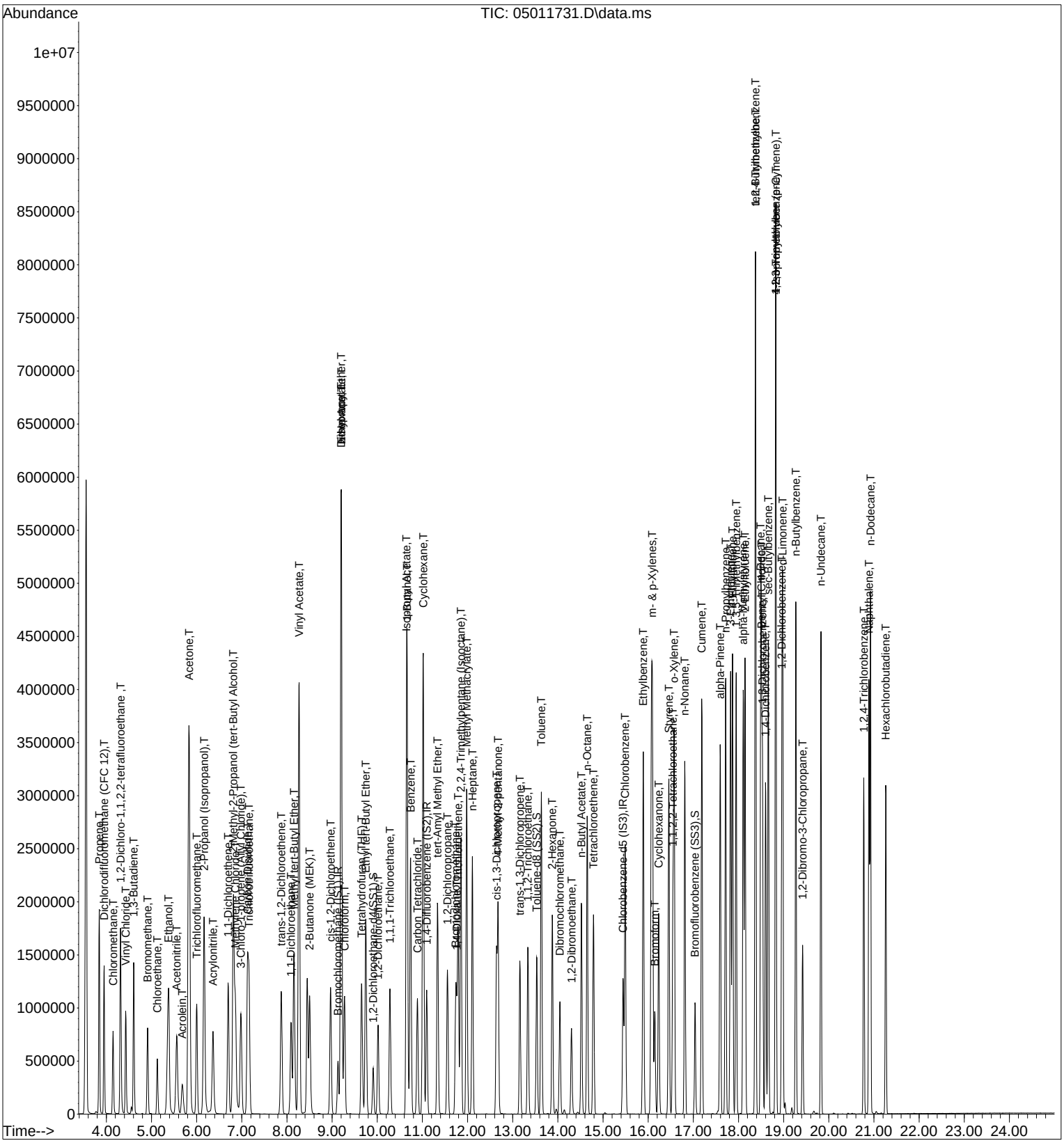
Quant Time: May 02 11:17:57 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.98	100	552737	54.154	ng	93
51) n-Heptane	12.11	71	678242	24.645	ng	98
52) cis-1,3-Dichloropropene	12.64	75	1089497	26.655	ng	99
53) 4-Methyl-2-pentanone	12.67	58	640154	27.294	ng	96
54) trans-1,3-Dichloropropene	13.16	75	979034	28.472	ng	100
55) 1,1,2-Trichloroethane	13.33	97	629158	24.711	ng	98
58) Toluene	13.63	91	2704906	23.043	ng	100
59) 2-Hexanone	13.88	43	1418512	27.807	ng	98
60) Dibromochloromethane	14.05	129	711313	25.860	ng	100
61) 1,2-Dibromoethane	14.30	107	697249	25.843	ng	100
62) n-Butyl Acetate	14.52	43	1613805	27.799	ng	99
63) n-Octane	14.65	57	587861	24.303	ng	98
64) Tetrachloroethene	14.79	166	677569	23.609	ng	100
65) Chlorobenzene	15.49	112	1729198	23.955	ng	100
66) Ethylbenzene	15.89	91	3033842	23.664	ng	99
67) m- & p-Xylenes	16.09	91	4748912	48.034	ng	99
68) Bromoform	16.14	173	578943	26.474	ng	100
69) Styrene	16.46	104	1887830	26.622	ng	99
70) o-Xylene	16.57	91	2412381	24.323	ng	99
71) n-Nonane	16.81	43	1286961	25.567	ng	97
72) 1,1,2,2-Tetrachloroethane	16.55	83	1149738	26.915	ng	100
74) Cumene	17.19	105	3009419	24.498	ng	99
75) alpha-Pinene	17.59	93	1603763	26.050	ng	100
76) n-Propylbenzene	17.72	91	3686901	25.677	ng	99
77) 3-Ethyltoluene	17.83	105	2994842	24.779	ng	100
78) 4-Ethyltoluene	17.87	105	2973332	26.508	ng	99
79) 1,3,5-Trimethylbenzene	17.95	105	2526348	24.869	ng	99
80) alpha-Methylstyrene	18.10	118	1364742	27.743	ng	99
81) 2-Ethyltoluene	18.15	105	2982010	25.240	ng	99
82) 1,2,4-Trimethylbenzene	18.38	105	2580868	26.228	ng	99
83) n-Decane	18.49	57	1472757	26.616	ng	98
84) Benzyl Chloride	18.51	91	2254969	32.545	ng	99
85) 1,3-Dichlorobenzene	18.53	146	1424051	26.688	ng	99
86) 1,4-Dichlorobenzene	18.60	146	1407161	26.397	ng	99
87) sec-Butylbenzene	18.66	105	3390038	25.320	ng	99
88) 4-Isopropyltoluene (p-...	18.83	119	3113776	24.841	ng	99
89) 1,2,3-Trimethylbenzene	18.83	105	2639003	26.743	ng	99
90) 1,2-Dichlorobenzene	18.96	146	1371209	26.527	ng	100
91) d-Limonene	18.98	68	1080382	27.662	ng	97
92) 1,2-Dibromo-3-Chloropr...	19.42	157	495505	30.891	ng	94
93) n-Undecane	19.83	57	1558181	30.008	ng	98
94) 1,2,4-Trichlorobenzene	20.78	180	1005031	31.377	ng	100
95) Naphthalene	20.89	128	3270264	31.793	ng	100
96) n-Dodecane	20.92	57	1583792	34.046	ng	98
97) Hexachlorobutadiene	21.26	225	615316	26.536	ng	99
98) Cyclohexanone	16.23	55	956564	27.018	ng	97
99) tert-Butylbenzene	18.38	119	2426144	25.037	ng	100
100) n-Butylbenzene	19.27	91	2788940	26.827	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 05\01\05011731.D
Acq On : 2 May 2017 10:52 Operator: SC
Sample : 25ng TO-15 ICV STD
Misc : S31-04191701/S31-04251705 (5/24)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: May 02 11:17:57 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **05011731.D** Acq. Method File: **TO15.M** 5/2/17

Data File Path: **I:\MS09\Data\2017_05\01** Sample Name: **25ng TO-15 ICV STD**

Operator: **SC** Misc Info: **S31-04191701/S31-04251705 (**

Date Acquired: **5/2/17** **10:52** Instrument Name: **MS09**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	**Propene**	**3.84**	**21.277**	26.275	81	**52**	**127**	*	*
3)	**Dichlorodifluoromethane (CFC 1**	**3.95**	**24.156**	**26.250**	92	**68**	**109**	*	*
4)	**Chloromethane**	**4.15**	**22.783**	**26.225**	87	**51**	**130**	*	*
5)	**1,2-Dichloro-1,1,2,2-tetrafluoroet**	**4.31**	**22.853**	**26.375**	87	**66**	**114**	*	*
6)	**Vinyl Chloride**	**4.43**	**24.791**	**26.250**	94	**61**	**125**	*	*
7)	**1,3-Butadiene**	**4.61**	**27.871**	**26.250**	106	**62**	**144**	*	*
8)	**Bromomethane**	**4.91**	**24.620**	**26.250**	94	**73**	**123**	*	*
9)	**Chloroethane**	**5.13**	**24.748**	**26.225**	94	**69**	**122**	*	*
10)	**Ethanol**	**5.38**	**128.155**	**132.650**	97	**62**	**124**	*	*
11)	**Acetonitrile**	**5.56**	**25.531**	**26.650**	96	**57**	**114**	*	*
12)	**Acrolein**	**5.68**	**25.166**	**26.525**	95	**62**	**116**	*	*
13)	**Acetone**	**5.83**	**128.091**	**133.050**	96	**57**	**117**	*	*
14)	**Trichlorofluoromethane**	**6.00**	**24.039**	**26.275**	91	**63**	**98**	*	*
15)	**2-Propanol (Isopropanol)**	**6.17**	**55.000**	**53.025**	104	**66**	**121**	*	*
16)	**Acrylonitrile**	**6.36**	**28.907**	**26.575**	109	**68**	**123**	*	*
17)	**1,1-Dichloroethene**	**6.70**	**25.071**	**26.575**	94	**76**	**118**	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alc	6.81	54.584	53.275	102	74	126	*	*
19)	**Methylene Chloride**	**6.86**	**23.210**	**26.550**	110	**60**	**118**	*	*
20)	**3-Chloro-1-propene (Allyl Chlorid**	**6.98**	**27.440**	**26.500**	104	**65**	**126**	*	*
21)	**Trichlorotrifluoroethane**	**7.16**	**23.779**	**26.450**	90	**73**	**114**	*	*
22)	**Carbon Disulfide**	**7.13**	**23.648**	**26.675**	89	**57**	**102**	*	*
23)	**trans-1,2-Dichloroethene**	**7.87**	**25.805**	**26.675**	97	**74**	**123**	*	*
24)	**1,1-Dichloroethane**	**8.09**	**24.775**	**26.550**	93	**69**	**111**	*	*
25)	**Methyl tert-Butyl Ether**	**8.16**	**25.065**	**26.600**	94	**69**	**113**	*	*
26)	**Vinyl Acetate**	**8.27**	**147.492**	**132.550**	111	**76**	**128**	*	*
27)	**2-Butanone (MEK)**	**8.50**	**26.436**	**26.550**	100	**63**	**127**	*	*
28)	**cis-1,2-Dichloroethene**	**8.97**	**24.765**	**26.475**	94	**72**	**117**	*	*
29)	Diisopropyl Ether	9.20	24.285	26.575	91	64	118	*	*
30)	**Ethyl Acetate**	**9.20**	**54.758**	**53.275**	103	**68**	**127**	*	*
31)	**n-Hexane**	**9.20**	**24.869**	**26.600**	93	**55**	**116**	*	*
32)	**Chloroform**	**9.28**	**24.439**	**26.475**	92	**70**	**109**	*	*
34)	**Tetrahydrofuran (THF)**	**9.65**	**24.885**	**26.575**	94	**72**	**113**	*	*
35)	Ethyl tert-Butyl Ether	9.75	25.968	26.525	98	73	117	*	*
36)	**1,2-Dichloroethane**	**10.02**	**24.766**	**26.500**	93	**69**	**113**	*	*
38)	**1,1,1-Trichloroethane**	**10.28**	**24.209**	**26.475**	91	**72**	**115**	*	*
39)	Isopropyl Acetate	10.65	52.376	53.050	99	68	122	*	*
40)	1-Butanol	10.66	53.033	53.075	100	75	141	*	*
41)	**Benzene**	**10.74**	**23.108**	**26.525**	87	**65**	**107**	*	*
42)	**Carbon Tetrachloride**	**10.89**	**24.960**	**26.600**	94	**71**	**113**	*	*
43)	**Cyclohexane**	**11.02**	**49.113**	**53.125**	92	**71**	**115**	*	*
44)	tert-Amyl Methyl Ether	11.33	25.727	**26.525**	97	73	115	*	*
45)	**1,2-Dichloropropane**	**11.56**	**25.159**	**26.525**	95	**71**	**115**	*	*
46)	**Bromodichloromethane**	**11.74**	**24.941**	**26.700**	93	**75**	**118**	*	*
47)	**Trichloroethene**	**11.79**	**23.620**	**26.550**	89	**68**	**114**	*	*
48)	**1,4-Dioxane**	**11.76**	**26.017**	**26.600**	98	**81**	**131**	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	11.85	24.872	26.525	94	68	112	*	*

Bold = 75 Compound List

*** = Pass**

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **05011731.D** **TO15.M**
Data File Path: **I:\MS09\Data\2017_05\01** Sample Name: **25ng TO-15 ICV STD**
Operator: **SC** Misc Info: **S31-04191701/S31-04251705 (**
Date Acquired: **5/2/17** **10:52** Instrument Name: **MS09**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	**Methyl Methacrylate**	**11.98**	**54.154**	**53.000**	102	**72**	**130**	*	*
51)	**n-Heptane**	**12.11**	**24.645**	**26.600**	93	**68**	**116**	*	*
52)	**cis-1,3-Dichloropropene**	**12.64**	**26.655**	**26.275**	101	**77**	**126**	*	*
53)	**4-Methyl-2-pentanone**	**12.67**	**27.294**	**26.575**	103	**69**	**126**	*	*
54)	**trans-1,3-Dichloropropene**	**13.16**	**28.472**	**26.675**	107	**79**	**125**	*	*
55)	**1,1,2-Trichloroethane**	**13.33**	**24.711**	**26.525**	93	**75**	**119**	*	*
58)	**Toluene**	**13.63**	**23.043**	**26.450**	87	**59**	**118**	*	*
59)	**2-Hexanone**	**13.88**	**27.807**	**26.575**	105	**69**	**129**	*	*
60)	**Dibromochloromethane**	**14.05**	**25.860**	**26.600**	97	**74**	**136**	*	*
61)	**1,2-Dibromoethane**	**14.30**	**25.843**	**26.450**	98	**73**	**131**	*	*
62)	**n-Butyl Acetate**	**14.52**	**27.799**	**26.950**	103	**69**	**130**	*	*
63)	**n-Octane**	**14.65**	**24.303**	**26.500**	92	**66**	**120**	*	*
64)	**Tetrachloroethene**	**14.79**	**23.609**	**26.575**	89	**65**	**130**	*	*
65)	**Chlorobenzene**	**15.49**	**23.955**	**26.500**	90	**68**	**120**	*	*
66)	**Ethylbenzene**	**15.89**	**23.664**	**26.450**	89	**68**	**122**	*	*
67)	**m- & p-Xylenes**	**16.09**	**48.034**	**53.025**	91	**68**	**123**	*	*
68)	**Bromoform**	**16.14**	**26.474**	**26.550**	100	**69**	**130**	*	*
69)	**Styrene**	**16.46**	**26.622**	**26.475**	101	**71**	**133**	*	*
70)	**o-Xylene**	**16.57**	**24.323**	**26.450**	92	**68**	**122**	*	*
71)	**n-Nonane**	**16.81**	**25.567**	**26.475**	97	**65**	**120**	*	*
72)	**1,1,2,2-Tetrachloroethane**	**16.55**	**26.915**	**26.500**	102	**69**	**130**	*	*
74)	**Cumene**	**17.19**	**24.498**	**26.525**	92	**70**	**123**	*	*
75)	**alpha-Pinene**	**17.59**	**26.050**	**26.575**	98	**70**	**128**	*	*
76)	**n-Propylbenzene**	**17.72**	**25.677**	**26.725**	96	**69**	**125**	*	*
77)	3-Ethyltoluene	17.83	24.779	26.550	93	67	128	*	*
78)	**4-Ethyltoluene**	**17.87**	**26.508**	**26.525**	**100**	**67**	**130**	*	*
79)	**1,3,5-Trimethylbenzene**	**17.95**	**24.869**	**26.525**	**94**	**67**	**124**	*	*
80)	alpha-Methylstyrene	18.10	27.743	26.550	**104**	67	141	*	*
81)	2-Ethyltoluene	18.15	25.240	26.550	**95**	67	124	*	*
82)	**1,2,4-Trimethylbenzene**	**18.38**	**26.228**	**26.525**	**99**	**67**	**129**	*	*
83)	n-Decane	18.49	26.616	26.525	**100**	66	124	*	*
84)	**Benzyl Chloride**	**18.51**	**32.545**	**26.550**	**123**	**79**	**138**	*	*
85)	**1,3-Dichlorobenzene**	**18.53**	**26.688**	**26.475**	**101**	**65**	**136**	*	*
86)	**1,4-Dichlorobenzene**	**18.60**	**26.397**	**26.650**	**99**	**66**	**141**	*	*
87)	sec-Butylbenzene	18.66	25.320	26.550	**95**	68	125	*	*
88)	4-Isopropyltoluene (p-Cymene)	18.83	24.841	26.550	**94**	68	131	*	*
89)	1,2,3-Trimethylbenzene	18.83	26.743	26.500	**101**	68	132	*	*
90)	**1,2-Dichlorobenzene**	**18.96**	**26.527**	**26.550**	**100**	**67**	**136**	*	*
91)	**d-Limonene**	**18.98**	**27.662**	**26.550**	**104**	**71**	**134**	*	*
92)	**1,2-Dibromo-3-Chloropropane**	**19.42**	**30.891**	**26.475**	**117**	**73**	**136**	*	*
93)	n-Undecane	19.83	30.008	26.600	**113**	68	132	*	*
94)	**1,2,4-Trichlorobenzene**	**20.78**	**31.377**	**26.500**	**118**	**64**	**134**	*	*
95)	**Naphthalene**	**20.89**	**31.793**	**26.700**	**119**	**62**	**136**	*	*
96)	n-Dodecane	20.92	34.046	26.550	**128**	61	137	*	*
97)	**Hexachlorobutadiene**	**21.26**	**26.536**	**26.575**	**100**	60	133	*	*
98)	Cyclohexanone	16.23	27.018	26.575	102	64	131	*	*
99)	tert-Butylbenzene	18.38	25.037	26.500	94	67	128	*	*
100)	n-Butylbenzene	19.27	26.827	26.500	101	68	128	*	*

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Data File: I:\MS09\Data\2017 06\15\06151701.D
Acq On : 15 Jun 2017 5:40 Operator: SC
Sample : CCV R9061517 5.0ng
Misc : S31-06061702/S31-05221704 (6/20)
ALS Vial : 2 Sample Multiplier: 1

6/15/17

Quant Time: Jun 15 09:23:19 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	83	0.00
2	T	Propene	1.682	1.521	9.6	86	-0.03
3	T	Dichlorodifluoromethane (CF	2.565	2.147	16.3	78	-0.03
4	T	Chloromethane	1.966	1.463	25.6	74	-0.03
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.418	1.197	15.6	82	-0.03
6	T	Vinyl Chloride	2.158	1.845	14.5	79	-0.03
7	T	1,3-Butadiene	1.252	1.226	2.1	91	-0.03
8	T	Bromomethane	1.251	1.073	14.2	85	-0.03
9	T	Chloroethane	1.044	0.931	10.8	84	-0.03
10	T	Ethanol	0.996	0.912	8.4	88	0.00
11	T	Acetonitrile	2.486	2.292	7.8	83	-0.02
12	T	Acrolein	0.888	0.758	14.6	78	-0.02
13	T	Acetone	1.047	0.928	11.4	79	-0.03
14	T	Trichlorofluoromethane	2.164	1.764	18.5	77	-0.03
15	T	2-Propanol (Isopropanol)	3.253	2.674	17.8	73	-0.01
16	T	Acrylonitrile	1.653	1.638	0.9	81	-0.02
17	T	1,1-Dichloroethene	1.338	1.167	12.8	82	-0.02
18	T	2-Methyl-2-Propanol (tert-B	3.388	2.555	24.6	66	-0.03
19	T	Methylene Chloride	1.549	1.249	19.4	81	-0.01
20	T	3-Chloro-1-propene (Allyl C	1.891	1.617	14.5	78	-0.02
21	T	Trichlorotrifluoroethane	1.165	0.994	14.7	81	-0.01
22	T	Carbon Disulfide	5.527	4.607	16.6	83	-0.02
23	T	trans-1,2-Dichloroethene	1.957	1.716	12.3	81	-0.01
24	T	1,1-Dichloroethane	2.480	2.129	14.2	81	0.00
25	T	Methyl tert-Butyl Ether	4.281	3.599	15.9	78	-0.03
26	T	Vinyl Acetate	0.275	0.273	0.7	90	-0.01
27	T	2-Butanone (MEK)	0.961	0.865	10.0	81	-0.03
28	T	cis-1,2-Dichloroethene	1.929	1.635	15.2	80	0.00
29	T	Diisopropyl Ether	1.227	1.018	17.0	80	-0.02
30	T	Ethyl Acetate	0.502	0.463	7.8	80	-0.01
31	T	n-Hexane	2.449	2.141	12.6	81	-0.01
32	T	Chloroform	2.373	1.967	17.1	78	0.00
33	S	1,2-Dichloroethane-d4(SS1)	1.464	1.400	4.4	79	0.00
34	T	Tetrahydrofuran (THF)	0.980	0.842	14.1	80	-0.03
35	T	Ethyl tert-Butyl Ether	1.633	1.437	12.0	80	-0.02
36	T	1,2-Dichloroethane	1.717	1.418	17.4	78	0.00
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	83	0.00
38	T	1,1,1-Trichloroethane	0.414	0.333	19.6	76	0.00
39	T	Isopropyl Acetate	0.181	0.163	9.9	81	-0.02
40	T	1-Butanol	0.307	0.274	10.7	82	-0.02
41	T	Benzene	1.257	1.026	18.4	81	0.00
42	T	Carbon Tetrachloride	0.345	0.282	18.3	75	0.00
43	T	Cyclohexane	0.451	0.389	13.7	80	0.00
44	T	tert-Amyl Methyl Ether	0.809	0.713	11.9	80	-0.01
45	T	1,2-Dichloropropane	0.285	0.249	12.6	81	0.00
46	T	Bromodichloromethane	0.376	0.310	17.6	78	0.00
47	T	Trichloroethene	0.312	0.259	17.0	80	0.00
48	T	1,4-Dioxane	0.233	0.189	18.9	75	-0.02
49	T	2,2,4-Trimethylpentane (Iso	1.232	1.067	13.4	81	0.00
50	T	Methyl Methacrylate	0.112	0.105	6.3	81	0.00
51	T	n-Heptane	0.302	0.257	14.9	81	0.00
52	T	cis-1,3-Dichloropropene	0.448	0.399	10.9	78	0.00
53	T	4-Methyl-2-pentanone	0.257	0.232	9.7	78	-0.01
54	T	trans-1,3-Dichloropropene	0.377	0.355	5.8	78	0.00

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Acq On : 15 Jun 2017 5:40 Operator: SC
Sample : CCV R9061517 5.0ng
Misc : S31-06061702/S31-05221704 (6/20)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 15 09:23:19 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
55	T	1,1,2-Trichloroethane	0.279	0.241	13.6	81	0.00
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	79	0.00
57	S	Toluene-d8 (SS2)	2.546	2.575	-1.1	81	0.00
58	T	Toluene	2.973	2.572	13.5	81	0.00
59	T	2-Hexanone	1.292	1.244	3.7	79	-0.01
60	T	Dibromochloromethane	0.697	0.630	9.6	79	0.00
61	T	1,2-Dibromoethane	0.683	0.651	4.7	80	0.00
62	T	n-Butyl Acetate	1.470	1.421	3.3	81	0.00
63	T	n-Octane	0.613	0.540	11.9	82	0.00
64	T	Tetrachloroethene	0.727	0.661	9.1	84	0.00
65	T	Chlorobenzene	1.828	1.650	9.7	81	0.00
66	T	Ethylbenzene	3.247	2.820	13.2	80	0.00
67	T	m- & p-Xylenes	2.504	2.186	12.7	80	0.00
68	T	Bromoform	0.554	0.507	8.5	79	0.00
69	T	Styrene	1.796	1.756	2.2	81	0.00
70	T	o-Xylene	2.512	2.219	11.7	80	0.00
71	T	n-Nonane	1.275	1.208	5.3	84	0.00
72	T	1,1,2,2-Tetrachloroethane	1.082	1.066	1.5	83	0.00
73	S	Bromofluorobenzene (SS3)	0.728	0.749	-2.9	81	0.00
74	T	Cumene	3.111	2.820	9.4	80	0.00
75	T	alpha-Pinene	1.559	1.468	5.8	83	0.00
76	T	n-Propylbenzene	3.636	3.414	6.1	81	0.00
77	T	3-Ethyltoluene	3.061	2.755	10.0	75	0.00
78	T	4-Ethyltoluene	2.841	2.732	3.8	85	0.00
79	T	1,3,5-Trimethylbenzene	2.573	2.336	9.2	80	0.00
80	T	alpha-Methylstyrene	1.246	1.265	-1.5	82	0.00
81	T	2-Ethyltoluene	2.992	2.752	8.0	81	0.00
82	T	1,2,4-Trimethylbenzene	2.492	2.356	5.5	80	0.00
83	T	n-Decane	1.401	1.355	3.3	83	0.00
84	T	Benzyl Chloride	1.755	1.950	-11.1	91	0.00
85	T	1,3-Dichlorobenzene	1.351	1.325	1.9	81	0.00
86	T	1,4-Dichlorobenzene	1.350	1.322	2.1	80	0.00
87	T	sec-Butylbenzene	3.391	3.185	6.1	81	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.175	2.962	6.7	80	0.00
89	T	1,2,3-Trimethylbenzene	2.499	2.388	4.4	81	0.00
90	T	1,2-Dichlorobenzene	1.309	1.294	1.1	82	0.00
91	T	d-Limonene	0.989	0.998	-0.9	82	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.406	0.448	-10.3	85	0.00
93	T	n-Undecane	1.315	1.446	-10.0	95	0.00
94	T	1,2,4-Trichlorobenzene	0.811	0.935	-15.3	82	0.00
95	T	Naphthalene	2.605	3.000	-15.2	83	0.00
96	T	n-Dodecane	1.178	1.498	-27.2	118	0.00
97	T	Hexachlorobutadiene	0.587	0.564	3.9	84	0.00
98	T	Cyclohexanone	0.897	0.750	16.4	71	0.00
99	T	tert-Butylbenzene	2.454	2.279	7.1	80	0.00
100	T	n-Butylbenzene	2.633	2.565	2.6	80	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

00858833

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Sample : CCV R9061517 5.0ng
Misc : S31-06061702/S31-05221704 (6/20)
ALS Vial : 2 Sample Multiplier: 1

6/15/17

Quant Time: Jun 15 09:23:19 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.11	130	173564	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.09	114	854073	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.44	82	352141	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.89	65	243073	11.958	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.68%				
57) Toluene-d8 (SS2)	13.52	98	906798	12.642	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.12%				
73) Bromofluorobenzene (SS3)	17.04	174	263901	12.876	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.04%				
Target Compounds							Qvalue
2) Propene	3.84	42	109369	4.682	ng		99
3) Dichlorodifluoromethan...	3.95	85	156064	4.383	ng		99
4) Chloromethane	4.14	50	102083	3.740	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.31	135	83490	4.241	ng		100
6) Vinyl Chloride	4.42	62	131041	4.374	ng		100
7) 1,3-Butadiene	4.59	54	89959	5.174	ng		99
8) Bromomethane	4.90	94	73962	4.258	ng		100
9) Chloroethane	5.12	64	65210	4.497	ng		99
10) Ethanol	5.32	45	329511	23.822	ng		100
11) Acetonitrile	5.52	41	166420	4.821	ng		100
12) Acrolein	5.66	56	54783	4.443	ng		100
13) Acetone	5.80	58	342404	23.548	ng		95
14) Trichlorofluoromethane	5.99	101	128499	4.276	ng		99
15) 2-Propanol (Isopropanol)	6.12	45	390714	8.649	ng		99
16) Acrylonitrile	6.33	53	119999	5.228	ng		100
17) 1,1-Dichloroethene	6.69	96	85795	4.617	ng		98
18) 2-Methyl-2-Propanol (t...	6.77	59	374930	7.970	ng		98
19) Methylene Chloride	6.83	84	91640	4.261	ng		95
20) 3-Chloro-1-propene (Al...	6.96	41	118076	4.497	ng		96
21) Trichlorotrifluoroethane	7.15	151	72355	4.471	ng		99
22) Carbon Disulfide	7.12	76	339370	4.422	ng		99
23) trans-1,2-Dichloroethene	7.85	61	127088	4.678	ng		97
24) 1,1-Dichloroethane	8.07	63	150794	4.378	ng		99
25) Methyl tert-Butyl Ether	8.15	73	266355	4.481	ng		100
26) Vinyl Acetate	8.24	86	99735	26.148	ng	#	82
27) 2-Butanone (MEK)	8.48	72	62994	4.722	ng		92
28) cis-1,2-Dichloroethene	8.95	61	120739	4.507	ng		99
29) Diisopropyl Ether	9.19	87	75060	4.405	ng	#	79
30) Ethyl Acetate	9.19	61	68369	9.807	ng		97
31) n-Hexane	9.19	57	157971	4.646	ng		100
32) Chloroform	9.25	83	144444	4.384	ng		99
34) Tetrahydrofuran (THF)	9.65	72	62083	4.560	ng		94
35) Ethyl tert-Butyl Ether	9.73	87	105455	4.651	ng		94
36) 1,2-Dichloroethane	10.00	62	103585	4.344	ng		100
38) 1,1,1-Trichloroethane	10.27	97	122155	4.315	ng		98
39) Isopropyl Acetate	10.64	61	117027	9.484	ng	#	90
40) 1-Butanol	10.65	56	197315	9.413	ng		97
41) Benzene	10.72	78	368763	4.294	ng		99
42) Carbon Tetrachloride	10.88	117	101631	4.316	ng		99
43) Cyclohexane	11.01	84	283274	9.189	ng		97
44) tert-Amyl Methyl Ether	11.33	73	256725	4.645	ng		98
45) 1,2-Dichloropropane	11.54	63	90339	4.645	ng		99
46) Bromodichloromethane	11.73	83	112751	4.385	ng		99
47) Trichloroethene	11.78	130	93856	4.410	ng		97
48) 1,4-Dioxane	11.76	88	68721	4.325	ng		97
49) 2,2,4-Trimethylpentane...	11.85	57	385935	4.586	ng		99

Data File: I:\MS09\Data\2017 06\15\06151701.D
Acq On : 15 Jun 2017 5:40 Operator: SC
Sample : CCV R9061517 5.0ng
Misc : S31-06061702/S31-05221704 (6/20)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 15 09:23:19 2017
Quant Method : I:\MS09\Methods\R9050117.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue May 02 10:34:08 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.97	100	75355	9.857	ng	96
51) n-Heptane	12.10	71	93359	4.529	ng	97
52) cis-1,3-Dichloropropene	12.63	75	152239	4.973	ng	99
53) 4-Methyl-2-pentanone	12.67	58	83692	4.764	ng	93
54) trans-1,3-Dichloropropene	13.15	75	129160	5.015	ng	99
55) 1,1,2-Trichloroethane	13.33	97	87268	4.576	ng	99
58) Toluene	13.63	91	381489	4.555	ng	100
59) 2-Hexanone	13.88	43	185893	5.108	ng	97
60) Dibromochloromethane	14.04	129	94244	4.802	ng	100
61) 1,2-Dibromoethane	14.30	107	96821	5.030	ng	100
62) n-Butyl Acetate	14.52	43	212926	5.141	ng	98
63) n-Octane	14.64	57	80351	4.656	ng	99
64) Tetrachloroethene	14.78	166	98739	4.822	ng	99
65) Chlorobenzene	15.49	112	246569	4.788	ng	99
66) Ethylbenzene	15.89	91	419013	4.581	ng	99
67) m- & p-Xylenes	16.08	91	653564	9.266	ng	100
68) Bromoform	16.14	173	75907	4.865	ng	100
69) Styrene	16.45	104	262405	5.187	ng	98
70) o-Xylene	16.57	91	329381	4.655	ng	99
71) n-Nonane	16.81	43	179271	4.992	ng	94
72) 1,1,2,2-Tetrachloroethane	16.55	83	158545	5.202	ng	99
74) Cumene	17.19	105	417079	4.759	ng	99
75) alpha-Pinene	17.59	93	215920	4.916	ng	99
76) n-Propylbenzene	17.71	91	511124	4.989	ng	99
77) 3-Ethyltoluene	17.82	105	407391	4.724	ng	97
78) 4-Ethyltoluene	17.87	105	403742	5.045	ng	96
79) 1,3,5-Trimethylbenzene	17.94	105	345177	4.763	ng	100
80) alpha-Methylstyrene	18.10	118	187092	5.331	ng	100
81) 2-Ethyltoluene	18.15	105	411724	4.885	ng	99
82) 1,2,4-Trimethylbenzene	18.37	105	349079	4.972	ng	99
83) n-Decane	18.49	57	201031	5.092	ng	96
84) Benzyl Chloride	18.51	91	291443	5.896	ng	99
85) 1,3-Dichlorobenzene	18.53	146	197440	5.186	ng	100
86) 1,4-Dichlorobenzene	18.60	146	197031	5.181	ng	99
87) sec-Butylbenzene	18.66	105	472869	4.950	ng	99
88) 4-Isopropyltoluene (p-...	18.83	119	428539	4.792	ng	98
89) 1,2,3-Trimethylbenzene	18.82	105	345477	4.907	ng	99
90) 1,2-Dichlorobenzene	18.96	146	192911	5.231	ng	99
91) d-Limonene	18.98	68	141255	5.069	ng	97
92) 1,2-Dibromo-3-Chloropr...	19.42	157	66490	5.810	ng	97
93) n-Undecane	19.83	57	214730	5.796	ng	97
94) 1,2,4-Trichlorobenzene	20.78	180	137380	6.012	ng	99
95) Naphthalene	20.89	128	457693	6.237	ng	99
96) n-Dodecane	20.92	57	220571	6.646	ng	98
97) Hexachlorobutadiene	21.26	225	84134	5.086	ng	100
98) Cyclohexanone	16.23	55	111572	4.417	ng	97
99) tert-Butylbenzene	18.37	119	337382	4.880	ng	99
100) n-Butylbenzene	19.27	91	381550	5.144	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File: I:\MS09\Data\2017 06\15\06151701.D
Acq On : 15 Jun 2017 5:40 Operator: SC
Sample : CCV R9061517 5.0ng
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ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 15 09:23:19 2017
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Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
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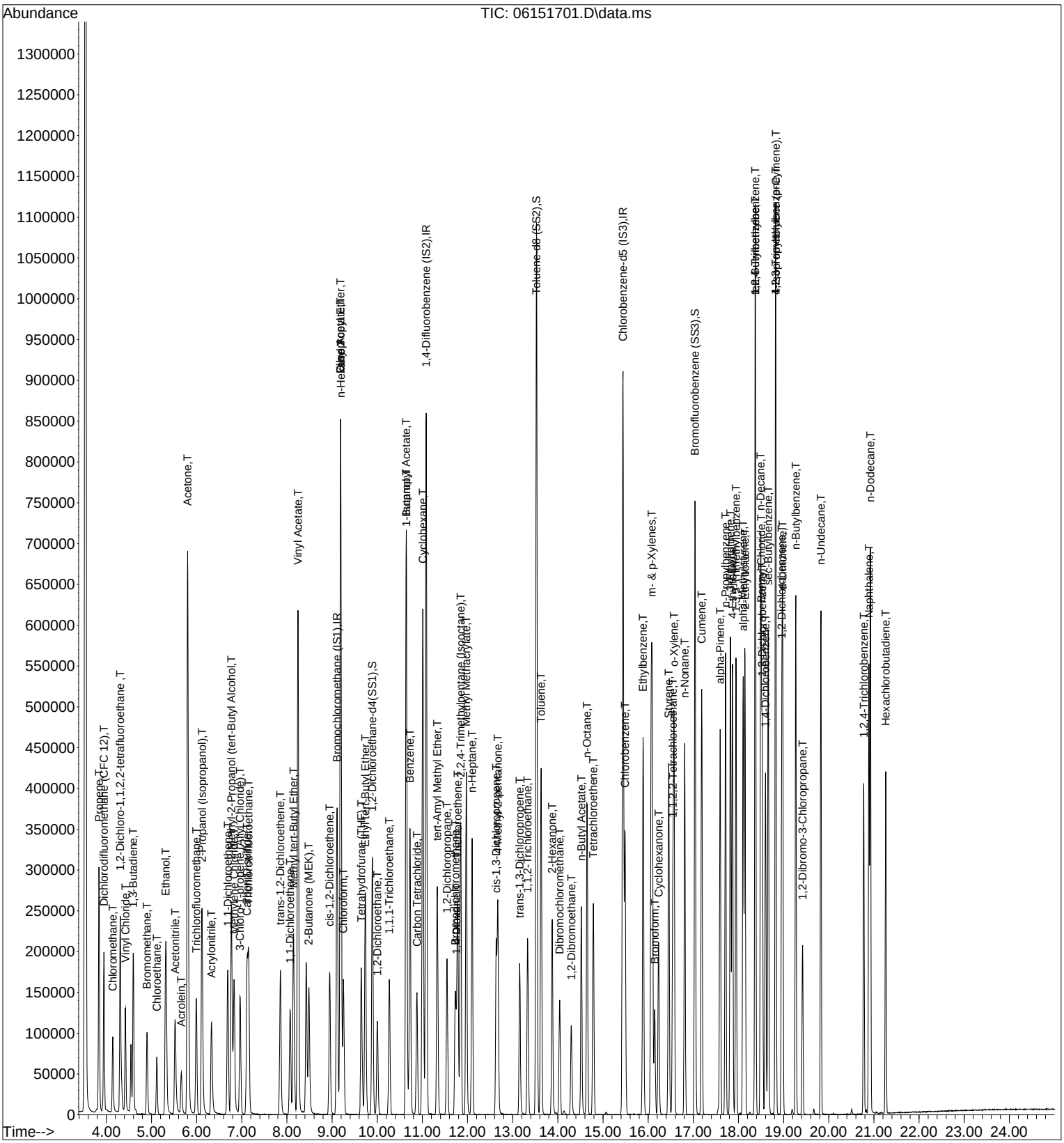
Response via : Initial Calibration
DataAcq Meth:TO15.M



00858836

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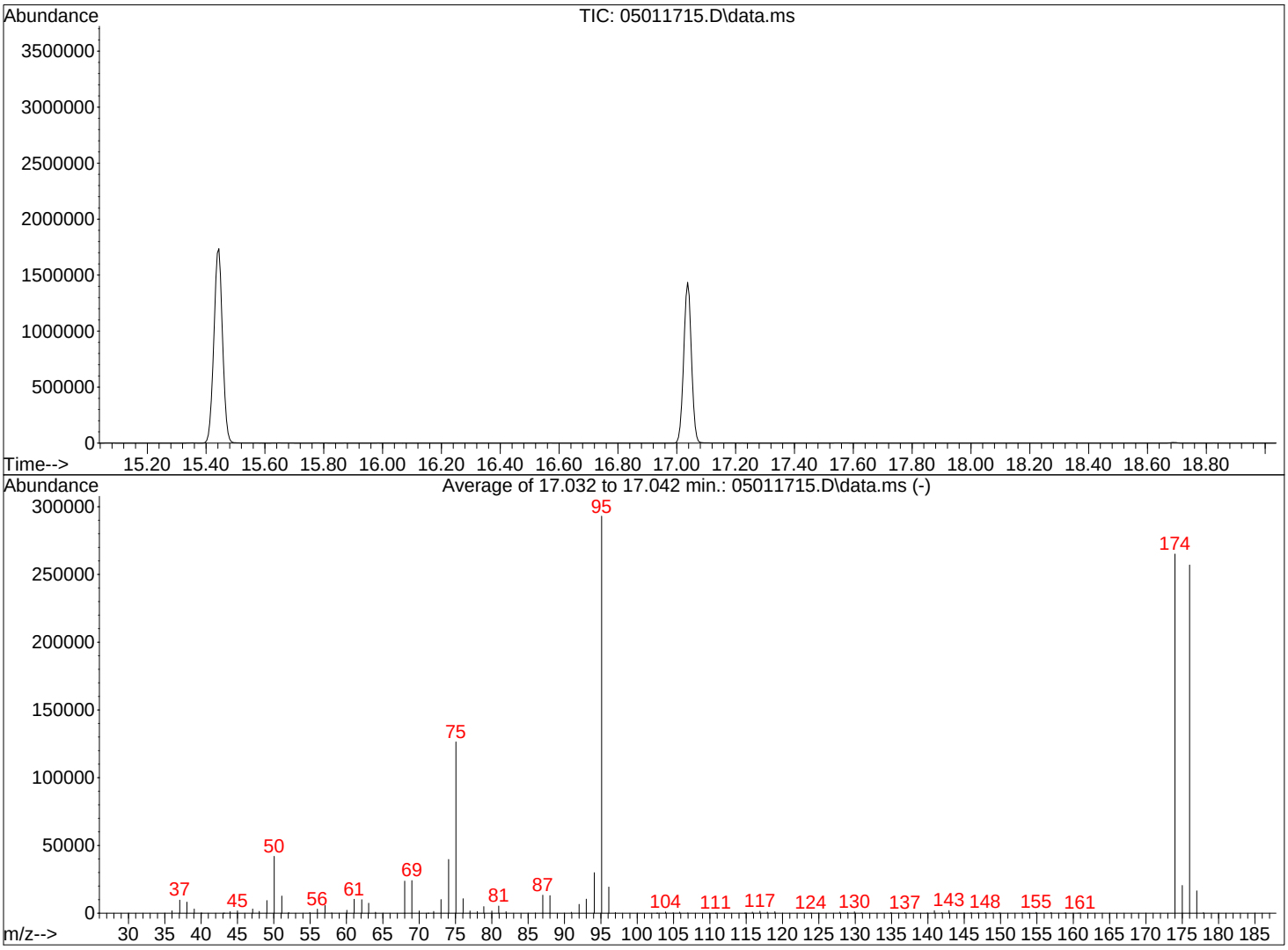
Data File : 05011715.D
Acq On : 1 May 2017 17:43
Operator : SC
Sample : 12.5ng TO-15 BFB
Misc : S31-04191701
ALS Vial : 2 Sample Multiplier: 1

5/2/17

Integration File: LSCINT.P

Method : I:\MS09\Methods\R9050117.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue May 02 08:39:42 2017



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Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	14.3	42011	PASS
75	95	30	66	43.1	126400	PASS
95	95	100	100	100.0	293013	PASS
96	95	5	9	6.6	19373	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	90.5	265109	PASS
175	174	4	9	7.7	20448	PASS
176	174	93	101	96.9	257003	PASS
177	176	5	9	6.4	16527	PASS

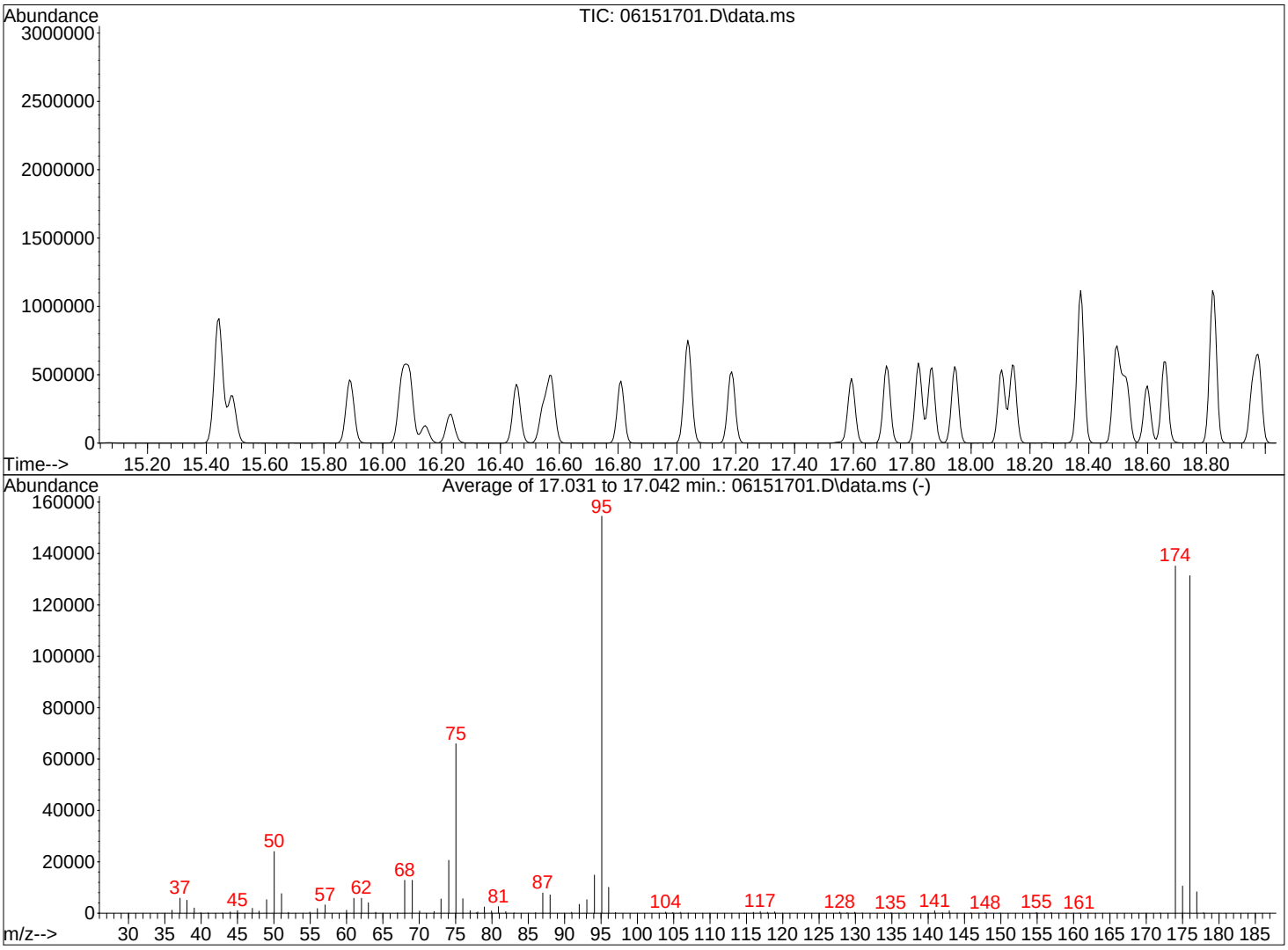
00858837

Data Path : I:\MS09\Data\2017 06\15\
Data File : 06151701.D
Acq On : 15 Jun 2017 5:40
Operator : SC
Sample : CCV R9061517 5.0ng
Misc : S31-06061702/S31-05221704 (6/20)
ALS Vial : 2 Sample Multiplier: 1

6/15/17

Integration File: LSCINT.P

Method : I:\MS09\Methods\R9050117.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue May 02 10:34:08 2017



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95	95	100	100	100.0	154539	PASS
96	95	5	9	6.5	10099	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	87.5	135163	PASS
175	174	4	9	7.8	10583	PASS
176	174	93	101	97.2	131344	PASS
177	176	5	9	6.4	8351	PASS

Injection Log

Directory: J:\MS09\Data\2017_05\01\

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3	5/1/17 9:52	05011703.D	Blank (100mL)	S31-04191701	SC	2	
4	5/1/17 10:32	05011704.D	Blank (100mL)	S31-04191701	SC	2	
5	5/1/17 11:14	05011705.D	Blank (100mL)	S31-04191701	SC	2	
6	5/1/17 11:53	05011706.D	Blank (100mL)	S31-04191701	SC	2	
7	5/1/17 12:28	05011707.D	Blank (100mL)	S31-04191701	SC	2	
8	5/1/17 13:44	05011708.D	Blank (100mL)	S31-04191701	SC	2	
9	5/1/17 14:10	05011709.D	CCV R9050117_5.0ng	S31-04191701/S31-04261705 (5/)25	SC	3	
10	5/1/17 14:44	05011710.D	CCV R9050117_25ng	S31-04191701/S31-04261703 (5/25)	SC	4	
11	5/1/17 15:18	05011711.D	0.1ng std check	S31-04191701/S31-04261707 (5/25)	SC	5	
12	5/1/17 15:51	05011712.D	0.1ng std check	S31-04191701/S31-04111708 (5/10)	SC	6	
13	5/1/17 16:25	05011713.D	0.1ng std check	S31-04191701/S31-04111709 (5/10)	SC	7	
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17	5/1/17 18:50	05011717.D	0.10ng TO-15 ICAL STD	S31-04191701/S31-04111709 (5/10)	SC	7	
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20	5/1/17 20:32	05011720.D	1.0ng TO-15 ICAL STD	S31-04191701/S31-04261705 (5/)25	SC	3	RR
21	5/1/17 21:06	05011721.D	5.0ng TO-15 ICAL STD	S31-04191701/S31-04261705 (5/)25	SC	3	
22	5/1/17 21:40	05011722.D	25ng TO-15 ICAL STD	S31-04191701/S31-04261703 (5/25)	SC	4	
23	5/1/17 22:14	05011723.D	50ng TO-15 ICAL STD	S31-04191701/S31-04261703 (5/25)	SC	4	
24	5/1/17 22:48	05011724.D	100ng TO-15 ICAL STD	S31-04191701/S31-04261703 (5/25)	SC	4	
25	5/1/17 23:21	05011725.D	Blank (100mL)	S31-04191701	SC	2	
26	5/1/17 23:55	05011726.D	25ng TO-15 ICV STD	S31-04191701/S31-04251705 (5/24)	SC	2	cf
27	5/2/17 0:29	05011727.D	25ng TO-15 ICV STD	S31-04191701/S31-04251705 (5/24)	SC	2	cf
28	5/2/17 8:57	05011728.D	1.0ng TO-15 ICAL STD	S31-04191701/S31-04261705 (5/25)	SC	3	
29	5/2/17 9:31	05011729.D	Blank (100mL)	S31-04191701	SC	2	
30	5/2/17 10:04	05011730.D	0.40ng TO-15 ICAL STD	S31-04191701/S31-04111708 (5/10)	SC	6	
31	5/2/17 10:52	05011731.D	25ng TO-15 ICV STD	S31-04191701/S31-04251705 (5/24)	SC	2	pass
32							
33							5/2/17
34							
35							
36							
37							
38							
39							
40							
41							
42							

Injection Log

00858839

Directory: I:\MS09\Data\2017_06\15\

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3	6/15/17 6:48	06151703.D	Blank (100mL)	S31-06061702	SC	2	
4	6/15/17 7:22	06151704.D	MB R9061517_1000mL	S31-06061702	SC	2	pass
5	6/15/17 7:55	06151705.D	LCS R9061517_25ng	S31-06061702/S31-05191701 (6/17)	SC	2	pass
6	6/15/17 8:29	06151706.D	LCSD R9061517_25ng	S31-06061702/S31-05191701 (6/17)	SC	2	pass
7	6/15/17 10:45	06151707.D	P1702678-001 (1000mL)	S31-06061702	SC	11	
8	6/15/17 11:19	06151708.D	P1702678-002 (1000mL)	S31-06061702	SC	12	
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13	6/15/17 15:16	06151713.D	P1702876-002 (1000mL)	S31-06061702	SC	6	
14	6/15/17 15:49	06151714.D	P1702876-003 (1000mL)	S31-06061702	SC	7	
15	6/15/17 16:23	06151715.D	P1702773-001 (3.0mL)	S31-06061702	SC	1	
16	6/15/17 16:57	06151716.D	P1702773-002 (3.0mL)	S31-06061702	SC	1	
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19	6/15/17 18:47	06151719.D	P1702677-001 (1000mL)	S31-06061702	SC	8	
20	6/15/17 19:21	06151720.D	P1702677-002 (1000mL)	S31-06061702	SC	15	
21	6/15/17 19:55	06151721.D	P1702773-003 (1000mL)	S31-06061702	SC	3	
22	6/15/17 20:29	06151722.D	P1702773-004 (1000mL)	S31-06061702	SC	4	
23	6/15/17 21:03	06151723.D	P1702771-002 (1000mL)	S31-06061702	SC	9	
							6/16/17

APPENDIX G: Protocol for Discharging GWTP Effluent

MEMORANDUM

DATE: September 14, 2017

PROJECT NAME: Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Karnack, TX

TO:	Richard Mayer	Senior Project Engineer US Environmental Protection Agency Federal Facilities Section (6PD-F)
	April Palmie	Project and Grant Manager Superfund Section, Remediation Division Texas Commission on Environmental Quality
FROM:	Rose M. Zeiler, Ph.D.	Longhorn AAP Site Manager

SUBJECT: **Protocol for Discharging GWTP Effluent**
Longhorn Army Ammunition Plant, Karnack, TX
(Contract: W912DY-09-D-0059, Task Order DS01)

INTRODUCTION

The purpose of this memo is to document the protocol for discharging Longhorn Army Ammunition Plant groundwater treatment plant (GWTP) effluent to Harrison Bayou, the INF-Pond, or LHAAP-18/24.

The GWTP is designed to:

- Extract groundwater from LHAAP-18/24 and LHAAP-16 for hydraulic control;
- Remove metals by pH adjustment, polymer addition, and gravity separation;
- Remove volatile organic compounds (VOCs) by air stripping;
- Remove perchlorate in a fluidized bed reactor (FBR) and an ion exchange scavenger system; and
- Discharge the effluent continuously.

DISCHARGE CRITERIA

The discharge criteria established for discharge to Harrison Bayou are:

Parameter	Discharge Criteria (µg/L)	
	Daily Average	Daily Maximum
Volatiles		
1,1,1-Trichloroethane	3,417	7,230
1,1,2-Trichloroethane	102.5	216.9
1,1-Dichloroethane	6,633	14,032
1,1-Dichloroethene	119	253
1,2-Dichloroethane	85	181
Acetone	1,132	2,395
Benzene	85	181
Carbon Tetrachloride	85	181
Chlorobenzene	22,300	47,180
Chloroform	1,708	3,615
Ethylbenzene	26,954	57,025
Xylenes	39.5	83.6
Methylene Chloride	803	1,699
Styrene	2,829	5,987
Tetrachloroethene	85.4	180.7
Toluene	1,980	4,189
Trichloroethene	85	181
Vinyl Chloride	34	72
Anions		
Chloride	*	*
Sulfate	*	*
Perchlorate	278	589
Metals		
Aluminum	777	1,644
Arsenic	365	772
Barium	1,000	2,000
Cadmium	1.6	3.4
Chromium, Total	355	752
Chromium, Hexavalent	58	124
Cobalt	5,433	11,495
Iron	1,132	2,395
Lead	2.2	4.6
Nickel	87	184
Manganese	7,323	15,494
Silver	1.4	3
Selenium	5.7	12
Vanadium	1,698	3,592
Zinc	146	310
Other		
Hexachlorobenzene	0.22	0.47
1,4-Dioxane		134.2
Oil and Grease		15
Chemical Oxygen Demand		200

*- Based upon flow in Harrison Bayou

PROTOCOL FOR DISCHARGING GWTP EFFLUENT

In accordance with the *Sampling and Analysis Plan, Groundwater Treatment Plant and Well Fields* (SAP) Table 2-2, indicator parameters for the FBR, such as temperature, pH and oxidation reduction potential (ORP), are monitored in real time to predict FBR performance and perchlorate removal. Based upon these indicator parameters, the operator of the GWTP can make adjustments such as:

- Bring the ion exchange system online;
- Increase or decrease the addition rate of electron donor (acetic acid);
- Increase or decrease the nutrient addition rate (urea or phosphoric acid); or
- Increase or decrease the FBR recirculation rate

Samples of the GWTP effluent are collected weekly, analyzed for perchlorate, nutrients (ammonia-nitrogen and ortho-phosphate), total organic carbon (TOC), chloride, and sulfate, with the results received from the laboratory 14 days later. Other parameters (e.g. Record of Decision metals and volatiles) are collected and analyzed in GWTP effluent samples according to the frequencies listed in Table 2-1 of the SAP.

As shown in Figure 1, groundwater is continuously extracted, treated, and discharged. If Harrison Bayou is flowing and indicator parameters are within their historical optimal ranges, then the ion exchange vessels can be bypassed and the GWTP effluent sample will be collected after the FBR. If Harrison Bayou is not flowing or the indicator parameters are not within historical optimal ranges, then the ion exchange vessels will be put on line, and the GWTP effluent sample will be collected between the lead and lag ion exchange vessel. Professional judgement may also be used as to when to bring the ion exchange vessels online, such as after a power outage or during anticipated cold temperatures when the FBR has historically not performed optimally.

If a parameter is measured in the effluent at a concentration above the discharge criteria, then a confirmation sample and an effluent sample after the lag ion exchange vessel will be collected and analyzed for the parameter with a 24-hour turnaround time. Corrective measures (e.g. increased nutrient or electron donor addition rates, bring ion exchange vessels on line) will be implemented as appropriate to bring the parameter back within the discharge criteria. ***If an upset condition in the FBR leads to high concentrations of perchlorate going into the lead ion exchange vessel and breaking through at the sample location between the vessels, the lag vessel will still remove perchlorate before it is discharged to Harrison Bayou, the INF Pond, or LHAAP-18/24.*** It is estimated that the lag ion exchange vessel can remove all of the perchlorate from two weeks of typical groundwater extraction at a concentration of 920 µg/L. If the residual perchlorate concentration after the FBR and lead ion exchange vessel is only 600 µg/L, the lag ion exchange vessel could last almost 2.5 years before perchlorate would be detected in the discharged effluent.

If a parameter exceeds the discharge criteria by more than 40% (see Appendix A-2, SAP, Section 7c of Monitoring and Reporting Requirements) or reaches 920 µg/L of perchlorate, then the GWTP will be put into full recycle mode (no discharge) until the parameter is below the discharge criteria again. Appendix A-2 of the SAP requires GWTP data to be provided to TCEQ monthly including a list of noncompliance(s), if applicable.

Discharge to Harrison Bayou

As shown in Figure 1, the GWTP effluent will be discharged to Harrison Bayou as long as it has a measurable flow. The flowrate in Harrison Bayou is estimated by measuring the height of water with a staff gauge and velocity in feet/sec at intervals along the width as described in the Installation-Wide Work Plan, Standard Operating Procedures, Attachment 18 – Water Depth and Velocity Measurements (AECOM, July 2014).

The allowable flow rate of GWTP effluent that can be discharged to Harrison Bayou is given by:

$$Q_E \leq \frac{Q_S(C_C - C_A)}{(C_E - C_C)}$$

where Q_E = GWTP effluent flow, gal/min

Q_S = Harrison Bayou flow, gal/min

C_C = Criteria concentration (100 mg/L for chloride, 50 mg/L for sulfate)

C_A = Ambient concentration = 10 mg/L

C_E = Chloride or sulfate concentration in GWTP effluent, mg/L

The allowable GWTP effluent flow will be the lower of the calculated values given the measured concentrations of chloride and sulfate in the discharge stream. For each day that GWTP effluent is discharged to Harrison Bayou, the measured Harrison Bayou flow, the allowable effluent flow, and the actual effluent flow are recorded.

Discharge to INF Pond

If Harrison Bayou is not flowing, then GWTP effluent will be discharged to the Intermediate-Range Nuclear Forces (INF) Pond for temporary storage until Harrison Bayou flow resumes. The INF Pond has a flexible membrane liner protected by a soil cover with a gravity discharge pipe (and valve) to Harrison Bayou. The INF Pond has a nominal capacity of 3 million gallons with a staff gage to measure the height of water stored in the pond. The GWTP operator maintains the INF Pond by visually inspecting for erosion, vegetative growth including tree growth along the anchor trench, and liner integrity and making necessary repairs. Periodically, accumulated debris must be removed from the influent and effluent piping to the INF Pond.

Prior to discharging to the INF Pond, a lead and lag ion exchange vessel will be brought online. The GWTP Operator will also confirm that the discharge valve is closed, will record the reading on the effluent totalizer, and will record the height of water using the staff gage. The GWTP Operator will then configure valves and pumps to direct GWTP effluent to the INF Pond. The height of water in the INF Pond and totalizer reading will be recorded at the beginning and end of each shift for the duration of active discharge. When the height of water in the pond reaches 3 feet below the height of the berm (freeboard), the GWTP Operator will stop discharging to the INF Pond and TCEQ will be notified; EPA will be copied on the notification. After the TCEQ acknowledges the INF Pond level, GWTP effluent may be discharged to the INF Pond again until 2 feet of freeboard is reached. The GWTP Operator will stop discharging to the INF Pond and TCEQ will be notified again; EPA will be copied on the

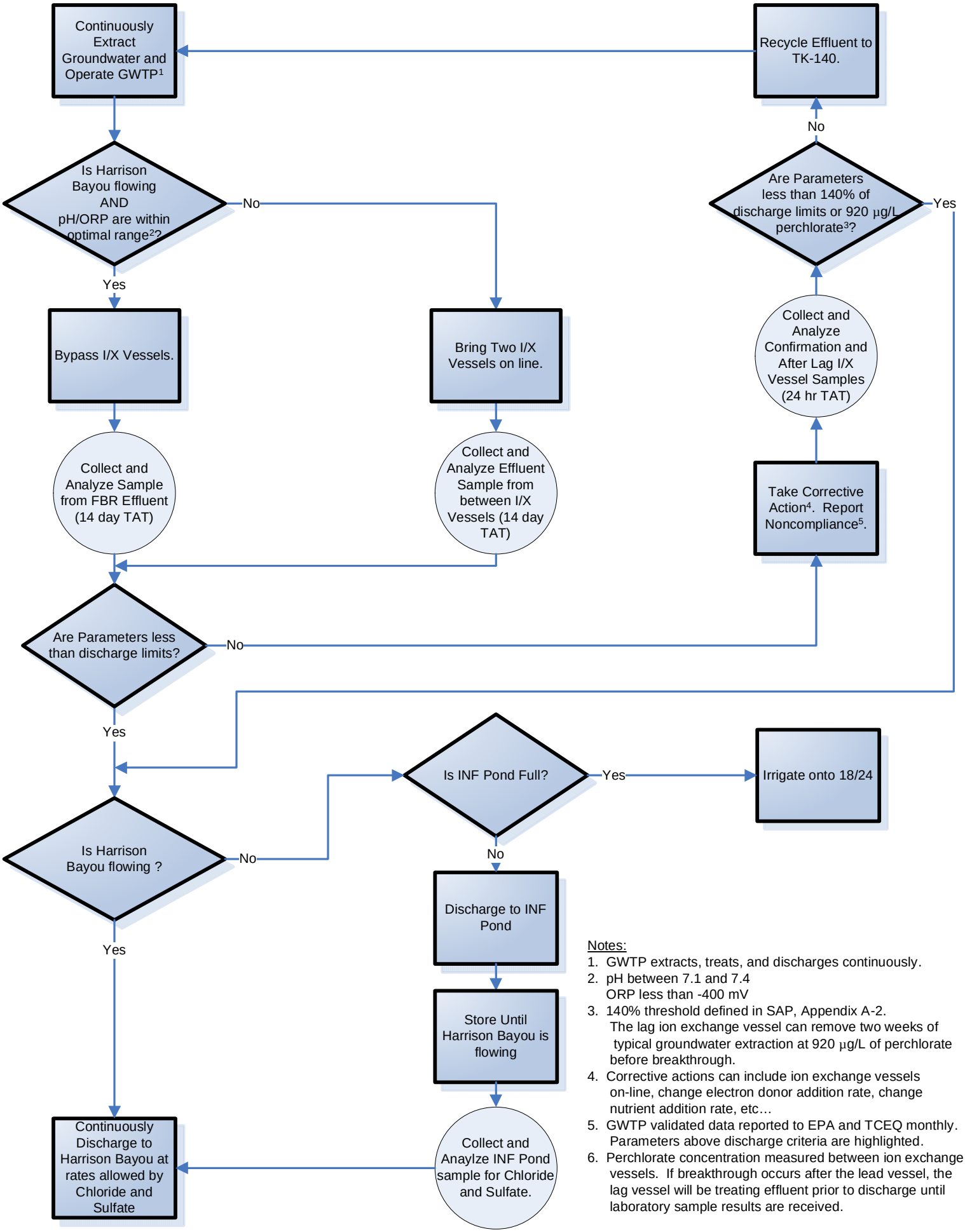
notification. After the TCEQ acknowledges 2 feet of freeboard in the INF Pond, GWTP effluent may be discharged again until 1 foot of freeboard remains. No additional GWTP effluent can be accepted at the INF Pond until greater than 1 foot of freeboard is measured.

As soon as flow in Harrison Bayou returns, stored GWTP effluent from the INF Pond will be discharged. As with direct discharges from the GWTP to Harrison Bayou, the allowable flowrate of effluent from the INF Pond is calculated based upon the chloride and sulfate concentrations in the pond and the flow in Harrison Bayou. The discharged water from the INF Pond will be measured with a flow totalizer. If effluent from the INF Pond and the GWTP are discharged simultaneously, total flow of both streams together should not exceed the calculated discharge level for either discharge location. For each day that INF Pond contents are discharged to Harrison Bayou, the measured Harrison Bayou flow, the allowable effluent flow, and the actual effluent flow are recorded.

Irrigation onto LHAAP-18/24

If Harrison Bayou is not flowing and the INF Pond has less than 1 foot of freeboard, then GWTP effluent will be irrigated onto LHAAP-18/24 using one of the three main sprinkler lines. To avoid pooling and runoff of irrigation water, only one line will be used for half a day at a time, with a separate line being used the second half of the day. If needed, the irrigation will occur 5 days a week for 8 hours each day (using 3 sprinklers in each line). If conditions are wet due to rain events, irrigation will not be conducted to avoid ponding and potential runoff, the GWTP will be put into recycle mode, and groundwater extraction will be interrupted if storage space is not available.

While irrigating, site inspections will be performed to ensure pooling and runoff are not occurring. During the irrigation activities, inspections will be performed twice a day, once approximately three hours and again approximately six hours into the 8-hour irrigation shift. The system will be inspected to ensure that the sprinkler heads are operating properly and not leaking large amounts of water. If ponding or runoff is observed, irrigation at that sprinkler line will cease, and irrigation at another sprinkler line will be started if possible. Volumes of GWTP effluent and twice daily inspections will be recorded daily and reported monthly until flow resumes in Harrison Bayou or greater than 1 foot of freeboard is available in the INF Pond.



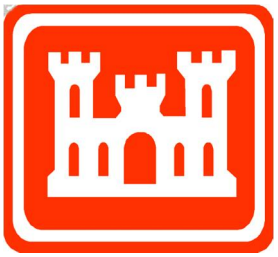
Notes:

1. GWTP extracts, treats, and discharges continuously.
2. pH between 7.1 and 7.4
   ORP less than -400 mV
3. 140% threshold defined in SAP, Appendix A-2.
   The lag ion exchange vessel can remove two weeks of typical groundwater extraction at 920 µg/L of perchlorate before breakthrough.
4. Corrective actions can include ion exchange vessels on-line, change electron donor addition rate, change nutrient addition rate, etc…
5. GWTP validated data reported to EPA and TCEQ monthly. Parameters above discharge criteria are highlighted.
6. Perchlorate concentration measured between ion exchange vessels. If breakthrough occurs after the lead vessel, the lag vessel will be treating effluent prior to discharge until laboratory sample results are received.

Figure 1. Continuous Discharge Protocol Flowchart

QUARTERLY EVALUATION REPORT
3RD QUARTER (JULY-SEPTEMBER) 2017
GROUNDWATER TREATMENT PLANT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:



U.S. Army Corps of Engineers
Tulsa District

Prepared By:

AECOM Technical Services, Inc.

November 2017

QUARTERLY EVALUATION REPORT
3RD QUARTER (JULY-SEPTEMBER) 2017
GROUNDWATER TREATMENT PLANT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Tulsa District

Prepared By:

AECOM Technical Services, Inc.

Contract No. W912DY-09-D-0059

Task Order No. DS01

November 2017

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Acronyms and Abbreviations

°F	Degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
AMCV	Air Monitoring Concentration Value
amsl	Above Mean Sea Level
bgs	Below Ground Surface
CD	Compact Disc
COD	Chemical Oxygen Demand
ESD	Explanation of Significant Differences
ESL	Effects Screening Level
FBR	Fluidized Bed Reactor
ft	Feet or foot
gpd	Gallons Per Day
gph	Gallons Per Hour
gpm	Gallons Per Minute
GWTP	Groundwater Treatment Plant
HAZWOPER	Hazardous Waste Operations
HDPE	High Density Polyethylene
HCl	Hydrochloric Acid
ICT	Interception-Collection Trench
IRA	Interim Remedial Action
lbs	Pounds
lbs/hr	Pounds Per Hour
L	Liter
LHAAP	Longhorn Army Ammunition Plant
MC	Methylene Chloride
MCL	Maximum Contaminant Level
mg/L	Milligram per Liter
$Mg(OH)_2$	Magnesium Hydroxide
Microbac	Microbac Laboratories
mV	Millivolt
NA	Not Applicable

NaOH	Sodium Hydroxide
ORP	Oxidation-Reduction Potential
PCL	Protective Concentration Level
pH	Negative logarithm of hydrogen ion concentration
PID	Photoionization Detector
PM	Preventive Maintenance
ppmv	Parts Per Million by Volume
psi	Pounds Per Square Inch
ROD	Record of Decision
SWEPCO	Southwestern Electric Power Company
TAC	Texas Administrative Code
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
tpy	Tons Per Year
UEP	Unlined Evaporation Pond
µg/L	Microgram Per Liter
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UTV	Utility Terrain Vehicle
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The operation of the Groundwater Treatment Plant (GWTP) is part of the Interim Remedial Action (IRA) at Burning Ground No. 3, also referred to as Longhorn Army Ammunition Plant (LHAAP)-18/24. A historical pilot test for nearby landfill LHAAP-16 resulted in the installation of eight extraction wells which also contribute groundwater to the GWTP. Groundwater extraction, treatment, and monitoring activities consist of:

- Continuous extraction of groundwater from multiple interception-collection trenches (ICTs) and extraction wells at both LHAAP-18/24 and LHAAP-16;
- Treatment of extracted groundwater for heavy metals, chlorinated compounds, and perchlorate using precipitation, air stripping, and biological methods, respectively;
- Evaluation of the hydraulic effectiveness of the extraction system by groundwater monitoring;
- Monitoring of treated groundwater to ensure compliance with the discharge limits; and
- Discharge of treated water to Harrison Bayou, or to a holding pond (INF Pond), or the treated water may be released as irrigation water on LHAAP-18/24.

The location of the extraction wells and ICTs are shown in **Figure A-1** of **Appendix A**. The process flow diagram of the GWTP is shown in **Figure A-2** of **Appendix A**.

Figure ES-1 depicts the monthly total volume of groundwater that was extracted from the ICTs and extraction wells at LHAAP-18/24 and LHAAP-16 between January 2012 and September 2017.

The GWTP was not operational during June, July, and August 2012. This was related to meltdown of the scrubber system, associated with the catalytic oxidizer, due to system overheating. Overheating occurred when the blower became inoperable after the bearing on the scrubber blower unit was shattered and damaged the blower. This occurred around 1:00 PM on May 21, 2012.

After developing an interim air monitoring plan and obtaining concurrence from the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA) to operate the GWTP without use of air abatement equipment, a pilot run of the GWTP was conducted on September 6, 2012. In that first pilot run, 85,170 gallons of water that had been stored in the influent tank (TK-140) were treated. The treated water was re-circulated through the fluidized bed reactor (FBR) to revive the FBR after three months of dormancy. Treated groundwater and air samples were collected and analyzed respectively for perchlorate, metals, and volatile organic compounds (VOCs); and VOCs only. On September 19, 2012, a second pilot run was performed at the GWTP and 107,264 gallons of water were treated. Based on the successful re-start of the GWTP, continuous groundwater extraction began again on September 24, 2012. While groundwater extraction occurs on a continuous basis, operation of the GWTP occurs intermittently due to the low volume of water available for treatment with respect to the design capacity of the GWTP. During the 3rd Quarter 2012, groundwater extraction occurred only from LHAAP-18/24. Groundwater extraction from LHAAP-16 was not performed due to equipment failure. However, extraction from LHAAP-16 began in October 2012 and the

extraction volumes increased steadily throughout the 4th Quarter 2012, as pumping equipment was gradually repaired/replaced. The GWTP operated under normal conditions until September 2015.

On September 14, 2015 at 11:15 AM, the blower on the air stripper (BL-340) malfunctioned during routine operation. The wiring on the blower was repaired and the blower operated for less than 2 hours on September 17, 2015, when the blower malfunctioned again. It was determined that the blower needed to be replaced, and groundwater extraction and operation of the GWTP ceased beginning September 18, 2015, as the influent equalization tank (TK-130) became full. Beginning on October 2, 2015, it was determined that the GWTP could operate without the blower at a reduced extraction rate. The operation of the GWTP allowed extraction of groundwater from ICTs 12E, 13A, 13B and 13C (13C was changed to ICT 13E on October 12, 2015), which were considered critical ICTs to prevent migration of contaminants to Harrison Bayou. Groundwater extraction was switched frequently between ICTs 12E, 13A, 13B, and 13E to ICTs 14B, 14C, and 14D beginning December 14, 2015.

On December 12, 2016, flange bolts at TK-380 failed and allowed hydrochloric acid (HCl) to drain into the sump. The containment area was washed down and the sump contents were transferred into TK-140 Equalization Tank. Because of the acid release, extraction of groundwater from ICTs was halted, and the GWTP was put into recycle mode (effluent sent back as influent) until the acid was neutralized and perchlorate, metals, and VOCs were below discharge criteria on March 17, 2017.

On August 12, 2017, severe storms caused a power outage at LHAAP-18/24. When electrical service was restored, the main transformer failed due to a manufacturing defect. A portable emergency generator was brought on-site on August 21, 2017 to allow the FBR to operate in full recycle mode. After a replacement transformer was installed on September 12, 2017, extraction began from ICT-13B, 13C, 13D, 13E, 13F, 7, and EW01 and the FBR was put into normal operation. Beginning on September 21, 2017, groundwater was extracted from all of the ICTs.

As indicated in **Figure ES-1**, the total extracted groundwater volume from LHAAP-18/24 during the 3rd quarter of 2017 decreased from the previous quarter as the GWTP because of a transformer failure. Extraction quantities in LHAAP-18/24 ranged between 226,716 gallons in August 2017 and 475,903 gallons in July 2017. Extraction from LHAAP-16 increased from the previous quarter and ranged between 23,246 gallons in August 2017 and 44,191 gallons in July 2017. Approximately 1,108,407 gallons of groundwater were extracted from LHAAP-18/24 and LHAAP 16 during the 3rd quarter of 2017 compared to approximately 2,044,325 gallons extracted during the 2nd quarter of 2017. The extracted groundwater volume was measured on a monthly basis as the sum of the ICTs flow meter totalizers' differences between the beginning and end of each month.The average discharged flowrate from the GWTP was calculated as 210 gallons per minute (gpm) during the 3rd quarter of 2017, with 651,434 gallons of groundwater discharged to Harrison Bayou, and 1,033,626 gallons discharged to the INF Pond. Grab perchlorate samples from the GWTP influent were collected on July 6, August 2, September 27, and September 28 2017 and the following concentrations were reported: 6,620 micrograms per liter (µg/L), 13,800 µg/L, 7,010 µg/L, and 5,610 µg/L, respectively. The average perchlorate concentration in the GWTP influent during the quarter was 8,260 µg/L. No perchlorate concentrations in any effluent (TK-650) samples exceeded the daily average or daily maximum effluent limits of 278 µg/L and 589 µg/L, respectively, during the quarter. Release of treated

groundwater from the GWTP occurred only after the perchlorate concentration was below the discharge limit, and flow in Harrison Bayou was adequate.

No treated water was returned to ICTs 6 and 9 during the 3rd Quarter 2017, because this practice was discontinued after system restart in September 2012. The treated water quantities returned to LHAAP-18/24 through the injection system each month since January 2008 are shown on **Figure ES-2**.

As shown in **Table ES-1**, no treated water was discharged directly from the GWTP to Harrison Bayou, but 651,434 gallons of treated water was discharged from the INF Pond to Harrison Bayou during the 3rd Quarter 2017.

The groundwater volume processed at the GWTP ranged from a low of approximately 196,607 gallons in August 2017 to a high of approximately 671,351 gallons in July 2017. Total water processed for the 3rd Quarter 2017 was approximately 1,263,604 gallons. The three month average was approximately 421,201 gallons per month. The water quantities treated each month since June 2012 are shown on **Figure ES-3**. The total volume of water processed in the 3rd quarter (1,263,604 gallons) is higher than the volume of water discharged (1,033,626 gallons). The reason for the difference is the change in volume stored in the GWTP, the amount of water lost with the removed metals precipitation sludge, and the amount of evaporative water lost in the air stripper (which is included in the volume processed, but not in the volume discharged).

The difference between the volume of water extracted (approximately 1,108,407 gallons) and the water volume discharged to the INF Pond (approximately 1,033,626 gallons) can be due to storage within the GWTP.

Figure ES-1: Groundwater Recovery Between
September 2012 & September 2017
LHAAP-18/24 & LHAAP-16

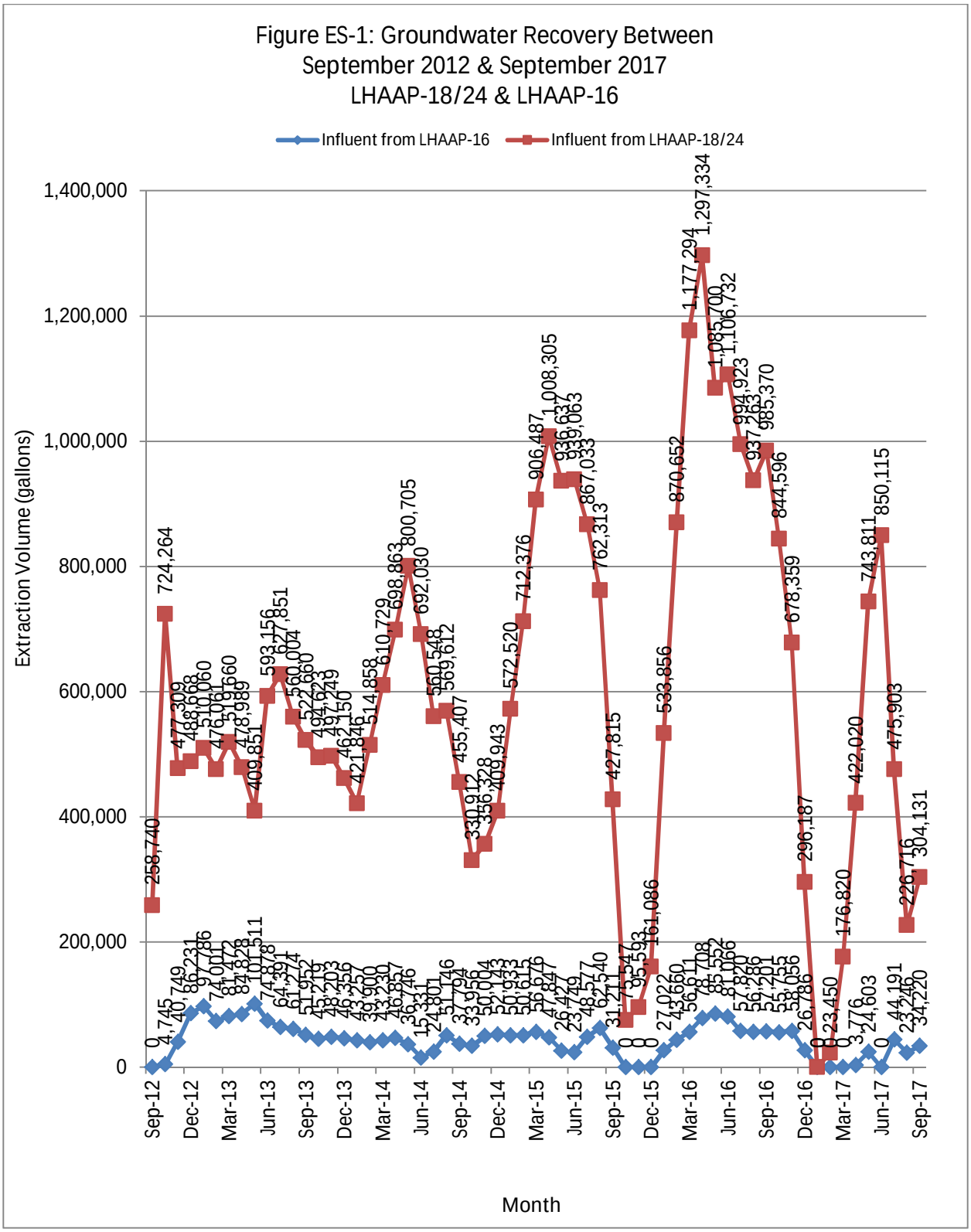


Figure ES-2: Treated Water Injected in LHAAP-18/24
from December 2007 through September 2017

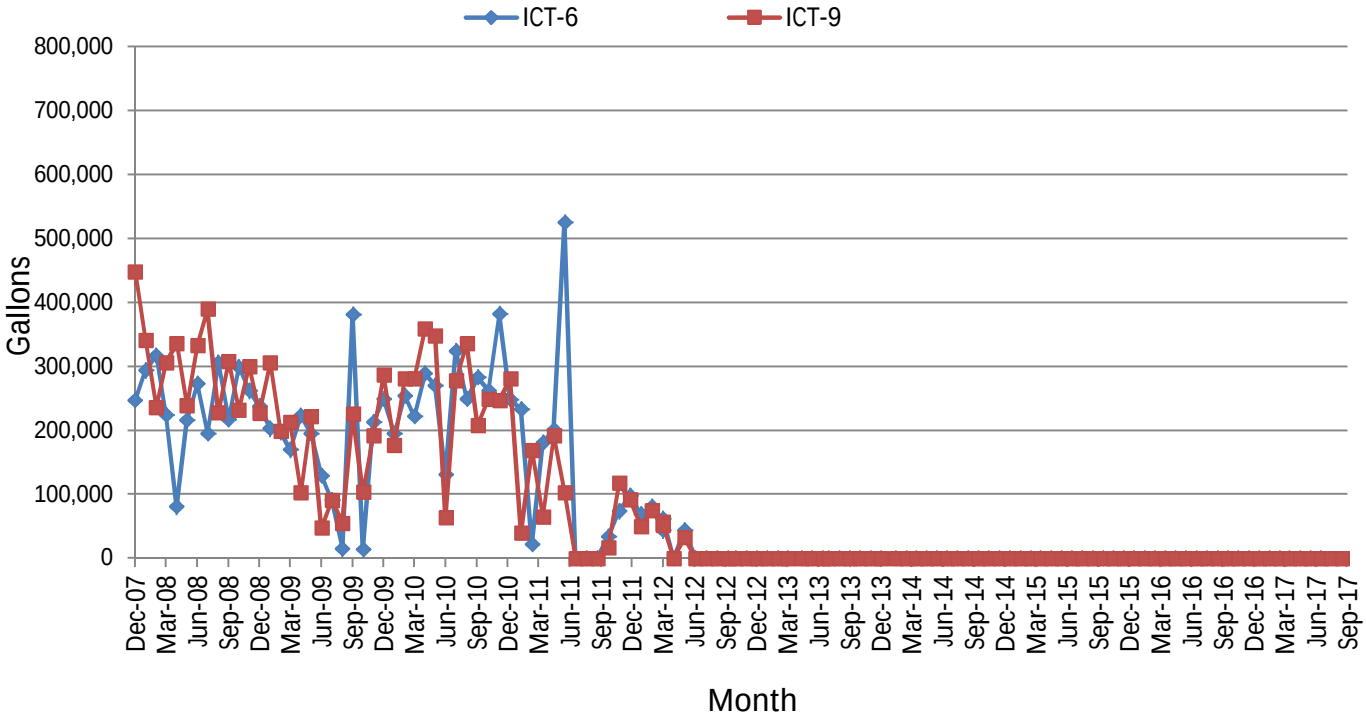


Figure ES-3: Water Treated Monthly from June 2012 through September 2017

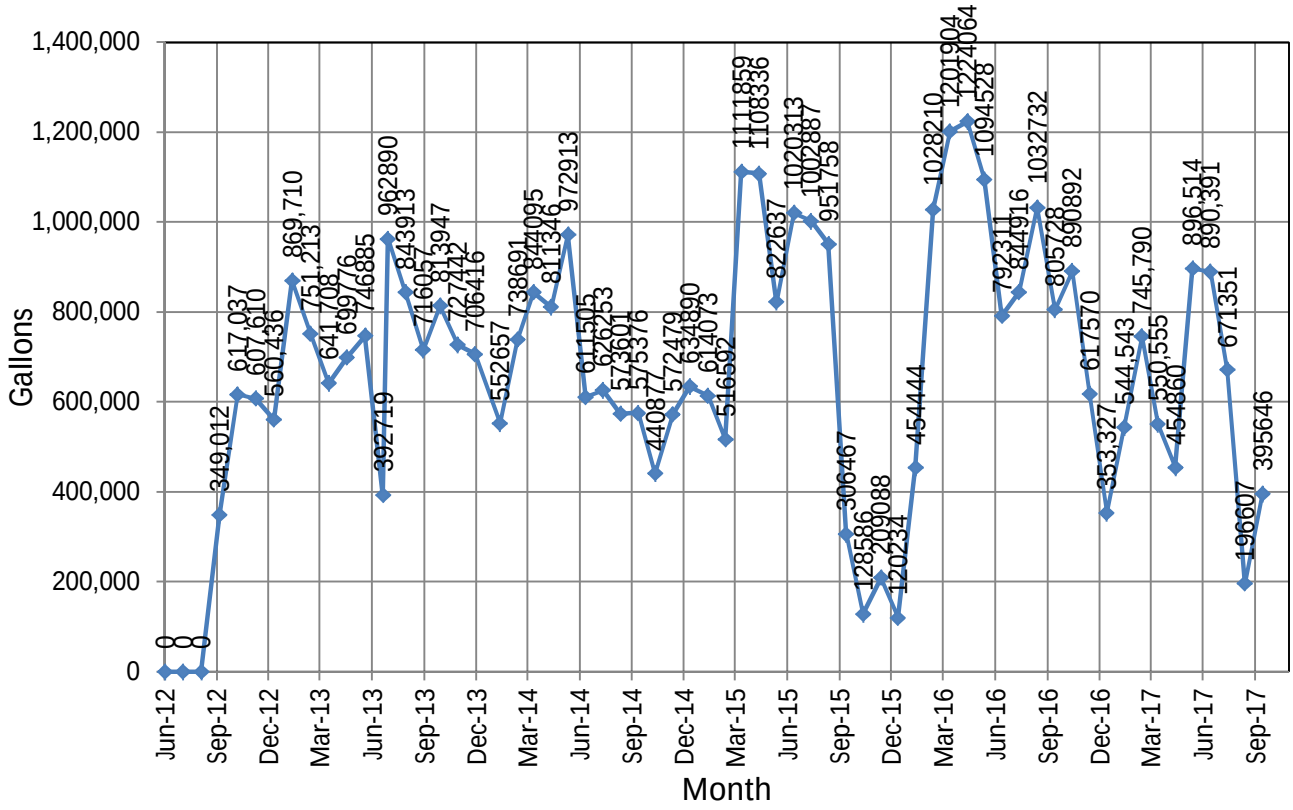


Table ES-1: Discharge Information to Harrison Bayou during 3rd Quarter 2017*

Date	HB Flow (gpm)	Maximum Rate Allowed (gpm)	Maximum Rate Allowed (gallons in 24 hours)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Combined Total Released to Harrison Bayou
09/01/2017	3071	897	1,291,680	0	184,900	184,900
09/02/2017	1246	284	408,960	0	190,735	190,735
09/03/2017	1031	235	338,400	0	127,746	127,746
09/04/2017	625	142	204,480	0	27,657	27,657
09/05/2017	280	64	92,160	0	51,276	51,276
09/06/2017	214	48	69,120	0	69,120	69,120
TOTAL Discharged				0	651,434	651,434

* Days where discharge occurred are shown.

HB - Harrison Bayou

gpm - gallons per minute

GWTP - Groundwater Treatment Plant

1 EVALUATION OF GWTP

The groundwater contamination at LHAAP-18/24 likely resulted from infiltration from an Unlined Evaporation Pond (UEP) that was used to store manufacturing wastewater, and from burning trenches, and other industrial processes used to flash pyrotechnic, propellant, and explosive waste streams. The Groundwater Treatment Plant (GWTP) was constructed as part of the Interim Remedial Action (IRA) at Burning Ground No. 3, also referred to as Longhorn Army Ammunition Plant (LHAAP)-18/24, to treat groundwater extracted from interception-collection trenches (ICTs) and extraction wells. The groundwater at LHAAP-18/24 is contaminated mainly with chlorinated ethenes and perchlorate, with lesser concentrations of 1,4-dioxane.

The GWTP also receives flow from eight extraction wells installed at LHAAP-16 as part of a historical treatability study. The extraction wells were installed in 1996 and 1997. The wells are located between the landfill at LHAAP-16 and Harrison Bayou. The groundwater at LHAAP-16 is also contaminated mainly with chlorinated ethenes and perchlorate.

1.1 Treatment Configuration

The GWTP was not operational between May 24, 2012 and September 6, 2012, due to malfunction of the scrubber unit associated with the catalytic oxidizer. Since September 6, 2012, the GWTP has operated without air abatement equipment. Although major repairs were conducted on the GWTP (e.g., replacement of level alarms, repair of the hydrochloric acid [HCl] tank, replacement of TK-650, replacement of malfunctioning valves and flow meters, replacement of metering pumps, repair or replacement of various system pumps, rust removal and repainting of various tanks, and replacement and repair of various extraction pumps, motors, and level switches), the GWTP treatment configuration has remained unchanged.

Malfunction of the blower on the air stripper (BL-340) on September 14, 2015 and on September 17, 2015 disrupted continuous extraction and routine operations of the GWTP, which lasted through January 7, 2016. Prior to this occurrence, the GWTP performed as designed and the GWTP was operated on an as needed basis (i.e., on semi-continuous operational basis). During the 4th Quarter 2015, groundwater was extracted from a limited number of ICTs (ICTs 12E, 13A, 13B, 13C, and/or 13E, or ICTs 14B, 14C, and 14D). Operation of the GWTP occurred on a batch basis through the fluidized bed reactor (FBR). After replacement of the blower, attempts were made to restore continuous operations to the FBR but remained predominantly on a batch basis throughout January 2016.

In December 2016, a hydrochloric acid spill caused plant operations to shut down until the issue could be properly addressed. The FBR performance was challenged by the increased chlorides in the neutralized wastewater, but performance gradually returned to normal in the 1st quarter of 2017. Groundwater extraction was gradually increased to full rates during the 2nd quarter 2017.

On August 12, 2017, severe storms caused a power outage at LHAAP-18/24. When electrical service was restored, the main transformer failed due to a manufacturing defect. A portable emergency generator was brought on-site on August 21, 2017 to allow the FBR to operate in full recycle mode. After a replacement transformer was installed on September 12, 2017, extraction began from ICT-13B, 13C, 13D, 13E, 13F, 7, and EW01 and the FBR was put into normal operation. Beginning on September 21, 2017, groundwater was extracted from all of the ICTs.

Flow rates for the treatment processes for metals and VOCs ranged between 195 and 227 gpm with an average of approximately 210 gpm for the operating hours (i.e., this flow rate does not represent continuous flows). The GWTP operated for 101 hours during the quarter. The process flow diagram is included as **Figure A-2** of **Appendix A**. The treatment configuration of the plant at these rates (with minor variations) is as follows:

GWTP Metals Precipitation Operating Parameters

Pretreatment Settings	Tank 200-A $Mg(OH)_2$ Mixing	Tank 200-B NaOH Mixing	Tank 200-C Polymer Mixing	Tank 300 feed line to Air Stripper
pH Adjustment	9.0	10.5	NA	5.0 to meet ≤ 8.0 release from stripper
Feed Pump Settings	Speed 100% Stroke 100% 10 gph $Mg(OH)_2$	Speed 100% Stroke 100% 9.0 gph NaOH	Speed 90% Stroke 100% 40 gph water	Speed 80% Stroke 80% 10 gph HCl

Notes:

gph	gallons per hour	HCl	hydrochloric acid	NaOH	sodium hydroxide
GWTP	Groundwater Treatment Plant	$Mg(OH)_2$	magnesium hydroxide	NA	not applicable

GWTP Air Compressors Operating Parameters

Air Compressors	K-700A	K-700B	K-701
Air Pressure Settings	88 psi	88 psi	105 psi

Notes:

GWTP Groundwater Treatment Plant
psi pounds per square inch

GWTP Stripper Operating Parameters

Stripper Tower	
pH Settings	7.4
Inlet Pressure Gauge	Not operational
Stripper Pressure Gauge	Not operational
Air Flow Rate	Not operational

Notes:

GWTP Groundwater Treatment Plant

GWTP Fluidized Bed Reactor Operating Parameters

Fluidized Bed Reactor	
Carbon Bed Height	12 feet & 8 to 11 inches
Recycle Flow Rate	200 gpm
pH	7.1 to 7.4
Recycle oxidation-reduction potential (ORP)	-430 mV to -452 mV

Notes:

gpm	gallons per minute
GWTP	Groundwater Treatment Plant
mV	millivolts

1.2 Work Performed at the GWTP

Work performed at the GWTP during the 3rd Quarter 2017 is described in the following subsections.

1.2.1 Major Maintenance

The major maintenance items that were completed at the GWTP during this quarterly reporting period are:

- 7/3/17: Jack Spring Electrical was on site to repair broken power line from a fallen tree.
- 7/7/17: Tri-State Electrical was on site to repair bad contactors and overloads on mixers in TK-200A & TK-200B. They also replaced a bad main breaker in the electrical panel at Site 16.
- 7/10/17: Jack Spring Electrical was on sire to repair blown fuses in circuit #7 power line.
- 7/18/17: Fuller Water Well Service was on site to investigate what needs to be done to repair the potable water system.
- 7/21/17: Ark-La-Tex Electric was on site to complete unfinished items on power line.
- 7/27/17: Fuller Well Service was on site to repair potable water system.
- 7/27/17: SafteLite Auto Glass was on site to replace broken passenger door window in truck.
- 8/4/17: Fuller Water Well Service was on site to disinfect potable water well #1 and collected sample to be analyzed for bacteria.
- 8/12/17: Power was lost to the GWTP.
- 8/15/17: Jack Spring Electrical was on site to repair two broken insulators on power line and to troubleshoot why power line was blowing fuses. After troubleshooting it was discovered that the new transformer stopped functioning due to a possible manufacturing defect.
- 8/16/17: Ark-La-Tex Electric was on-site to gather information on what size generator is needed to operate the air compressor and FBR.

- 8/21/17: Ark-La-Tex Electric was on site to wire in the temporary generator.
- 8/22/17: Tri-State Electrical was on site to troubleshoot a PLC problem on the FBR.
- 8/23/17: Ark-La-Tex Electric was on site to repair PLC problem on FBR.
- 9/12/17: Ark-La-Tex Electric was on site to install new transformer.
- 9/13/17: Glenmount Global Solutions was on site to troubleshoot PLC problems in Panels 1 & 3 in Burning Grounds.
- 9/21/17: Glenmount Global was on site to install new remote I/O card in Panel 3 in Burning Grounds and remote I/O card and power supply in Panel 1.

1.2.2 Routine Maintenance

The following routine maintenance items were completed at the GWTP during this quarterly reporting period:

- Performed housekeeping in GWTP office, Army trailer, GWTP and containment area, and GWTP Shop.
- Mow grass around directional signs and GWTP.
- Bush-hog around INF pond and roadway from automatic gate to GWTP.
- Repair broken seal water line on P-320.
- Replace diaphragms on P-270.
- Remove suction piping on P-270 and remove plug from line.
- Replaced broken ½" nipple between discharge piping and pressure gauge on P-320.
- Greased bearings and tighten belts on air stripper blower.
- Back flush Ion Exchange Vessels.
- Install new hoist on boom arm.
- Rebuild used grundfos pumps.
- Install new flow meter at INF pond discharge location.
- Used chainsaw and tractor to remove fallen tree from road between Site 16 & INF pond.
- Repair tail wheel and sway bar on bush-hog.
- Install new deck wheels, center rollers and blades on lawn mower.
- Replace broken section of 3" piping and broken 3" flange on discharge of P-320.
- Triple rinse empty acetic acid drums and place in storage location.
- Bush-hogged Site 17.
- Weed eat around GWTP and Army trailer.
- Bush-hogged Landfill 12.

- Repair concrete at TK-380 (HCL storage tank).

1.2.2.1 Safety

- No safety training or events occurred during the reporting period.

1.2.2.2 Lubrication

- No lubrication maintenance was conducted during the reporting period.

1.2.2.3 Air Compressors

- Ingersoll-Rand was on site to finish PM of K-701 air compressor and also to rebuild the inlet valve.

1.2.2.4 Belt Press and Waste Disposal

- No belt press or waste disposal was conducted during the reporting period.

1.2.2.5 Catalytic Oxidation & Continuous Emission Monitor System

- The catalytic oxidizer was not operated during the reporting period.

1.2.2.6 Sand Filter

- No maintenance or repairs were conducted on the sand filter.

1.2.2.7 Well Field at LHAAP-18/24

- Collect monthly flowmeter readings
- Collect monthly water levels
- Bush-hog & weed eat around ICT wells
- Clean low level probe in ICT 2, 8, 14C & 14D
- Install new pumps on ICT's 13A, 13C & 13B.
- Install new pump and electric motor in ICT 11.
- Replaced low level probe in ICT 4.
- Install a rebuilt pump in ICT 2
- Adjust level probes in ICT 13D

1.2.2.8 Miscellaneous Activities

- Started clearing around UXO signs at MMRP Site 001
- Bush-hog and weed eat around UXO signs at MMRP Site 003
- Bush-hog around wetland area at Site 17
- Used bulldozer and weed eater to clear around MMRP Site 001.

- Use bulldozer to remove fallen trees from monitoring well access road below Site 16.
- Replaced missing signs and installed new Danger decals on existing signs at MMRP Site 001.
- Use chainsaw and tractor to remove fallen trees from electrical right of way.

1.2.3 Routine Maintenance at LHAAP-16

- Check site daily
- Collected monthly water levels
- Mow grass around TK-700, pump house and extraction wells

1.2.4 Routine Maintenance (Potable Water Wells)

- Flush potable water lines
- Work to restore potable water to GWTP
- Re-connect piping and flanges on 500 gallon pressure tank at potable water pump house
- Added chlorine tablets to potable water well # 1

1.3 Filter Cake Operations and Management

- No filter cake operations took place during this reporting period.

1.4 Fluidized Bed Reactor Operations

- The combined FBR and ion exchange system operated well during the 3rd quarter of 2017 with no exceedances of the perchlorate discharge criteria. Except for the period of the transformer outage (August 12, 2017 to September 12, 2017), the FBR and ion exchange system discharged continuously to the INF Pond. During the quarter, the ORP ranged between -331 and -564 millivolts (mV), and the pH ranged between 6.8 and 7.5 standard units. While in recycle mode, the nutrients levels were higher than usual with ammonia nitrogen concentrations between 5.35 mg/L to 43.8 mg/L, orthophosphate concentrations between 1.44 mg/L and 7.84 mg/L, and total organic carbon concentrations between 50.5 mg/L and 206 mg/L. Nutrient levels returned to their normal levels once the FBR began discharging continuously. During the transformer outage, sodium nitrate was added to the FBR as a supplemental electron acceptor until perchlorate in extracted groundwater could be fed to the reactor. The average perchlorate concentration in the GWTP influent during the 3rd Quarter 2017 was 8,260 µg/L.

1.5 Process Chemical Usage at GWTP

Approximate chemical consumption and the quantity delivered during the 3rd Quarter 2017 are shown on **Table 1-1**.

Table 1-1: Process Chemicals Delivered and Used

Chemical	Usage 3rd Quarter 2017	Quantity Delivered 3rd Quarter 2017
Hydrochloric acid	365 gallons	
Sodium hydroxide (35%)	525 gallons	
Acetic acid (50%)	495 gallons	
Phosphoric acid (75%)	37.7 liters	55 gallons
Magnesium hydroxide	170 gallons	
Urea	277.7 lbs.	500 lbs.
Polymer (magnafloc 110-L)	6.0 liters	

Note(s):
L – liters
lbs - pounds

2 EVALUATION OF LHAAP-18/24 ICT EFFECTIVENESS

The ICT system at Burning Ground No. 3 is composed of 14 sections ranging in length from 100 feet (ft) to 1,300 ft. A total of approximately 5,000 linear ft. of trench was installed within and around three sides of Burning Ground No. 3. The trench sections extend approximately 22 ft to 45 ft below ground surface (bgs). Most, but not all of the trenches are as deep as the confining clay layer of the shallow groundwater zone. High density polyethylene (HDPE) liners were installed in ICTs 12 and 13, located on the western and northern boundaries of LHAAP-18/24, respectively. The locations of the liners are shown on **Figure A-1** in **Appendix A**. **Table A-1** in **Appendix A** presents the depths of the ICTs.

2.1 Sampling Activities

No sampling of the monitoring wells at LHAAP-18/24 was performed during the 3rd Quarter 2017.

2.2 Performance of Plume Capture

The intent of the ICTs is to control groundwater gradients, prevent off-site migration of contaminated groundwater, and to extract the most highly contaminated groundwater and reduce the mass of contaminants in groundwater. Liners were installed in the ICTs on the northern (ICT 13) and western (ICT 12) site boundaries to limit migration of contaminated water from the site towards Harrison Bayou. At the same time, the liners reduce or prevent removal of contaminated groundwater that is outside the containment zone, between the site and Harrison Bayou. The ICTs are installed within the shallow subsurface at the site and capture primarily shallow groundwater (e.g., < 40 ft bgs).

In 2007 and 2008, in consultation with the Texas Commission on Environmental Quality (TCEQ) and the USEPA, the Army ceased operations of ICTs 1, 3, 5, 10, and 12A for groundwater extraction (note that extraction from ICT 12A was resumed after pump replacement in December 2012). Two other ICTs (ICT 6 and ICT 9) were changed from extraction ICTs to re-injection ICTs. Groundwater extraction from well EW-01 located in the northeast central portion of the site began in October 2008 and well 18WW17 located to the northeast of the ICT containment area began in January 2008. **Table B-1** in **Appendix B** presents a summary of extraction equipment replacement since 2011, as dictated by poor extraction performance (malfunctioning pumps, poor pump positioning with respect to groundwater, non-operational level probes, scale build up, etc.). Further discussion of extraction performance of various ICTs and extraction wells is presented in **Section 2.3**.

Potentiometric surface maps of the shallow zone groundwater in the vicinity of LHAAP-18/24, based on groundwater elevations measured on 31 July, 31 August, and 28 September 2017 are shown on **Figures B-1, B-2, and B-3 in Appendix B**, respectively.

The potentiometric surface maps of the shallow zone were contoured by hand. The HDPE liners in the ICTs, where present, were interpreted as groundwater flow barriers. The potentiometric surface maps for July, August, and September 2017 continue to reflect high groundwater elevations in the northern/northwestern portion of the site with groundwater flow occurring radially from a groundwater high at monitor well 123 (174.81 ft above mean sea level [amsl],

July 2017, 174.12 ft amsl, August 2017 and 173.76 ft amsl, September 2017) inside the ICT containment area.

The elevated potentiometric surface contours within the ICTs compared to the lower potentiometric surface contours on the outside of the ICTs is likely due to a no flow boundary condition caused by the ICT liners and groundwater extraction along the ICTs. From the groundwater high at monitoring wells 123 and AWD-2 groundwater flows radially towards the surrounding ICTs which include ICT 13 to the north and northwest, and ICT 12 to the west and southwest. East of the groundwater mound and in the north eastern third of the site, groundwater flow is primarily towards ICT 14 along the northeast site boundary.

Groundwater extraction rates from the ICTs were 520,094 gallons in July 2017, 249,962 gallons in August 2017, and 338,351 gallons in September 2017. Rainfall amounts recorded at the GWTP were 1.85 inches in July 2017, 3.42 inches in August 2017, and 0.33 inches in September 2017.

During the reporting period, approximately 651,434 gallons of treated groundwater was discharged to Harrison Bayou. No treated groundwater from the GWTP was returned to LHAAP-18/24 site via the sprinkler system. Overall groundwater levels decreased throughout the 3rd Quarter 2017 with an average Shallow zone groundwater elevation decline of 1.24 ft.

Groundwater levels in Wilcox Formation wells (generally > 40 to 50 ft bgs) were measured during the 3rd Quarter 2017 groundwater gauging events. Wilcox Formation wells correspond generally to those wells previously identified as "Intermediate" and "Deep" wells. "Intermediate" wells are designated as Upper Wilcox Formation wells and "Deep" wells are designated as Lower Wilcox Formation wells. Generally, groundwater in the Upper and Lower Wilcox Formation wells are in hydraulic communication and so can be treated as a single hydrogeologic unit. Therefore, the groundwater elevations in Upper Wilcox wells were used to construct the potentiometric surface maps for the Wilcox Formation. **Figures B-4, B-5, and B-6** of **Appendix B** show the locations of the Wilcox Formation monitoring wells and the potentiometric surface of the Wilcox aquifer, based on static water levels measured during the July, August, and September 2017 gauging events, respectively. Groundwater in the Wilcox aquifer generally flows in a northerly direction, towards Caddo Lake and there is a downward vertical gradient between the overlying shallow zone and Wilcox Formation. However, a groundwater high in the Wilcox occurs in the area of MW-14. The groundwater elevations in the Wilcox aquifer have decreased between July and September 2017.

2.3 Quantity of Water Extracted from LHAAP-18/24

The average daily extraction rates from the ICTs were 16,777 gallons per day (gpd) in July, approximately 8,063 gpd in August, and approximately 11,278 gpd in September 2017. Extraction rates in August and September were impacted by the transformer failure. Since no power was available to the ICTs, no groundwater was extracted between 8/12/17 and 9/12/17.

The volume of groundwater removed from LHAAP-18/24 and LHAAP-16 during the 3rd Quarter 2017 measured approximately 1,263,604 gallons, based on total flow measured at the GWTP headwork. **Figure 2-1** shows the historical trends of extracted volumes by quarter.

In contrast to the approximate total extracted volume based on total flow measured at the GWTP, the total estimated volume based on individual flow meter readings from LHAAP-18/24 and

LHAAP-16 was approximately 1,108,407 gallons. The difference is approximately 12%, with flow volumes measured at the headwork of the GWTP considered more representative of the extracted groundwater volume due to inaccuracies in the individual flow meter readings.

As indicated by **Table 2-1**, 24 of 28 ICTs produced water during the 3rd Quarter 2017. Below is a brief explanations for the four ICT wells that were not productive:

- ICTs 1, 3, 5, and 10 were shut down on 18 February 2008 as part of a Pilot Study implementation and remain non-operational;

2.4 Groundwater Treatment Plant Sampling and Analysis

As part of the GWTP operations, samples from various water streams are required to be collected and analyzed for the parameters cited in the Interim Record of Decision (ROD) and the TCEQ letter dated January 8, 2002. Besides the ROD sampling requirement, additional sample analyses are typically performed on the influent and effluent samples to monitor the effectiveness of the FBR process. Sections 2.4.1 through 2.4.4 present the results of analyses conducted during the 3rd Quarter 2017. The complete laboratory results are provided on a compact disk (CD) (**Appendix C**).

2.4.1 Perchlorate Sampling

Table 2-2 presents the effluent perchlorate results for the 3rd quarter of 2017. All perchlorate concentrations in the effluent (TK-650) were lower than the daily maximum concentration discharge limit of 589 µg/L. Treated groundwater from the GWTP was discharged to Harrison Bayou during the current quarter when effluent perchlorate concentrations where less than the daily maximum concentration of 589 µg/L, and adequate flow in the bayou was observed.

Four grab samples from the influent to the GWTP (Tank 140) were collected. The perchlorate concentrations in these samples ranged from 5,610 to 13,800 µg/L.

2.4.2 VOC Sampling

Tables 2-3 through 2-5 present the effluent VOC results for July, August, and September 2017. Sampling of the effluent for VOCs was conducted on a biweekly basis beginning on July 6, 2017. The results, where applicable, were below the discharge limits. The tables also provide monthly influent concentrations for VOCs and perchlorate.

2.4.3 Monthly Metals Sampling

As per the revised sampling and analysis plan (Shaw, 2007), the monthly metals sampling is reported in **Tables 2-3 through 2-5**. None of the metals exceeded the effluent discharge limits; however, the selenium reporting limit of 20 µg/L exceeded the daily average limit of 5.7 µg/L and the daily maximum concentration of 12 µg/L.

2.4.4 Quarterly Sampling

Sampling of the effluent for VOCs, anions, chemical oxygen demand (COD), oil and grease, perchlorate, and metals was conducted during this quarter and the results were below the discharge limits. **Table 2-6** presents the analytical results for the 3rd quarter of 2017.

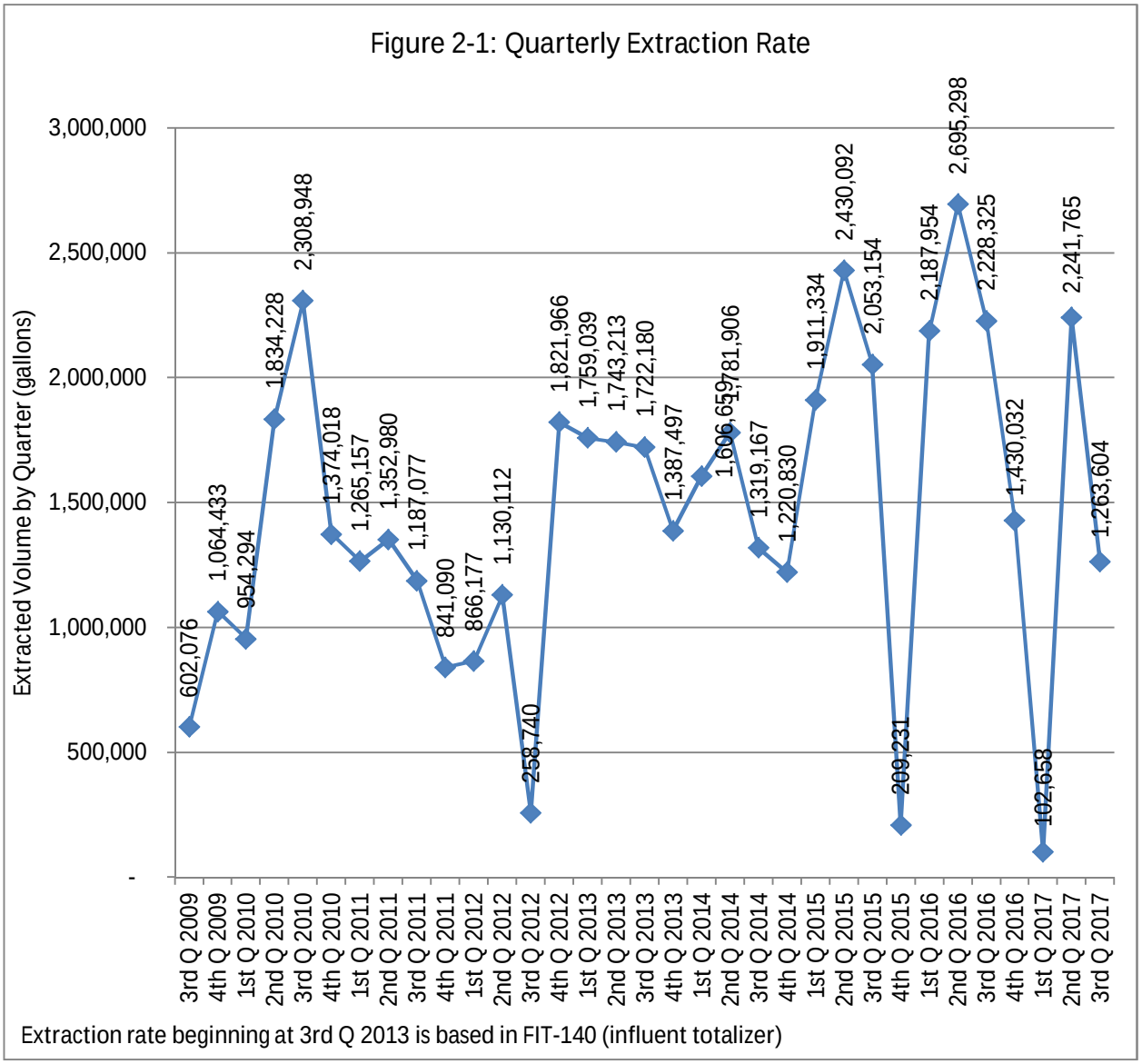


Figure 2-1: Quarterly Extraction Rate
Extracted Volume by Quarter (gallons)
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
602,076
1,064,433
954,294
1,834,228
2,308,948
1,374,018
1,265,157
1,352,980
1,187,077
841,090
866,177
1,130,112
258,740
1,821,966
1,759,039
1,743,213
1,722,180
1,387,497
1,606,659
1,781,906
1,319,167
1,220,830
1,911,334
2,430,092
2,053,154
209,231
2,187,954
2,695,298
2,228,325
1,430,032
102,658
2,241,765
1,263,604
3rd Q 2009
4th Q 2009
1st Q 2010
2nd Q 2010
3rd Q 2010
4th Q 2010
1st Q 2011
2nd Q 2011
3rd Q 2011
4th Q 2011
1st Q 2012
2nd Q 2012
3rd Q 2012
4th Q 2012
1st Q 2013
2nd Q 2013
3rd Q 2013
4th Q 2013
1st Q 2014
2nd Q 2014
3rd Q 2014
4th Q 2014
1st Q 2015
2nd Q 2015
3rd Q 2015
4th Q 2015
1st Q 2016
2nd Q 2016
3rd Q 2016
4th Q 2016
1st Q 2017
2nd Q 2017
3rd Q 2017
Extraction rate beginning at 3rd Q 2013 is based in FIT-140 (influent totalizer)

Table 2-1: Monthly Groundwater Extraction Quantities (Gallons)

Well #	Jul-17	Aug-17	Sep-17	Total
1	0	0	0	0
2	48,906	41,988	20,863	111,757
3	0	0	0	0
4	81,064	26,182	26,245	133,491
5	0	0	0	0
EW-01	1,856	616	1,802	4,274
7	6,747	2,177	3,658	12,582
8	105,427	39,733	40,670	185,830
18WW17	10,722	3,944	2,603	17,269
10	0	0	0	0
11	0	1,825	41,366	43,191
12A	9,498	3,963	3,277	16,738
12B	21,045	6,954	2	28,001
12C	894	26,206	8,083	35,183
12D	34,809	11,524	14,789	61,122
12E	15,880	5,280	9,737	30,897
13A	3,147	1,349	123	4,619
13B	1,556	6,327	31,892	39,775
13C	1,942	5,077	39,320	46,339
13D	0	2	4,989	4,991
13E	2,288	629	1,557	4,474
13F	55	1,206	443	1,704
14A	4,447	1,023	893	6,363
14B	14,595	1,819	7,230	23,644
14C	55,735	19,704	21,399	96,838
14D	54,412	19,188	21,586	95,186
14E	878	0	1,604	2,482
Total LHAAP-18/24	***475,903***	***226,716***	***304,131***	***1,006,750***
LHAAP-16	44,191	23,246	34,220	101,657
Total LHAAP-16	***44,191***	***23,246***	***34,220***	***101,657***
TOTAL	**520,094**	**249,962**	**338,351**	**1,108,407**

Table 2-2: Weekly Perchlorate Sample Results

Sample ID	Date Sampled	Sample Location	Effluent Limitation for Discharge (µg/L)		MAL	Influent	Effluent		Does Concentration Meet Discharge Limit? (Yes/No)
			Daily Average Concentration	Daily Maximum Concentration		Result (µg/L)	Result (µg/L)	DVQ	
LH18/24-SP140-7454	7/6/2017	TK-140	NA	NA	NA	6,620	NA	U	NA
LH18/24-SP650-6454-GRAB	7/6/2017	TK650	278	589	2	NA	1.01		Yes
LH18/24-SP650-6456-GRAB	7/12/2017	TK650	278	589	2	NA	0.657		Yes
LH18/24-SP650-AFTER ION	7/19/2017	TK650	278	589	2	NA	1.18		Yes
LH18/24-SP650-BEFORE ION	7/19/2017	TK650	278	589	2	NA	80.8		Yes
LH18/24-SP650-6460-GRAB	7/26/2017	TK650	278	589	2	NA	1.15		Yes
LH18/24-SP140-7461	8/2/2017	TK-140	NA	NA	NA	13,800	NA	U	NA
LH18/24-SP650-6462 AFTER ION	8/2/2017	TK650	278	589	2	NA	0.9		Yes
LH18/24-SP650-6462 BEFORE ION	8/2/2017	TK650	278	589	2	NA	24.3		Yes
LH18/24-SP650-6464 AFTER ION	8/9/2017	TK650	278	589	2	NA	0.762		Yes
LH18/24-SP650-6464 BEFORE ION	8/9/2017	TK650	278	589	2	NA	68.9		Yes
LH18/24-SP650-6465-GRAB	8/24/2017	TK650	278	589	2	NA	34.9		Yes
LH18/24-SP650-6466-GRAB	8/30/2017	TK650	278	589	2	NA	0.2	U	Yes
LH18/24-SP650-6467-GRAB	9/6/2017	TK650	278	589	2	NA	0.2	U	Yes
LH18/24-SP650-6468-GRAB	9/13/2017	TK650	278	589	2	NA	0.54		Yes
LH18/24-SP650-6470-GRAB	9/20/2017	TK650	278	589	2	NA	0.622		Yes
LH18/24-SP140-7472	9/27/2017	TK-140	NA	NA	NA	7,010	NA	U	NA
LH18/24-SP650-6473-GRAB	9/27/2017	TK650	278	589	2	NA	0.761		Yes
LH18/24-SP140-7474	9/28/2017	TK-140	NA	NA	NA	5,610	NA	U	NA
LH18/24-SP650-6474-GRAB	9/28/2017	TK650	278	589	2	NA	0.667		Yes

Notes:

No discharge to Harrison Bayou occurred unless perchlorate concentration was below the daily maximum concentration of 13 µg/L.

SP140 samples are influent samples.

µg/L - micrograms per liter

DVQ - data validation qualifier

ID - identification

J - Estimated concentration

MAL - minimum analytical level

NA - not applicable

U - non detect

Table 2-3: Bi-Weekly GWTP Analytical Sampling Results for July 2017

	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Sample Location								Does Concentration Meet Effluent Discharge Limits? (Yes/No)
				Sample Identification	LH18/24-SP650-6454		LH18/24-SP140-7454		LH18/24-SP650-6456		LH18/24-SP650-6459	
				Sample Date	6-Jul-17		6-Jul-17		12-Jul-17		26-Jul-17	
				Sample Type	GRAB		GRAB		GRAB		GRAB	
	Daily Average Concentration	Daily Maximum Concentration	MAL	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		
1,1,1-Trichloroethane	3,417	7,230	10	<0.5	U	NA		<0.5	U	<0.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	10	<0.5	U	NA		<0.5	U	<0.5	U	Yes
1,1-Dichloroethane	6,633	14,032	10	<0.25	U	NA		<0.25	U	<0.25	U	Yes
1,1-Dichloroethene	119	253	NA	<1	U	NA		<1	U	<1	U	Yes
1,2-Dichloroethane	85	181	10	<0.5	U	NA		<0.5	U	<0.5	U	Yes
Acetone	1,132	2,395	NA	12.1		NA		10.1		<0.5	U	Yes
Benzene	85	181	10	<0.25	U	NA		<0.25	U	<0.25	U	Yes
Carbon Tetrachloride	85	181	10	<0.5	U	NA		<0.5	U	<0.5	U	Yes
Chloroform	1,708	3,615	10	<0.25	U	NA		<0.25	U	<0.25	U	Yes
Ethylbenzene	26,954	57,025	10	<0.5	U	NA		<0.5	U	<0.5	U	Yes
m,p-Xylenes	39.5	83.6	NA	<1	U	NA		<1	U	<1		Yes
Methylene Chloride	803	1,699	20	<0.5	U	NA		<0.5	U	<0.5	U	Yes
o-Xylene	39.5	83.6	NA	<0.5	U	NA		<0.5	U	<0.5	U	Yes
Styrene	2,829	5,987	NA	<0.25	U	NA		<0.25	U	<0.25	U	Yes
Tetrachloroethene	85.4	180.7	10	<0.5	U	NA		<0.5	U	<0.5	U	Yes
Toluene	1,980	4,189	10	<0.5	U	NA		<0.5	U	<0.5	U	Yes
Trichloroethene	85	181	10	0.679	J	NA		1.22		0.41	J	Yes
Vinyl Chloride	34	72	10	0.472	J	NA		1	J	<0.5	U	Yes
ANIONS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		**mg/L**		**mg/L**		
Chloride	NA	NA	NA	NA		NA		480		688		NA
Sulfate	NA	NA	NA	NA		NA		18.2		30.9		NA
PERCHLORATE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Perchlorate	278	589	2	1.01		6,620		0.657		NA		Yes
METALS	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Hexavalent Chromium	58	124	10	<10	U	<10	U	NA		NA		Yes
Lead	2.2	4.6	5	<1	U	NA		NA		NA		Yes
Selenium*	5.7	12	5	<20	U	<20	U	NA		NA		Yes
Silver	1.4	3	2	<1	U	<1	U	NA		NA		Yes
Barium	1,000	2,000	10	166		NA		NA		NA		Yes
SEMI-VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		
1,4-Dioxane**	NA	134.2	NA	17.7		NA		NA		NA		Yes

Notes:

µg/L - micrograms per liter
mg/L - milligrams per liter
DVQ - data validation qualifier
NA - not applicable
GWTP - Groundwater Treatment Plant
ROD - Record of Decision
MAL - minimum analytical level

Grab samples are compared to the daily maximum and composite samples to the daily average.

* Selenium reporting limit exceeds the daily average discharge limit.

** Calculated Effluent Limit

Table 2-4: Bi-Weekly GWTP Analytical Sampling Results for August 2017

	Sample Location	EFFLUENT		INFLUENT		EFFLUENT		EFFLUENT		EFFLUENT		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
	Sample Identification	LH18/24-SP650-6461		LH18/24-SP140-7461		LH18/24-SP650-6463		LH18/24-SP650-6465		LH18/24-SP650-6466		
	Sample Date	2-Aug-17		2-Aug-17		9-Aug-17		24-Aug-17		30-Aug-17		
	Sample Type	GRAB		GRAB		GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD											
	Daily Average Concentration	Daily Maximum Concentration	MAL	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		
1,1,1-Trichloroethane	3,417	7,230	10	<0.5	U	NA		<0.5	U	NA		NA		Yes
1,1,2-Trichloroethane	102.5	216.9	10	<0.5	U	NA		<0.5	U	NA		NA		Yes
1,1-Dichloroethane	6,633	14,032	10	<0.25	U	NA		<0.25	U	NA		NA		Yes
1,1-Dichloroethene	119	253	NA	<1	U	NA		<1	U	NA		NA		Yes
1,2-Dichloroethane	85	181	10	<0.5	U	NA		<0.5	U	NA		NA		Yes
Acetone	1,132	2,395	NA	<5	U	NA		4.1	J	NA		NA		Yes
Benzene	85	181	10	<0.25	U	NA		<0.25	U	NA		NA		Yes
Carbon Tetrachloride	85	181	10	<0.5	U	NA		<0.5	U	NA		NA		Yes
Chloroform	1,708	3,615	10	<0.25	U	NA		<0.25	U	NA		NA		Yes
Ethylbenzene	26,954	57,025	10	<0.5	U	NA		<0.5	U	NA		NA		Yes
m,p-Xylenes	39.5	83.6	NA	<1	U	NA		<1	U	NA		NA		Yes
Methylene Chloride	803	1,699	20	<0.5	U	NA		<0.5	U	NA		NA		Yes
o-Xylene	39.5	83.6	NA	<0.5	U	NA		<0.5	U	NA		NA		Yes
Styrene	2,829	5,987	NA	<0.25	U	NA		<0.25	U	NA		NA		Yes
Tetrachloroethene	85.4	180.7	10	<0.5	U	NA		<0.5	U	NA		NA		Yes
Toluene	1,980	4,189	10	<0.5	U	NA		<0.5	U	NA		NA		Yes
Trichloroethene	85	181	10	0.253	J	NA		0.675	J	NA		NA		Yes
Vinyl Chloride	34	72	10	<0.5	U	NA		<0.5	U	NA		NA		Yes
ANIONS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		**mg/L**		**mg/L**		**mg/L**		
Chloride	NA	NA	NA	NA		NA		663		NA		NA		NA
Sulfate	NA	NA	NA	NA		NA		76		NA		NA		NA
PERCHLORATE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Perchlorate	278	589	2	NA	U	13,800		NA	U	34.9		<0.2	U	Yes
METALS	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Hexavalent Chromium	58	124	10	<10	U	<10	U	NA		NA		NA		Yes
Lead	2.2	4.6	5	<1	U	NA		NA		NA		NA		Yes
Selenium	5.7	12	5	<10	U	<10	U	NA		NA		NA		Yes
Silver	1.4	3	2	<1	U	<1	U	NA		NA		NA		Yes
Barium	1,000	2,000	10	0.1650		NA		NA		NA		NA		Yes
SEMI-VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		
1,4-Dioxane*	NA	134.2	NA	23.5		NA		NA		NA		NA		Yes

Notes:

µg/L - micrograms per liter
mg/L - milligrams per liter
DVQ - data validation qualifier
NA - not applicable
GWTP - Groundwater Treatment Plant
ROD - Record of Decision
MAL - minimum analytical level
U - non detect

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

Grab samples are compared to the daily maximum and composite samples to the daily average.

* Calculated Effluent Limit

Table 2-5: Bi-Weekly Analytical GWTP Sampling Results for September 2017

			Sample Location	EFFLUENT		EFFLUENT		EFFLUENT		EFFLUENT		INFLUENT		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
			Sample Identification	LH18/24-SP650-6467		LH18/24-SP650-6468		LH18/24-SP650-6469		LH18/24-SP650-6474		LH18/24-SP140-7474		
			Sample Date	6-Sep-17		13-Sep-17		20-Sep-17		28-Sep-17		28-Sep-17		
			Sample Type	GRAB		GRAB		GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	MAL											
VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		
1,1,1-Trichloroethane	3,417	7,230	10	NA		NA		<0.5	U	<0.5	U	NA		Yes
1,1,2-Trichloroethane	102.5	216.9	10	NA		NA		<0.5	U	<0.5	U	NA		Yes
1,1-Dichloroethane	6,633	14,032	10	NA		NA		<0.25	U	<0.25	U	NA		Yes
1,1-Dichloroethene	119	253	NA	NA		NA		<1	U	<1	U	NA		Yes
1,2-Dichloroethane	85	181	10	NA		NA		<0.5	U	<0.5	U	NA		Yes
Acetone	1,132	2,395	NA	NA		NA		<5	U	<5	U	NA		Yes
Benzene	85	181	10	NA		NA		<0.25	U	<0.25	U	NA		Yes
Carbon Tetrachloride	85	181	10	NA		NA		<0.5	U	<0.5	U	NA		Yes
Chloroform	1,708	3,615	10	NA		NA		<0.25	U	<0.25	U	NA		Yes
Ethylbenzene	26,954	57,025	10	NA		NA		<0.5	U	<0.5	U	NA		Yes
m,p-Xylenes	39.5	83.6	NA	NA		NA		<1	U	<1	U	NA		NA
Methylene Chloride	803	1,699	20	NA		NA		<0.5	U	0.396	J	NA		Yes
o-Xylene	39.5	83.6	NA	NA		NA		<0.5	U	<0.5	U	NA		Yes
Styrene	2,829	5,987	NA	NA		NA		<0.25	U	<0.25	U	NA		NA
Tetrachloroethene	85.4	180.7	10	NA		NA		<0.5	U	<0.5	U	NA		Yes
Toluene	1,980	4,189	10	NA		NA		<0.5	U	<0.5	U	NA		Yes
Trichloroethene	85	181	10	NA		NA		<0.5	U	1.27		NA		Yes
Vinyl Chloride	34	72	10	NA		NA		<0.5	U	1.21		NA		Yes
ANIONS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		**mg/L**		**mg/L**		**mg/L**		
Chloride	NA	NA	NA	NA		NA		565		NA		NA		NA
Sulfate	NA	NA	NA	NA		NA		89.9		NA		NA		NA
PERCHLORATE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Perchlorate	278	589	2	<0.2	U	0.54		NA		0.667		5,610		Yes
METALS	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Hexavalent Chromium	58	124	10	NA		NA		NA		<10	U	<10	U	Yes
Lead	2.2	4.6	5	NA		NA		NA		<1	U	NA		Yes
Selenium	5.7	12	5	NA		NA		NA		<10	U	<10	U	Yes
Silver	1.4	3	2	NA		NA		NA		<1	U	<1	U	Yes
Barium	1,000	2,000	10	NA		NA		NA		97.3		NA		Yes
SEMI-VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		
1,4-Dioxane*	NA	134.2	NA	NA		NA		NA		25.4		NA		Yes

Notes:
µg/L - micrograms per liter
DVQ - data validation qualifier
GWTP - Groundwater Treatment Plant
J - estimated concentration
MAL - minimum analytical level
mg/L - milligrams per liter
Grab samples are compared to the daily maximum and composite samples to the daily average
* Calculated Effluent Limit

Table 2-6: Quarterly GWTP Analytical Sampling Results for the 3rd Quarter 2017

			Sample Location	EFFLUENT		INFLUENT		Does Concentration Meet Discharge Limits? (Yes/No)
			Sample Identification	LH18/24-SP650-6472		LH18/24-SP140-7472		
			Sample Date	27-Sep-17		27-Sep-17		
			Sample Type	GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	MAL					
VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		
1,1,1-Trichloroethane	3,417	7,230	10	<0.5	U	<25	U	Yes
1,1,2-Trichloroethane	102.5	216.9	10	<0.5	U	<25	U	Yes
1,1-Dichloroethane	6,633	14,032	10	<0.25	U	13	J	Yes
1,1-Dichloroethene	119	253	NA	<1	U	107		Yes
1,2-Dichloroethane	85	181	10	<0.5	U	70.7		Yes
Acetone	1,132	2,395	NA	<5	U	<250	U	Yes
Benzene	85	181	10	<0.25	U	<12.5	U	Yes
Carbon Tetrachloride	85	181	10	<0.5	U	<25	U	Yes
Chloroform	1,708	3,615	10	<0.25	U	16.5	J	Yes
Ethylbenzene	26,954	57,025	10	<0.5	U	<25	U	Yes
m,p-Xylenes	39.5	83.6	NA	<1	U	<50	U	Yes
Methylene Chloride	803	1,699	20	0.38	J	8,370		Yes
o-Xylene	39.5	83.6	NA	<0.5	U	<25	U	Yes
Styrene	2,829	5,987	NA	<0.25	U	<12.5	U	Yes
Tetrachloroethene	85.4	180.7	10	<0.5	U	54.4		Yes
Toluene	1,980	4,189	10	<0.5	U	<25	U	Yes
Trichloroethene	85	181	10	<0.5	U	9,330		Yes
Vinyl Chloride	34	72	10	1.33		221		Yes
ANIONS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		
Chloride	NA	NA	NA	645		425		NA
Sulfate	NA	NA	NA	136		45.1		NA
PERCHLORATE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		
Perchlorate	278	589	2	NA		7,010		Yes
METALS	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		
Aluminum	777	1,644	20	<200	U	<200	U	Yes
Antimony	NA	NA	NA	<1	U	<1	U	NA
Arsenic	365	772	10	2.43		3		Yes
Barium	1,000	2,000	10	96.4		740		Yes
Cadmium	1.6	3.4	1	<0.6	U	<0.6	U	Yes
Chromium	355	752	5	3.14	J	1.93	J	Yes
Cobalt	5,433	11,495	NA	0.573	J	12.5		Yes
Iron	1,132	2,395	NA	<100	U	2,740		Yes
Lead	2.2	4.6	5	<1	U	<1	U	Yes
Manganese	7,323	15,494	NA	36.2		708		Yes

Table 2-6: Quarterly GWTP Analytical Sampling Results for the 3rd Quarter 2017

				Sample Location	EFFLUENT		INFLUENT		Does Concentration Meet Discharge Limits? (Yes/No)
				Sample Identification	LH18/24-SP650-6472		LH18/24-SP140-7472		
				Sample Date	27-Sep-17		27-Sep-17		
				Sample Type	GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD								
	Daily Average Concentration	Daily Maximum Concentration	MAL	Result	DVQ	Result	DVQ	
Nickel	87	184	10	3.06	J	13.5		Yes
Selenium*	5.7	12	5	<20	U	<20	U	Yes
Silver	1.4	3	2	<1	U	<1	U	Yes
Thallium	NA	NA	NA	<0.2	U	0.183	J	NA
Vanadium	1,698	3,592	NA	<1	U	<1	U	Yes
Zinc	146	310	5	<25	U	13.6	J	Yes
1,4-Dioxane	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		
1,4-Dioxane	NA	134.4	2	16.2		17.9	J	Yes
	mg/L	**mg/L**	**mg/L**	**mg/L**		**mg/L**		
Chemical Oxygen Demand	NA	200	NA	93.8		17.4	J	Yes
Oil and Grease	NA	15	NA	<2.8	U	<2.8	U	Yes

Notes:

µg/L - micrograms per liter
GWTP - Groundwater Treatment Plant
MAL - minimum analytical level
NA - not applicable
DVQ - data validation qualifier
J - Estimated concentration
mg/L - milligrams per liter
ROD - Record of Decision
Grab samples are compared to the daily maximum and composite samples to the daily average
U - non detect
* Selenium reporting limit exceeds the daily average concentration and the daily maximum concentration

3 EVALUATION OF LHAAP-16 EXTRACTION SYSTEM

Groundwater was extracted from LHAAP-16 during July (44,191 gallons), August (23,246 gallons), and September (34,220 gallons) 2017. The volume of extracted groundwater from LHAAP-16 is shown in **Figure ES-1**.

3.1 Quantity of Groundwater Extracted from LHAAP-16

The quantity of groundwater extracted on a monthly basis is presented on **Table 3-1**. These flows are based on the sum of individual flow meter readings.

3.2 Groundwater Elevation

The groundwater elevations in the piezometers and monitoring wells at LHAAP-16 for July, August, and September 2017 are presented on **Table 3-2**. The potentiometric surface maps for the shallow and Upper Wilcox (intermediate) groundwater zones at LHAAP-16 for July, August, and September 2017 are presented in **Figures B-7 through B-12** in **Appendix B**. Based on the potentiometric surface maps, the general groundwater flow direction in the Shallow and Intermediate zone is towards south-east.

Table 3-1: Groundwater Extraction Quantities from LHAAP-16 (gallons)

Jul-17	Aug-17	Sep-17
44,191	23,246	34,220

Table 3-2: Groundwater Elevations at LHAAP-16 Piezometers and Monitoring Wells

PIEZOMETER LEVELS

Piezometers	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
16PZ-1	07/28/2017	199.44	27.04	172.40
16PZ-2	07/28/2017	199.75	27.70	172.05
16PZ-3	07/28/2017	198.61	26.30	172.31
16PZ-4	07/28/2017	198.81	26.82	171.99
16PZ-5	07/28/2017	198.31	26.09	172.22
16PZ-6	07/28/2017	198.61	26.57	172.04
16PZ-7	07/28/2017	200.10	27.78	172.32
16PZ-8	07/28/2017	199.93	27.70	172.23
16PZ-9	07/28/2017	196.49	24.70	171.79
16PZ-10	07/28/2017	196.65	24.65	172.00
16PZ-11	07/28/2017	198.88	26.50	172.38
16PZ-12	07/28/2017	199.00	26.89	172.11
16PZ-13	07/28/2017	196.58	24.31	172.27
16PZ-14	07/28/2017	196.09	23.99	172.10
16PZ-15	07/28/2017	191.93	19.71	172.22
16PZ-16	07/28/2017	190.79	18.91	171.88
16PZ-17	07/28/2017	186.67	15.15	171.52
16PZ-18	07/28/2017	185.99	14.45	171.54
16PZ-19	07/28/2017	183.98	12.90	171.08
16PZ-20	07/28/2017	183.12	12.09	171.03

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
16WW12	07/28/2017	188.81	17.40	171.41
16WW14	07/28/2017	198.87	25.57	173.30
16WW22	07/28/2017	200.13	27.75	172.38
16WW25	07/28/2017	188.77	17.03	171.74
16WW26	07/28/2017	188.83	17.17	171.66
16WW29	07/28/2017	178.24	7.00	171.24
16WW30	07/28/2017	178.47	7.30	171.17
16WW31	07/28/2017	202.78	30.08	172.70
16WW33	07/28/2017	203.09	30.10	172.99
16WW35	07/28/2017	191.23	18.29	172.94
16WW36	07/28/2017	190.94	17.77	173.17

Table 3-2: Groundwater Elevations at LHAAP-16 Piezometers and Monitoring Wells

PIEZOMETER LEVELS

Piezometers	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
16PZ-1	08/29/2017	199.44	27.32	172.12
16PZ-2	08/29/2017	199.75	27.83	171.92
16PZ-3	08/29/2017	198.61	26.51	172.10
16PZ-4	08/29/2017	198.81	26.97	171.84
16PZ-5	08/29/2017	198.31	26.48	171.83
16PZ-6	08/29/2017	198.61	26.91	171.70
16PZ-7	08/29/2017	200.10	27.74	172.36
16PZ-8	08/29/2017	199.93	27.95	171.98
16PZ-9	08/29/2017	196.49	25.37	171.12
16PZ-10	08/29/2017	196.65	25.13	171.52
16PZ-11	08/29/2017	198.88	26.74	172.14
16PZ-12	08/29/2017	199.00	27.05	171.95
16PZ-13	08/29/2017	196.58	24.56	172.02
16PZ-14	08/29/2017	196.09	24.34	171.75
16PZ-15	08/29/2017	191.93	20.28	171.65
16PZ-16	08/29/2017	190.79	19.35	171.44
16PZ-17	08/29/2017	186.67	16.35	170.32
16PZ-18	08/29/2017	185.99	15.13	170.86
16PZ-19	08/29/2017	183.98	14.22	169.76
16PZ-20	08/29/2017	183.12	13.33	169.79

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
16WW12	08/29/2017	188.81	17.90	170.91
16WW14	08/29/2017	198.87	25.69	173.18
16WW22	08/29/2017	200.13	28.15	171.98
16WW25	08/29/2017	188.77	18.47	170.30
16WW26	08/29/2017	188.83	17.72	171.11
16WW29	08/29/2017	178.24	8.13	170.11
16WW30	08/29/2017	178.47	8.51	169.96
16WW31	08/29/2017	202.78	30.34	172.44
16WW33	08/29/2017	203.09	30.27	172.82
16WW35	08/29/2017	191.23	18.46	172.77
16WW36	08/29/2017	190.94	17.94	173.00

Table 3-2: Groundwater Elevations at LHAAP-16 Piezometers and Monitoring Wells

PIEZOMETER LEVELS

Piezometers	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
16PZ-1	09/25/2017	199.44	27.88	171.56
16PZ-2	09/25/2017	199.75	28.64	171.11
16PZ-3	09/25/2017	198.61	27.04	171.57
16PZ-4	09/25/2017	198.81	27.65	171.16
16PZ-5	09/25/2017	198.31	27.03	171.28
16PZ-6	09/25/2017	198.61	27.49	171.12
16PZ-7	09/25/2017	200.10	28.61	171.49
16PZ-8	09/25/2017	199.93	28.48	171.45
16PZ-9	09/25/2017	196.49	25.94	170.55
16PZ-10	09/25/2017	196.65	25.67	170.98
16PZ-11	09/25/2017	198.88	27.21	171.67
16PZ-12	09/25/2017	199.00	27.68	171.32
16PZ-13	09/25/2017	196.58	25.26	171.32
16PZ-14	09/25/2017	196.09	24.94	171.15
16PZ-15	09/25/2017	191.93	20.83	171.10
16PZ-16	09/25/2017	190.79	19.82	170.97
16PZ-17	09/25/2017	186.67	17.03	169.64
16PZ-18	09/25/2017	185.99	15.63	170.36
16PZ-19	09/25/2017	183.98	15.02	168.96
16PZ-20	09/25/2017	183.12	12.97	170.15

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
16WW12	09/25/2017	188.81	18.45	170.36
16WW14	09/25/2017	198.87	26.03	172.84
16WW22	09/25/2017	200.13	28.58	171.55
16WW25	09/25/2017	188.77	19.24	169.53
16WW26	09/25/2017	188.83	18.42	170.41
16WW29	09/25/2017	178.24	8.91	169.33
16WW30	09/25/2017	178.47	9.31	169.16
16WW31	09/25/2017	202.78	30.71	172.07
16WW33	09/25/2017	203.09	30.66	172.43
16WW35	09/25/2017	191.23	18.88	172.35
16WW36	09/25/2017	190.94	18.35	172.59

Notes:
amsl - above mean sea level

4 GROUNDWATER MONITORING AT LHAAP-18/24

Water levels from 95 monitoring wells and 11 piezometers (piezometer 12 was damaged and plugged and abandoned in May 2013) are measured monthly to generate potentiometric surface maps that assist in monitoring the effectiveness of the groundwater extraction system on plume containment. The groundwater contours are generated using the water levels from the shallow zone and Wilcox Formation wells. The water level data are presented in **Table 4-1**. No re-injection of treated groundwater or reinjection to LHAAP-18/24 grounds via the existing irrigation system occurred during the 3rd Quarter 2017. Discharge to Harrison Bayou occurred during September of the quarter. Potentiometric surface maps are presented in **Appendix B** and groundwater elevations from the 3rd Quarter 2017 are discussed in **Section 2.2**.

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

PIEZOMETER LEVELS

Piezometers	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
BGPZ-1	07/31/2017	184.99	8.34	176.65
BGPZ-2	07/31/2017	184.39	14.33	170.06
BGPZ-3	07/31/2017	180.35	10.86	169.49
BGPZ-4	07/31/2017	177.77	7.99	169.78
BGPZ-5	07/31/2017	180.76	10.65	170.11
BGPZ-6	07/31/2017	197.82	27.75	170.07
BGPZ-7	07/31/2017	195.96	27.40	168.56
BGPZ-8	07/31/2017	197.08	29.31	167.77
BGPZ-9	07/31/2017	196.45	27.30	169.15
BGPZ-10	07/31/2017	197.00	27.07	169.93
BGPZ-11	07/31/2017	196.99	26.55	170.44
BGPZ-12	07/31/2017	188.17	NA	Plugged

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
AWD-1	07/31/2017	182.27	9.98	172.29
AWD-2	07/31/2017	186.78	14.50	172.28
AWD-3	07/31/2017	200.13	27.87	172.26
AWD-4	07/31/2017	193.89	23.29	170.60
MW-1	07/31/2017	199.22	27.27	171.95
MW-2	07/31/2017	196.73	27.06	169.67
MW-3	07/31/2017	196.54	26.35	170.19
MW-4	07/31/2017	197.27	26.16	171.11
MW-5	07/31/2017	194.97	24.95	170.02
MW-6	07/31/2017	192.18	22.30	169.88
MW-7	07/31/2017	188.47	18.49	169.98
MW-8	07/31/2017	187.13	16.45	170.68
MW-9	07/31/2017	184.73	14.62	170.11
MW-10	07/31/2017	178.12	8.36	169.76
MW-11	07/31/2017	184.65	15.12	169.53
MW-12	07/31/2017	178.33	8.65	169.68
MW-13	07/31/2017	176.72	7.04	169.68
MW-14	07/31/2017	186.19	13.30	172.89
MW-16	07/31/2017	178.59	8.60	169.99
MW-17	07/31/2017	179.03	9.19	169.84
MW-18	07/31/2017	178.58	8.51	170.07
MW-19	07/31/2017	178.60	8.38	170.22
MW-20	07/31/2017	186.64	11.60	175.04
MW-21	07/31/2017	198.70	31.69	167.01
MW-22	07/31/2017	197.51	27.50	170.01
MW-23	07/31/2017	198.79	27.55	171.24
101	07/31/2017	197.53	7.33	190.20
102	07/31/2017	193.94	19.45	174.49
109	07/31/2017	197.02	28.60	168.42
120	07/31/2017	184.19	11.91	172.28
123	07/31/2017	186.21	11.40	174.81
125	07/31/2017	196.28	24.72	171.56
126	07/31/2017	199.37	28.94	170.43
129	07/31/2017	197.24	26.11	171.13
130	07/31/2017	177.73	7.19	170.54

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
C-01	07/31/2017	193.89	23.86	170.03
C-02	07/31/2017	175.95	5.88	170.07
C-03	07/31/2017	196.34	26.55	169.79
C-04	07/31/2017	194.64	25.20	169.44
C-04A	07/31/2017	194.61	25.13	169.48
C-05	07/31/2017	180.74	12.55	168.19
C-06	07/31/2017	192.22	25.14	167.08
C-07	07/31/2017	196.80	27.20	169.60
C-08	07/31/2017	193.10	23.90	169.20
C-09	07/31/2017	202.35	32.64	169.71
C-10	07/31/2017	201.86	31.98	169.88
17WW08	07/31/2017	179.72	9.74	169.98
18WW01	07/31/2017	201.31	31.10	170.21
18WW02	07/31/2017	179.30	9.22	170.08
18WW03	07/31/2017	195.59	26.13	169.46
18WW04	07/31/2017	183.74	15.85	167.89
18WW05	07/31/2017	189.59	22.34	167.25
18WW06	07/31/2017	179.70	10.20	169.50
18WW07	07/31/2017	183.67	7.23	176.44
18WW08	07/31/2017	177.77	9.24	168.53
18WW09	07/31/2017	177.51	8.20	169.31
18WW10	07/31/2017	182.26	12.50	169.76
18WW11	07/31/2017	182.29	12.46	169.83
18WW14	07/31/2017	186.47	16.83	169.64
18WW15	07/31/2017	186.24	16.40	169.84
18WW16	07/31/2017	201.88	31.63	170.25
18WW18	07/31/2017	196.82	27.21	169.61
18WW19	07/31/2017	179.56	9.57	169.99
18WW20	07/31/2017	180.42	11.45	168.97
18WW21	07/31/2017	195.20	26.51	168.69
18WW22	07/31/2017	195.37	26.02	169.35
18WW24	07/31/2017	176.40	6.31	170.09
18WW25	07/31/2017	175.15	6.35	168.80
18CPTMW01SW	07/31/2017	198.20	27.40	170.80
18CPTMW01DW	07/31/2017	197.92	28.22	169.70
18CPTMW03SW	07/31/2017	198.53	29.87	168.66
18CPTMW04	07/31/2017	196.60	24.11	172.49
18CPTMW04SW	07/31/2017	196.42	26.65	169.77
18CPTMW06	07/31/2017	198.12	28.35	169.77
18CPTMW07	07/31/2017	197.32	27.86	169.46
18CPTMW08SW	07/31/2017	196.38	26.63	169.75
18CPTMW08DW	07/31/2017	196.59	27.07	169.52
18CPTMW10SW	07/31/2017	186.98	17.13	169.85
18CPTMW10DW	07/31/2017	187.38	17.70	169.68
18CPTMW12SW	07/31/2017	190.90	21.14	169.76
18CPTMW12DW	07/31/2017	190.25	20.60	169.65
18CPTMW14	07/31/2017	196.69	26.77	169.92
18CPTMW15	07/31/2017	179.79	10.12	169.67
18CPTMW16	07/31/2017	175.37	6.05	169.32
18CPTMW18	07/31/2017	194.53	26.88	167.65
18CPTMW19	07/31/2017	193.59	23.60	169.99
18CPTMW19SW	07/31/2017	193.29	23.67	169.62

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
18CPTMW22SW	07/31/2017	187.79	18.16	169.63
18CPTMW22R	07/31/2017	187.23	9.75	177.48
18CPTMW22DW	07/31/2017	188.00	18.20	169.80
18CPTMW23	07/31/2017	177.47	7.61	169.86
18CPTMW23SW	07/31/2017	177.43	7.63	169.80
18CPTMW24	07/31/2017	194.89	26.35	168.54
18CPTMW26	07/31/2017	182.60	16.92	165.68
18CPTMW26SW	07/31/2017	182.00	12.12	169.88

SURFACE WATER LEVELS

Harrison Bayou	Date	Reference Elevation (feet amsl)	Staff Reading (water depth) (feet)	Surface Water Elevation (feet amsl)
1824HBSW7	07/31/2017	167.92	0.63	168.55

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

PIEZOMETER LEVELS

Piezometers	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
BGPZ-1	08/31/2017	184.99	9.57	175.42
BGPZ-2	08/31/2017	184.39	15.08	169.31
BGPZ-3	08/31/2017	180.35	11.65	168.70
BGPZ-4	08/31/2017	177.77	8.67	169.10
BGPZ-5	08/31/2017	180.76	11.22	169.54
BGPZ-6	08/31/2017	197.82	28.18	169.64
BGPZ-7	08/31/2017	195.96	27.98	167.98
BGPZ-8	08/31/2017	197.08	29.95	167.13
BGPZ-9	08/31/2017	196.45	27.91	168.54
BGPZ-10	08/31/2017	197.00	27.73	169.27
BGPZ-11	08/31/2017	196.99	27.11	169.88
BGPZ-12	08/31/2017	188.17	NA	Plugged

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
AWD-1	08/31/2017	182.27	10.77	171.50
AWD-2	08/31/2017	186.78	15.17	171.61
AWD-3	08/31/2017	200.13	28.22	171.91
AWD-4	08/31/2017	193.89	23.95	169.94
MW-1	08/31/2017	199.22	27.91	171.31
MW-2	08/31/2017	196.73	27.70	169.03
MW-3	08/31/2017	196.54	27.05	169.49
MW-4	08/31/2017	197.27	26.88	170.39
MW-5	08/31/2017	194.97	25.68	169.29
MW-6	08/31/2017	192.18	22.97	169.21
MW-7	08/31/2017	188.47	19.11	169.36
MW-8	08/31/2017	187.13	17.09	170.04
MW-9	08/31/2017	184.73	15.18	169.55
MW-10	08/31/2017	178.12	9.01	169.11
MW-11	08/31/2017	184.65	16.15	168.50
MW-12	08/31/2017	178.33	9.12	169.21
MW-13	08/31/2017	176.72	7.89	168.83
MW-14	08/31/2017	186.19	13.95	172.24
MW-16	08/31/2017	178.59	9.55	169.04
MW-17	08/31/2017	179.03	9.82	169.21
MW-18	08/31/2017	178.58	9.10	169.48
MW-19	08/31/2017	178.60	8.93	169.67
MW-20	08/31/2017	186.64	12.29	174.35
MW-21	08/31/2017	198.70	32.07	166.63
MW-22	08/31/2017	197.51	28.12	169.39
MW-23	08/31/2017	198.79	28.20	170.59
101	08/31/2017	197.53	8.57	188.96
102	08/31/2017	193.94	20.03	173.91
109	08/31/2017	197.02	29.25	167.77
120	08/31/2017	184.19	12.57	171.62
123	08/31/2017	186.21	12.09	174.12
125	08/31/2017	196.28	25.31	170.97
126	08/31/2017	199.37	29.58	169.79
129	08/31/2017	197.24	26.77	170.47
130	08/31/2017	177.73	7.93	169.80

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
C-01	08/31/2017	193.89	24.59	169.30
C-02	08/31/2017	175.95	7.04	168.91
C-03	08/31/2017	196.34	27.21	169.13
C-04	08/31/2017	194.64	25.98	168.66
C-04A	08/31/2017	194.61	25.89	168.72
C-05	08/31/2017	180.74	13.82	166.92
C-06	08/31/2017	192.22	26.02	166.20
C-07	08/31/2017	196.80	27.45	169.35
C-08	08/31/2017	193.10	24.54	168.56
C-09	08/31/2017	202.35	32.67	169.68
C-10	08/31/2017	201.86	31.92	169.94
17WW08	08/31/2017	179.72	10.49	169.23
18WW01	08/31/2017	201.31	31.03	170.28
18WW02	08/31/2017	179.30	10.07	169.23
18WW03	08/31/2017	195.59	26.85	168.74
18WW04	08/31/2017	183.74	17.23	166.51
18WW05	08/31/2017	189.59	23.63	165.96
18WW06	08/31/2017	179.70	11.02	168.68
18WW07	08/31/2017	183.67	8.00	175.67
18WW08	08/31/2017	177.77	9.93	167.84
18WW09	08/31/2017	177.51	9.11	168.40
18WW10	08/31/2017	182.26	13.17	169.09
18WW11	08/31/2017	182.29	13.10	169.19
18WW14	08/31/2017	186.47	17.42	169.05
18WW15	08/31/2017	186.24	17.14	169.10
18WW16	08/31/2017	201.88	31.57	170.31
18WW18	08/31/2017	196.82	27.97	168.85
18WW19	08/31/2017	179.56	10.25	169.31
18WW20	08/31/2017	180.42	12.04	168.38
18WW21	08/31/2017	195.20	27.13	168.07
18WW22	08/31/2017	195.37	26.80	168.57
18WW24	08/31/2017	176.40	7.62	168.78
18WW25	08/31/2017	175.15	7.44	167.71
18CPTMW01SW	08/31/2017	198.20	28.08	170.12
18CPTMW01DW	08/31/2017	197.92	28.82	169.10
18CPTMW03SW	08/31/2017	198.53	30.59	167.94
18CPTMW04	08/31/2017	196.60	24.78	171.82
18CPTMW04SW	08/31/2017	196.42	27.14	169.28
18CPTMW06	08/31/2017	198.12	28.95	169.17
18CPTMW07	08/31/2017	197.32	28.50	168.82
18CPTMW08SW	08/31/2017	196.38	27.17	169.21
18CPTMW08DW	08/31/2017	196.59	27.79	168.80
18CPTMW10SW	08/31/2017	186.98	17.69	169.29
18CPTMW10DW	08/31/2017	187.38	18.31	169.07
18CPTMW12SW	08/31/2017	190.90	21.77	169.13
18CPTMW12DW	08/31/2017	190.25	21.19	169.06
18CPTMW14	08/31/2017	196.69	27.33	169.36
18CPTMW15	08/31/2017	179.79	10.90	168.89
18CPTMW16	08/31/2017	175.37	7.52	167.85
18CPTMW18	08/31/2017	194.53	27.57	166.96
18CPTMW19	08/31/2017	193.59	24.29	169.30
18CPTMW19SW	08/31/2017	193.29	24.24	169.05

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
18CPTMW22SW	08/31/2017	187.79	18.85	168.94
18CPTMW22R	08/31/2017	187.23	10.32	176.91
18CPTMW22DW	08/31/2017	188.00	18.89	169.11
18CPTMW23	08/31/2017	177.47	8.55	168.92
18CPTMW23SW	08/31/2017	177.43	8.52	168.91
18CPTMW24	08/31/2017	194.89	27.02	167.87
18CPTMW26	08/31/2017	182.60	17.15	165.45
18CPTMW26SW	08/31/2017	182.00	12.79	169.21

SURFACE WATER LEVELS

Harrison Bayou	Date	Reference Elevation (feet amsl)	Staff Reading (water depth) (feet)	Surface Water Elevation (feet amsl)
1824HBSW7	08/31/2017	167.92	0.85	168.77

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

PIEZOMETER LEVELS

Piezometers	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
BGPZ-1	09/28/2017	184.99	10.23	174.76
BGPZ-2	09/28/2017	184.39	15.60	168.79
BGPZ-3	09/28/2017	180.35	12.09	168.26
BGPZ-4	09/28/2017	177.77	9.10	168.67
BGPZ-5	09/28/2017	180.76	11.60	169.16
BGPZ-6	09/28/2017	197.82	28.57	169.25
BGPZ-7	09/28/2017	195.96	28.41	167.55
BGPZ-8	09/28/2017	197.08	30.31	166.77
BGPZ-9	09/28/2017	196.45	28.35	168.10
BGPZ-10	09/28/2017	197.00	28.14	168.86
BGPZ-11	09/28/2017	196.99	27.60	169.39
BGPZ-12	09/28/2017	188.17	NA	Plugged

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
AWD-1	09/28/2017	182.27	11.06	171.21
AWD-2	09/28/2017	186.78	15.50	171.28
AWD-3	09/28/2017	200.13	28.59	171.54
AWD-4	09/28/2017	193.89	24.37	169.52
MW-1	09/28/2017	199.22	28.26	170.96
MW-2	09/28/2017	196.73	28.08	168.65
MW-3	09/28/2017	196.54	27.41	169.13
MW-4	09/28/2017	197.27	27.22	170.05
MW-5	09/28/2017	194.97	26.05	168.92
MW-6	09/28/2017	192.18	23.29	168.89
MW-7	09/28/2017	188.47	19.53	168.94
MW-8	09/28/2017	187.13	17.45	169.68
MW-9	09/28/2017	184.73	15.58	169.15
MW-10	09/28/2017	178.12	9.63	168.49
MW-11	09/28/2017	184.65	16.55	168.10
MW-12	09/28/2017	178.33	9.53	168.80
MW-13	09/28/2017	176.72	8.21	168.51
MW-14	09/28/2017	186.19	14.37	171.82
MW-16	09/28/2017	178.59	9.94	168.65
MW-17	09/28/2017	179.03	10.17	168.86
MW-18	09/28/2017	178.58	9.44	169.14
MW-19	09/28/2017	178.60	9.29	169.31
MW-20	09/28/2017	186.64	12.67	173.97
MW-21	09/28/2017	198.70	32.57	166.13
MW-22	09/28/2017	197.51	28.50	169.01
MW-23	09/28/2017	198.79	28.64	170.15
101	09/28/2017	197.53	9.11	188.42
102	09/28/2017	193.94	20.40	173.54
109	09/28/2017	197.02	29.60	167.42
120	09/28/2017	184.19	12.98	171.21
123	09/28/2017	186.21	12.45	173.76
125	09/28/2017	196.28	25.69	170.59
126	09/28/2017	199.37	29.99	169.38
129	09/28/2017	197.24	27.15	170.09
130	09/28/2017	177.73	8.49	169.24

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
C-01	09/28/2017	193.89	24.55	169.34
C-02	09/28/2017	175.95	7.73	168.22
C-03	09/28/2017	196.34	27.85	168.49
C-04	09/28/2017	194.64	26.42	168.22
C-04A	09/28/2017	194.61	26.33	168.28
C-05	09/28/2017	180.74	14.17	166.57
C-06	09/28/2017	192.22	26.74	165.48
C-07	09/28/2017	196.80	28.09	168.71
C-08	09/28/2017	193.10	24.12	168.98
C-09	09/28/2017	202.35	32.97	169.38
C-10	09/28/2017	201.86	32.19	169.67
17WW08	09/28/2017	179.72	10.88	168.84
18WW01	09/28/2017	201.31	31.30	170.01
18WW02	09/28/2017	179.30	10.60	168.70
18WW03	09/28/2017	195.59	27.13	168.46
18WW04	09/28/2017	183.74	17.66	166.08
18WW05	09/28/2017	189.59	24.51	165.08
18WW06	09/28/2017	179.70	11.55	168.15
18WW07	09/28/2017	183.67	8.59	175.08
18WW08	09/28/2017	177.77	10.64	167.13
18WW09	09/28/2017	177.51	9.83	167.68
18WW10	09/28/2017	182.26	13.69	168.57
18WW11	09/28/2017	182.29	13.61	168.68
18WW14	09/28/2017	186.47	18.41	168.06
18WW15	09/28/2017	186.24	18.02	168.22
18WW16	09/28/2017	201.88	31.82	170.06
18WW18	09/28/2017	196.82	28.58	168.24
18WW19	09/28/2017	179.56	10.77	168.79
18WW20	09/28/2017	180.42	12.53	167.89
18WW21	09/28/2017	195.20	27.46	167.74
18WW22	09/28/2017	195.37	27.25	168.12
18WW24	09/28/2017	176.40	8.30	168.10
18WW25	09/28/2017	175.15	8.13	167.02
18CPTMW01SW	09/28/2017	198.20	28.52	169.68
18CPTMW01DW	09/28/2017	197.92	29.27	168.65
18CPTMW03SW	09/28/2017	198.53	31.02	167.51
18CPTMW04	09/28/2017	196.60	25.12	171.48
18CPTMW04SW	09/28/2017	196.42	27.57	168.85
18CPTMW06	09/28/2017	198.12	29.35	168.77
18CPTMW07	09/28/2017	197.32	28.97	168.35
18CPTMW08SW	09/28/2017	196.38	27.57	168.81
18CPTMW08DW	09/28/2017	196.59	28.23	168.36
18CPTMW10SW	09/28/2017	186.98	18.08	168.90
18CPTMW10DW	09/28/2017	187.38	18.69	168.69
18CPTMW12SW	09/28/2017	190.90	22.15	168.75
18CPTMW12DW	09/28/2017	190.25	21.61	168.64
18CPTMW14	09/28/2017	196.69	27.70	168.99
18CPTMW15	09/28/2017	179.79	11.43	168.36
18CPTMW16	09/28/2017	175.37	8.42	166.95
18CPTMW18	09/28/2017	194.53	27.31	167.22
18CPTMW19	09/28/2017	193.59	24.66	168.93
18CPTMW19SW	09/28/2017	193.29	24.64	168.65

Table 4-1: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells and Surface Water

MONITORING WELL LEVELS

Monitoring Wells	Date	Reference Elevation (feet amsl)	Depth to Water (feet)	Groundwater Elevation (feet amsl)
18CPTMW22SW	09/28/2017	187.79	19.22	168.57
18CPTMW22R	09/28/2017	187.23	10.69	176.54
18CPTMW22DW	09/28/2017	188.00	19.23	168.77
18CPTMW23	09/28/2017	177.47	9.09	168.38
18CPTMW23SW	09/28/2017	177.43	9.05	168.38
18CPTMW24	09/28/2017	194.89	27.41	167.48
18CPTMW26	09/28/2017	182.60	17.51	165.09
18CPTMW26SW	09/28/2017	182.00	13.12	168.88

SURFACE WATER LEVELS

Harrison Bayou	Date	Reference Elevation (feet amsl)	Staff Reading (water depth) (feet)	Surface Water Elevation (feet amsl)
1824HBSW7	09/28/2017	167.92	0.53	168.45

5 QUALITY CONTROL

This report summarizes the data for samples collected during July, August, and September 2017. The samples were collected in accordance with the Sampling and Analysis Plan for the GWTP (United States Army Corps of Engineers [USACE], September 2017) that treats water from LHAAP-18/24 and LHAAP-16. The purpose of the sampling program is to evaluate the effectiveness of the groundwater pump and treat system, assess water quality within the capture zone, and assure compliance with the effluent discharge requirements of the Interim ROD. Quality control and quality assurance problems noted in the case narratives received from the laboratory are minor and do not affect the usability of the data for compliance at the GWTP. No sample results from the 3rd Quarter 2017 were rejected due to quality control problems.

Microbac Laboratories (Microbac) analyzed the compliance samples collected from the GWTP. Independent data verification and validation was performed by the AECOM Technical Services, Inc. (AECOM) project chemist (**Appendix C**); the laboratory reports for the 3rd Quarter 2017 are included in **Appendix C** on a CD.

6 TREATED GROUNDWATER DISCHARGED

Reinjection of groundwater in ICT 6 and ICT 9 was discontinued as of July 15, 2012. The last injection occurred on May 24, 2012, immediately prior to the scrubber system malfunction which caused GWTP operation to cease temporarily. Treated groundwater that met the perchlorate discharge criteria was discharged to Harrison Bayou or the INF Pond in accordance with the Protocol for Discharging GWTP Effluent (Appendix G). Table 6-1 summarizes flow rates in Harrison Bayou, the maximum flow rate allowed by chloride and sulfate concentrations, and the actual flow rate discharged for September 2017. No treated groundwater was discharged to Harrison Bayou during July or August 2017.

Table 6-1: Treated Groundwater Discharged to Harrison Bayou - July 2017 through September 2017

Date	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou (gpm)	Released From INF Pond To Harrison Bayou (gpm)	Combined Total Released To Harrison Bayou (gpm)
07/01/2017	No Release	N/A	0.0	0.0	0.0
07/02/2017	No Release	N/A	0.0	0.0	0.0
07/03/2017	No Release	N/A	0.0	0.0	0.0
07/04/2017	No Release	N/A	0.0	0.0	0.0
07/05/2017	No Release	N/A	0.0	0.0	0.0
07/06/2017	No Release	N/A	0.0	0.0	0.0
07/07/2017	No Release	N/A	0.0	0.0	0.0
07/08/2017	No Release	N/A	0.0	0.0	0.0
07/09/2017	No Release	N/A	0.0	0.0	0.0
07/10/2017	No Release	N/A	0.0	0.0	0.0
07/11/2017	No Release	N/A	0.0	0.0	0.0
07/12/2017	No Release	N/A	0.0	0.0	0.0
07/13/2017	No Release	N/A	0.0	0.0	0.0
07/14/2017	No Release	N/A	0.0	0.0	0.0
07/15/2017	No Release	N/A	0.0	0.0	0.0
07/16/2017	No Release	N/A	0.0	0.0	0.0
07/17/2017	No Release	N/A	0.0	0.0	0.0
07/18/2017	No Release	N/A	0.0	0.0	0.0
07/19/2017	No Release	N/A	0.0	0.0	0.0
07/20/2017	No Release	N/A	0.0	0.0	0.0
07/21/2017	No Release	N/A	0.0	0.0	0.0
07/22/2017	No Release	N/A	0.0	0.0	0.0
07/23/2017	No Release	N/A	0.0	0.0	0.0
07/24/2017	No Release	N/A	0.0	0.0	0.0
07/25/2017	No Release	N/A	0.0	0.0	0.0
07/26/2017	No Release	N/A	0.0	0.0	0.0
07/27/2017	No Release	N/A	0.0	0.0	0.0
07/28/2017	No Release	N/A	0.0	0.0	0.0
07/29/2017	No Release	N/A	0.0	0.0	0.0
07/30/2017	No Release	N/A	0.0	0.0	0.0
07/31/2017	No Release	N/A	0.0	0.0	0.0

Table 6-1: Treated Groundwater Discharged to Harrison Bayou - July 2017 through September 2017

Date	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou (gpm)	Released From INF Pond To Harrison Bayou (gpm)	Combined Total Released To Harrison Bayou (gpm)
08/01/2017	No Release	N/A	0.0	0.0	0.0
08/02/2017	No Release	N/A	0.0	0.0	0.0
08/03/2017	No Release	N/A	0.0	0.0	0.0
08/04/2017	No Release	N/A	0.0	0.0	0.0
08/05/2017	No Release	N/A	0.0	0.0	0.0
08/06/2017	No Release	N/A	0.0	0.0	0.0
08/07/2017	No Release	N/A	0.0	0.0	0.0
08/08/2017	No Release	N/A	0.0	0.0	0.0
08/09/2017	No Release	N/A	0.0	0.0	0.0
08/10/2017	No Release	N/A	0.0	0.0	0.0
08/11/2017	No Release	N/A	0.0	0.0	0.0
08/12/2017	No Release	N/A	0.0	0.0	0.0
08/13/2017	No Release	N/A	0.0	0.0	0.0
08/14/2017	No Release	N/A	0.0	0.0	0.0
08/15/2017	No Release	N/A	0.0	0.0	0.0
08/16/2017	No Release	N/A	0.0	0.0	0.0
08/17/2017	No Release	N/A	0.0	0.0	0.0
08/18/2017	No Release	N/A	0.0	0.0	0.0
08/19/2017	No Release	N/A	0.0	0.0	0.0
08/20/2017	No Release	N/A	0.0	0.0	0.0
08/21/2017	No Release	N/A	0.0	0.0	0.0
08/22/2017	No Release	N/A	0.0	0.0	0.0
08/23/2017	No Release	N/A	0.0	0.0	0.0
08/24/2017	No Release	N/A	0.0	0.0	0.0
08/25/2017	No Release	N/A	0.0	0.0	0.0
08/26/2017	No Release	N/A	0.0	0.0	0.0
08/27/2017	No Release	N/A	0.0	0.0	0.0
08/28/2017	No Release	N/A	0.0	0.0	0.0
08/29/2017	No Release	N/A	0.0	0.0	0.0
08/30/2017	No Release	N/A	0.0	0.0	0.0
08/31/2017	5,475	1,600	0.0	0.0	0.0

Table 6-1: Treated Groundwater Discharged to Harrison Bayou - July 2017 through September 2017

Date	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou (gpm)	Released From INF Pond To Harrison Bayou (gpm)	Combined Total Released To Harrison Bayou (gpm)
09/01/2017	3,071	897	0.0	128	128
09/02/2017	1,246	284	0.0	132	132
09/03/2017	1,031	235	0.0	89	89
09/04/2017	625	142	0.0	19	19
09/05/2017	280	64	0.0	36	36
09/06/2017	214	48	0.0	48	48
09/07/2017	No Release	N/A	0.0	0.0	0.0
09/08/2017	No Release	N/A	0.0	0.0	0.0
09/09/2017	No Release	N/A	0.0	0.0	0.0
09/10/2017	No Release	N/A	0.0	0.0	0.0
09/11/2017	No Release	N/A	0.0	0.0	0.0
09/12/2017	No Release	N/A	0.0	0.0	0.0
09/13/2017	No Release	N/A	0.0	0.0	0.0
09/14/2017	No Release	N/A	0.0	0.0	0.0
09/15/2017	No Release	N/A	0.0	0.0	0.0
09/16/2017	No Release	N/A	0.0	0.0	0.0
09/17/2017	No Release	N/A	0.0	0.0	0.0
09/18/2017	No Release	N/A	0.0	0.0	0.0
09/19/2017	No Release	N/A	0.0	0.0	0.0
09/20/2017	No Release	N/A	0.0	0.0	0.0
09/21/2017	No Release	N/A	0.0	0.0	0.0
09/22/2017	No Release	N/A	0.0	0.0	0.0
09/23/2017	No Release	N/A	0.0	0.0	0.0
09/24/2017	No Release	N/A	0.0	0.0	0.0
09/25/2017	No Release	N/A	0.0	0.0	0.0
09/26/2017	No Release	N/A	0.0	0.0	0.0
09/27/2017	No Release	N/A	0.0	0.0	0.0
09/28/2017	No Release	N/A	0.0	0.0	0.0
09/29/2017	No Release	N/A	0.0	0.0	0.0
09/30/2017	No Release	N/A	0.0	0.0	0.0

gpm - gallons per minute

N/A - not applicable

7 AIR MONITORING

7.1 Summary of Air Monitoring Approach

Operation of the GWTP without air abatement was approved by the TCEQ and USEPA conditioned on collection of air monitoring data to determine the effect on GWTP operation on ambient air quality with respect to potential human health exposure risk. An Interim Air Monitoring Plan was developed by AECOM in August 2012 and used to implement the air monitoring program. The air monitoring program included sampling emission concentrations from the air stripper, ambient air at the GWTP, and ambient air downwind of the GWTP. Collection of air data occurred on a weekly basis between September 2012 and September 2013, on a monthly basis between September 2013 and September 2014, and on a quarterly basis since that time. The sampling program includes use of Summa canisters and a photoionization detector (PID) to measure vapor phase concentrations. The air stripper emission sample is collected as a grab sample, while the ambient air samples are collected as composite samples. The GWTP sample is collected over 8 hours to represent a work day and the downwind sample is collected over 24 hours to represent potential exposure to an off-site receptor[1]. The downwind sample is collected at the closest downwind property boundary, based on prevailing wind direction.

PID data (after system calibration) are collected each time the GWTP is operated and serve as a real-time indicator of ambient air conditions at and downwind of the GWTP. Correlations between definitive analytical air data and PID measurements were established and a means to calculate contaminant concentration from PID measurements was developed. A PID threshold of 0.4 parts per million by volume (ppmv) in ambient air was established, such that Summa canister measurements would occur when the PID threshold is exceeded.

The Summa canister samples are analyzed for VOCs using USEPA Method TO-15. The PID measurements are collected after instrument calibration. The air sampling results are summarized and reported to the USEPA and TCEQ in the GWTP quarterly reports; however, the air results are reviewed immediately upon receipt for the potential presence of any exceedances of ambient air concentrations. The GWTP report includes a summary of analytical results and PID readings, calculations of emission rates from the emission point, comparison of ambient air concentrations with TCEQ Air Monitoring Comparison Values (AMCVs) or the short-term Effects Screening Levels (ESLs) for chemicals with no published AMCVs, and a compilation of PID results and calibration records. The air monitoring results to date indicate that all ambient air concentrations are lower than the AMCVs or ESLs. The stripper stack sample concentrations are used to calculate emission rates in pounds per hour (lbs/hr) and tons per year (tpy). The calculated emission rates in lbs/hr are then compared to the allowable emission rates per 30 Texas Administrative Code (TAC) 106.533(f)(1). All emission rates have been lower than the

[1] Off-site receptor - Any recreational area, residence, commercial/industrial facility, or other normally occupied structures not used solely by the owner or operator of the facilities or the owner of the site upon which the facilities are located. Measurements of distances to determine compliance with this distance restriction must be taken toward structures that are in use as of the date that a notification is filed with the commission.

allowable emission rates to the conservatively-selected off-site receptor[1]. The calculated emission rate in tpy is compared to the allowable limit of 5 tpy per chemical. All emission rates have been lower than the allowable emission rates.

The air monitoring results from the first few months of operation between September and November 2012 were compiled and submitted in a separate report (December 2012) (along with validated data) to TCEQ to demonstrate compliance with Texas Permit by Rule emission standards. Approval of the analytical results and concurrence that the site will continue to meet Title 30 TAC §106.533 without the use of air abatement using a catalytic oxidation system was obtained from the TCEQ via email on February 22, 2013.

On February 18, 2013, AECOM presented analysis of the approach applicable to obtaining a variance for operating the GWTP without air abatement equipment to the TCEQ and USEPA. The analysis indicated that the use of Explanation of Significant Difference (ESD) is the appropriate approach for the site. Approval of use of ESD was obtained from the USEPA via email on March 21, 2013. The ESD was developed, reviewed, and accepted by USEPA and TCEQ. The ESD was signed by the designated parties on April 3, 2014 and concurrence from the TCEQ was obtained in a letter dated April 16, 2014.

7.2 Air Monitoring Results for the 3rd Quarter 2017

A summary of the air sampling results is presented in **Appendix D**. Air samples during the 3rd Quarter 2017 were collected on September 26, 2017. All results met the criteria described in **Section 7.1**.

7.2.1 Summa Canister Monitoring Results

One sampling event was conducted during the 3rd Quarter 2017 using Summa canisters. The samples were collected and analyzed as described in **Section 7.1** and per the approved air monitoring plan dated August 2012. The analytical results were then compiled in spreadsheets where calculations were completed and comparisons to applicable criteria were made as described in **Section 7.1**.

7.2.1.1 Ambient Air Results

Tetrachloroethene, trichloroethene, n-Hexane, toluene, dichlorodifluoromethane, trichlorofluoromethane, trichlorotrifluoroethane, alpha-Pinene, and d-Limonene were detected in September 2017 in ambient air downwind of the GWTP.

Compounds originating at the GWTP would be expected to have lower concentrations in the downwind sampling location than at the GWTP sampling location. Likewise, compounds like n-hexane, toluene, dichlorodifluoromethane, trichlorofluoromethane, alpha-Pinene, and d-Limonene with similar concentrations in both GWTP ambient air and downwind ambient air are suspected to be present in the ambient (background) air.

All ambient air results during the quarter met the ambient air criteria.

7.2.1.2 Air Stripper Effluent Results

The VOCs present in groundwater that are removed via the air stripper include 1,1-Dichloroethene, 1,2-dichloroethane, cis-1,2-dichloroethene, MC, TCE, vinyl chloride, and

trichlorotrifluoroethane. The highest reported concentrations are for TCE, MC, cis-1,2-dichloroethene, and trichlorotrifluoroethane. These compounds are frequently reported in groundwater at the site, with the exception of trichlorotrifluoroethane which is not typically a groundwater analyte at LHAAP. Trichlorotrifluoroethane, however, appears to be present in groundwater as indicated by limited analysis conducted in December 2013, where it was detected in several wells, and from historical accounts. Many of the chemicals that are reported in ambient air are not detected in the air stripper effluent. This is likely because the reporting limit for the air stripper effluent is higher than the reporting limit for the ambient air samples or the source for some of these chemicals are extraneous to groundwater.

All air stripper effluent concentrations were below the emission criteria.

7.2.2 PID Results

Along with collection of Summa canister air samples, PID measurements from the same sources/areas are collected and recorded. These simultaneous measurements allowed establishing a correlation between PID readings and VOC concentrations in the Summa canister air samples. Conversion from PID to compound concentrations was established by TCEQ in 30 TAC §106.533(h). The TCEQ equation allows use of a PID to determine individual compound concentrations if the distribution of chemicals in the ambient air is known or assumed. This allows the use of a PID as a tool to measure VOC concentrations and convert the PID results to estimates of compound concentrations. All ambient air PID measurements during this quarter at the GWTP were reported at 0.0 ppmv. The results of the PID readings collected during GWTP operations are presented in **Appendix D**.

8 COMMENTS AND RESPONSES

Comments were received from the EPA on the 1st 2017 Quarterly Report via email dated October 7, 2017 and on the 2nd 2017 Quarterly Report from the EPA via email dated 10/8/17.

EPA Comments on the 1st Quarter 2017 Report

1. ***General Comment****: EPA noticed that in March 2017 some groundwater was pumped out ICT 13D, but much less than the other #13 ICTs. Please explain why ICT 13D is pumping much less water than the adjacent 13 ICTs. Based on the groundwater elevations, it appears that ICT 13 D should be pumping a greater volume of groundwater.*

Response: Upon inspection, we found that the level probes may have been set incorrectly. We have reset the probes and will check to see if ICT-13D extracts more groundwater in the future.

1. ***General Comment:*** *EPA observed that some of the monitoring well concentrations have changed since the discontinuance of the sprinkling/watering of site 18/24. The perchlorate concentrations in MW-16 have dropped dramatically while concentrations of some wells near the Unlined Evaporation Pond has increased.*

Response: Noted.

EPA Comments on the 2nd Quarter 2017 Report

1. ***General Comment****: EPA thought that the ICTs were going to be sampled. When are they going to be sampled again? It would be interesting to see a time series plot of the ICTs sample results over time.*

Response: ICTs are sampled annually, traditionally during 1st Quarter. Since the GWTP was not fully functional during the 1st Quarter 2017, selected monitoring wells were sampled instead. ICT sampling is scheduled for 1st Quarter 2018.

2. ***General Comment:*** *The wells recently sampled need to be included in the time series plots.*

Response: Monitoring wells sampled in March 2017 were added to time series plots presented in the 2nd Quarter 2017 Report.

3. ***General Comment:*** *An interesting note in this report is that the perchlorate levels in monitoring well 109 went from 17,500 ppb to an all-time low of 268 ppb. Also, monitoring well MW-2 had large increases of MC and perchlorate.*

Response: Noted.

APPENDIX A: ICT Layout and GWTP Process Flow Diagram

Table A-1: ICTs Completion Depths

ICT	TOC Elevation	Total Depth	Sump Elevation	Comment
1	186.07	22.5	163.57	Taken out of service in 2007
2	185.02	29.5	155.52	
3	192.27	37.75	154.52	Taken out of service in 2007
4	193.51	37.5	156.01	
5	192.67	35	157.67	Taken out of service in 2007
6	197.30	40.75	156.55	Converted to infiltration in 2007. Ceased reinjection in July 2012.
7	198.03	32.33	165.7	
8	198.97	44.5	154.47	
9	197.64	45.5	152.14	Converted to infiltration in 2007. Ceased reinjection in July 2012.
10	198.07	45.42	152.65	Taken out of service in 2007
11	198.01	43.33	154.68	
12A	189.06	31.5	157.56	Taken out of service in 2007. Reinstituted in December 2012.
12B	191.97	36.25	155.72	
12C	193.90	34.33	159.57	
12D	185.64	33.75	151.89	
12E	183.38	32.25	151.13	
13A	182.59	28.17	154.42	
13B	184.72	29.58	155.14	
13C	186.13	28.17	157.96	
13D	186.72	26.17	160.55	
13E	191.79	27.08	164.71	
13F	197.81	32.33	165.48	
13G	197.03	27.25	169.78	Taken out of service in 2008.
14A	196.8	43.00	153.8	
14B	197.61	43.42	154.19	
14C	197.86	41.33	156.53	
14D	198.47	44.25	154.22	
14E	198.47	43.08	155.39	

Note(s):

Sump elevation calculated by subtracting total depth from TOC elevation.

ICTs were installed in 1998.

Elevations are reported as feet above mean sea level.

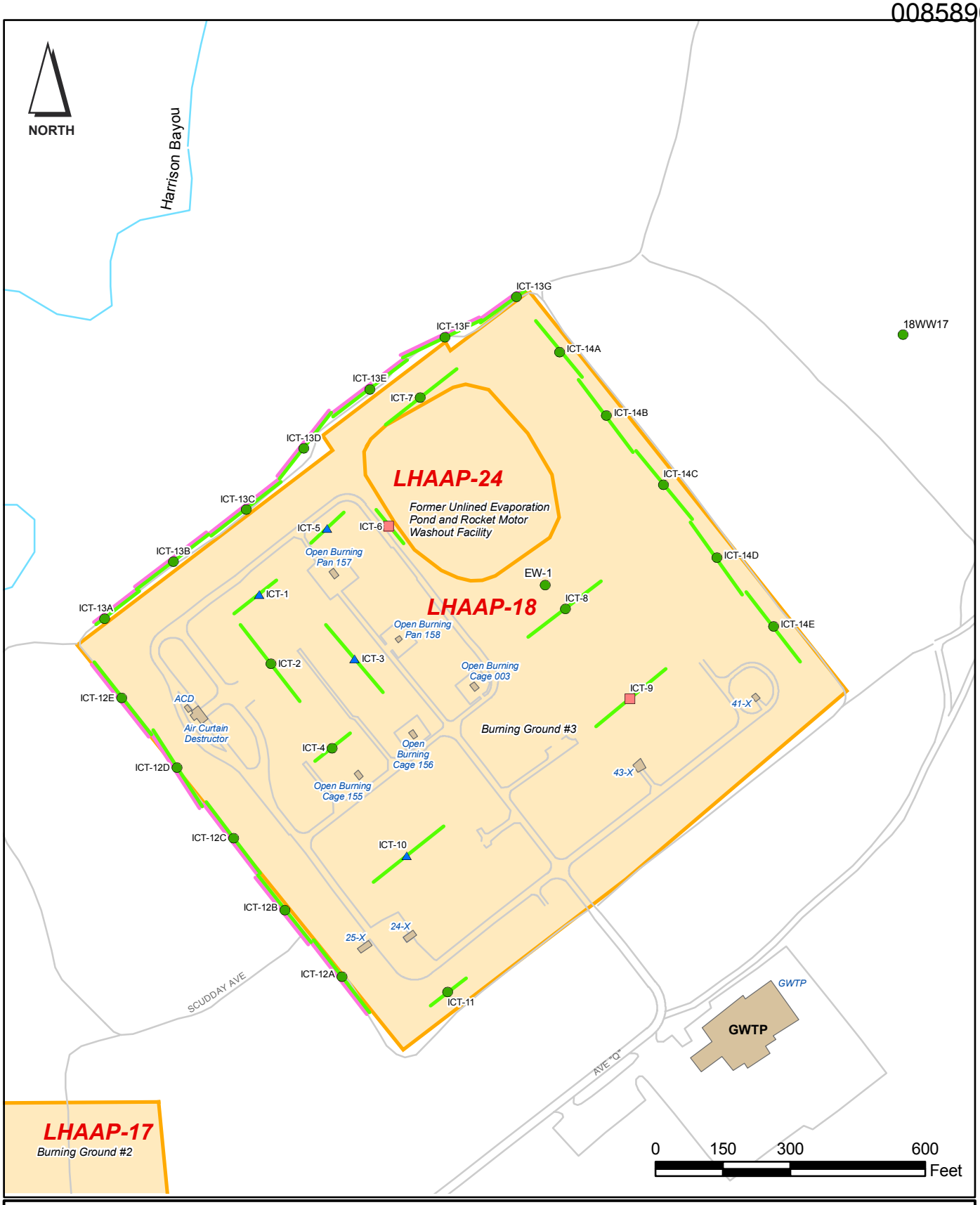
Total depths are reported as feet below TOC.

ICT 12A was replaced on December 5,2012 and extraction has resumed.

TOC Elevations and total depth measured in October 2003, 4th Quarter 2003, GWTP Report.

ICT - interception-collection trench

TOC - top of casing, measuring point for groundwater elevations



LEGEND

- Extraction Location
- Deactivated ICT Sump
- Injection Point – inactive since May 24, 2012
- ICT Location
- HDPE Liner Installed on the Outside of the ICT
- Stream
- Road
- Building or Pad
- Site

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TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A-1
SITE VICINITY MAP
LHAAP-18/24

\\ENV_PROD\Projects\ET\DATA\work\60263702\GIS\Project\Fig A-1 Site Vicnity Map v7 [20140113].ai

FLOW MONITORING METER FIT-140

GROUNDWATER FROM BURNING GROUNDS AND SITE 16

PROCESS WATER FROM SUMP COLLECTION

TK-140 EQUALIZATION 300,000 GAL

TK-140 Sampling Spigot

FLOW MONITORING METER FIT-172

TK-200A ORP 5,900 GAL

TK-200B pH 5,700 GAL

METALS TREATMENT

POLYMER POTABLE WATER

TK-200C POLYMER 3,400 GAL

TK-240 CLARIFIER 10,000 GAL

TK-640 BACK WASH TANK

FL-290 SAND FILTER

TK-300 STRIPPER FEED TANK 22,800 GAL

FLOW MONITORING METER FIT-322

VENT TO ATMOSPHERE

RECYCLE

VENT HEADER

TK-530 8,670 GAL

TK-510B 8,670 GAL

TK-510A 8,670 GAL

DECANT

DECANT

FILTER PRESS MAKEUP WATER SOURCE

SAND FILTER BACKWASH WATER SOURCE

FILTER PRESS MAKEUP WATER

SAND FILTER BACKWASH WATER

CARBON FILTER

T-330 AIR STRIPPER

FILTER CAKE FOR DISPOSAL

BELT PRESS BFP-560

SOLIDS REMOVAL

COLLECTION FROM FLOOR DRAINS IN CONTAINMENT AREA AND FROM DECON PAD

SUMP

TO TK 140

TK-104 ELECRTON DONOR SUBSTRATE TANK

P-104

TK-103 NUTRIENT TANK

P-103

TK-102 pH CONTROL TANK

P-102

TK-630

EFFLUENT STORAGE 127,000 GAL

P-175

FLOW MONITORING METER FIT-103

VOLATILE ORGANICS TREATMENT

Recycle

FLOW MONITORING METER FIT-686

TO INF POND

TO HARRISON BAYOU

TO REINJECTION AT BURNING GROUNDS

P-101A

P-101B

T-101 FBR

T-105 MEDIA CAPTURE TANK

TK-650 1,000 GAL

P-641

P-642

TK-650 Sampling Spigot

PERCHLORATE TREATMENT

"DRAWING NOT TO SCALE

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TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A-2

PROCESS FLOW DIAGRAM

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

MAY, 2013

60256135

APPENDIX B: Groundwater Elevation Contour Maps

Table B-1: Extraction Equipment Maintenance Since 2011

LHAAP-18/24

Well I.D.	Replaced Parts	Date	Contractor
ICT 14E	pump	3/15/2012	Shaw
ICT 14D	pump, motor, level probes	3/16/2012	Shaw
ICT 14B	pump, level probes, level probe wire	3/16/2012	Shaw
ICT 14A	pump, motor, level probes, level probe wire	3/17/2012	Shaw
ICT 2	pump, motor	3/17/2012	Shaw
ICT 13D	pump	3/19/2012	Shaw
ICT 13B	pump	3/20/2012	Shaw
ICT 14E	pump, motor, broken piping	11/19/2012	AECOM
ICT 13C	pump	11/20/2012	AECOM
ICT13E	Pump	11/20/2012	AECOM
ICT 12A	pump, motor, wiring harness, level probes, level probe wire	12/5/2012	AECOM
ICT 7	pump, motor, wiring harness, level probes	12/6/2012	AECOM
ICT2	pump	6/10/2013	AECOM
ICT 13C	pump	6/11/2013	AECOM
ICT 13D	pump	6/12/2013	AECOM
ICT 14E	pump rebuilt	6/15/2013	AECOM
ICT 14E	Replaced low level switch	6/19/2013	AECOM
ICT 13C	pump, wiring harness, flow meter	4/15/2014	AECOM
ICT 14D	Repaired level probes	6/24/2014	AECOM
ICT 14E	Repaired level probes	6/24/2014	AECOM
ICT 14E	pump and motor troubleshooting	6/26/2014	AECOM
ICT2, 13F, 14C, 14D, 14E	Repaired level probes	7/7/2014	AECOM
ICT 12E	pump, motor	10/2/2014	AECOM
ICT 12E	wiring harness, fixed leak	10/8/2014	AECOM
ICT 12E	level probes	10/9/2014	AECOM
ICT13A	pump, piping	10/15/2014	AECOM
ICT 12E	Repaired leaking fittings	10/16/2014	AECOM
ICT 11	1" tee and 1" elbow	1/13/2015	AECOM
ICT 12B	Flow meter	1/13/2015	AECOM
ICT 7	1" tee, repaired 1" pipe	1/13/2015	AECOM
ICT 13A	Flow meter	1/15/2015	AECOM
ICT 13B	Pump	1/15/2015	AECOM
ICT 13C	Pump	1/16/2015	AECOM
ICT 7	Low level probe	1/16/2015	AECOM
ICT 13D	Pump, level probes	1/17/2015	AECOM
ICT 14C	Low level probe	1/17/2015	AECOM
ICT 14C	Low level probe	1/29/2015	AECOM
ICT 14D	Low level probe	1/29/2015	AECOM
ICT 13D	Level probes	1/29/2015	AECOM
ICT 2	Pump	1/30/2015	AECOM
ICT 8	Fuse	3/2/2015	AECOM
ICT 8	Fuse	3/9/2015	AECOM
ICT 12E	Flow meter	3/13/2015	AECOM
ICT 13D	Union	3/13/2015	AECOM

Table B-1: Extraction Equipment Maintenance Since 2011

Well I.D.	Replaced Parts	Date	Contractor
ICT 14C	Cleaned level probes	4/1/2015	AECOM
ICT 14D	Cleaned level probes	4/1/2015	AECOM
ICT 13A	Cleaned level probes	4/21/2015	AECOM
ICT 14C	Cleaned level probes	4/21/2015	AECOM
ICT 8	Low level probe	7/24/2015	AECOM
ICT 13C	Installed New Pump	7/28/2015	AECOM
ICT 14C	Installed New Pump and Electric Motor	7/29/2015	AECOM
ICT 14E	Installed New Pump and Electric Motor	7/31/2015	AECOM
ICT 12E	Repaired wiring	8/12/2015	AECOM
ICT 13E	Replaced high and low level probes	8/12/2015	AECOM
ICT 2	Installed Rebuilt Pump	9/9/2015	AECOM
ICT 12 E, ICT 14E	Replaced high level probe and wiring	9/15/2015	AECOM
ICT 13A	Installed new pump	12/23/2015	AECOM
ICT 13B	Installed new pump	12/24/2015	AECOM
ICT 13D	Replaced high level probe	2/11/2016	Aerotek
ICT 14C	Replace low level probe on ICT 14C	2/15/2016	Aerotek
ICT 8	Installed new pump and electric motor	2/19/2016	Aerotek
ICT 14C	Repaired piping leak	3/10/2016	Aerotek
ICT 14E	Installed high and low level probes, level probe wire	3/22/2016	Aerotek
ICT 13D, ICT 14B	Installed high and low level probes, level probe wire	3/24/2016	Aerotek
ICT 14B	Installed new pump and electric motor	3/31/2016	Aerotek
ICT 14C	Installed new low level probe	4/20/2016	Aerotek
ICT 12B	Installed new mechanical flow meter	6/16/2016	Aerotek
ICT 13C	Installed rebuilt pump and new flow meter	8/10/2016	Aerotek
ICT 13A	Installed rebuilt pump, new flow meter, and new 1" unions	8/24/2016	Aerotek
ICT 14E	Installed new mechanical flow meter	8/26/2016	Aerotek
ICT 12C	Repair flow meter	8/30/2016	Aerotek
ICT 2	Install rebuilt pump and new flow meter	8/31/2016	Aerotek
ICT 14C	Clean and adjust level probes	9/7/2016	Aerotek
ICT 14C	Replaced level probes	9/12/2016	Aerotek
ICT 14C	Installed new level probe wire and level probes	9/21/2016	Aerotek
ICT 12C	Installed rebuilt pump, new electric motor, new wiring harness, new level probe wire, and new level probes	9/27/2016	Aerotek

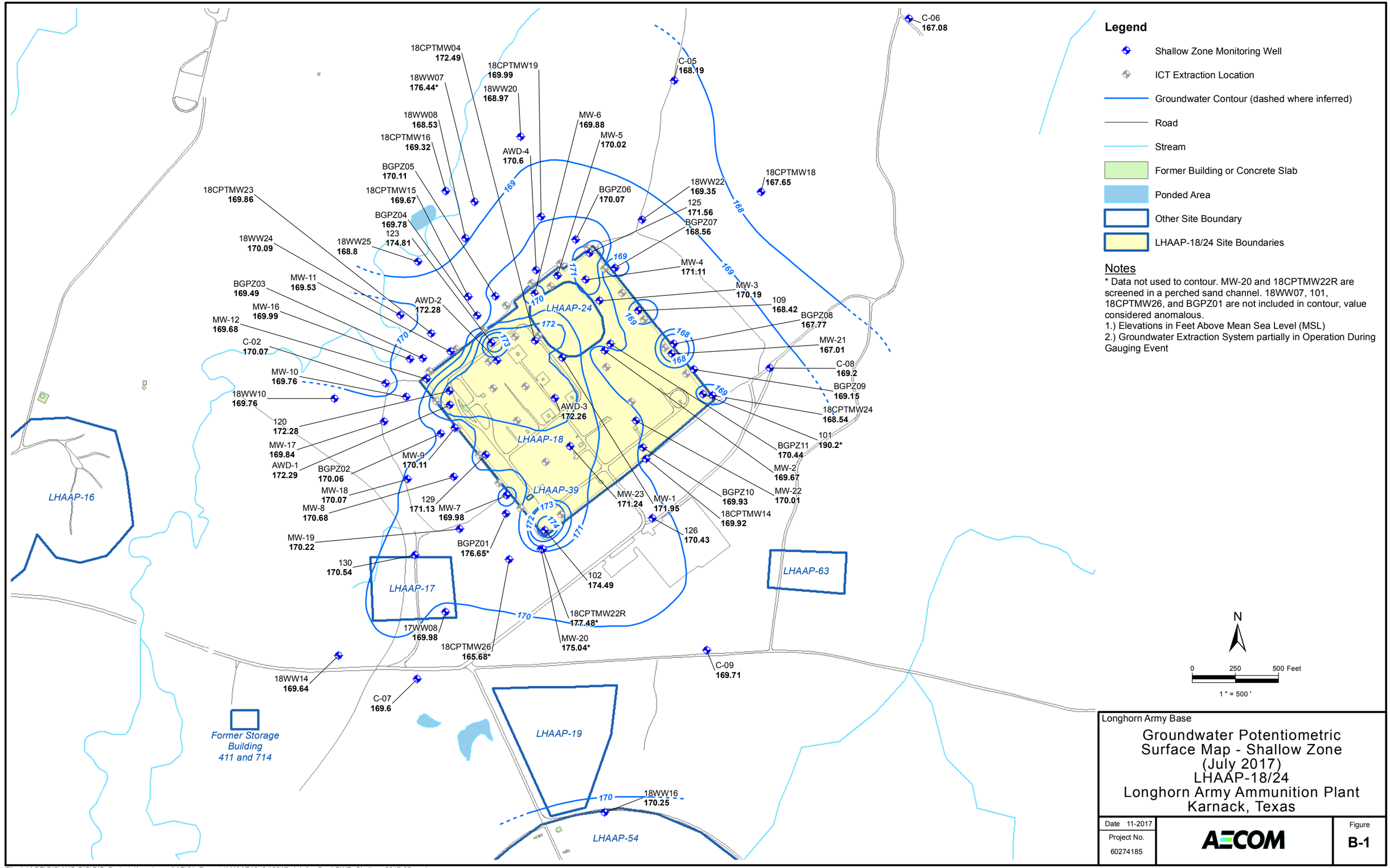
Table B-1: Extraction Equipment Maintenance Since 2011

Well I.D.	Replaced Parts	Date	Contractor
ICT 14C	Cleaned and adjusted level probes	10/14/2016	Aerotek
ICT 13C	Cleaned and adjusted level probes	10/21/2016	Aerotek
ICT 13B	Installed rebuilt pump	10/25/2016	Aerotek
ICT 14D	Installed rebuilt pump	10/27/2016	Aerotek
ICT 13C	Replace low level probe	11/8/2016	Aerotek
ICT 13B	Replace relay base plate	11/8/2016	Aerotek
ICT 13E	Clean and adjust low level probe	11/15/2016	Aerotek
ICT 13B	Replace broken relay base plate and bad level probe wire	11/17/2016	Aerotek
ICT 13C	Clean & repair leaking flow meter	11/18/2016	Aerotek
ICT 13B	Clean & adjust low level probe	11/18/2016	Aerotek
ICT 13A, 13B, & 13E	Clean and adjust low level probes	12/2/2016	Aerotek
ICT 13C & 14C	Pulled piping and pumps	2/8/2017	Aerotek
ICT 14C	Installed new electric motor	2/8/2017	Aerotek
ICT 13C & 14C	Installed rebuilt grundfos pumps	2/8/2017	Aerotek
ICT 7, 13A, & 14D	Repaired sample ports	2/9/2017	Aerotek
ICT 13B & 14E	Cleaned and adjusted low level probes	3/30/2017	Aerotek
ICT 13B & 13F	Installed new flow meters	3/30/2017	Aerotek
ICT 12B	Repair flow meter	4/13/2017	Aerotek
ICT 12C	Replace broken 1" tee	5/1/2017	Aerotek
ICT 11	Installed new manual flow meter	5/5/2017	Aerotek
ICT 2	Installed new flow meter	5/9/2017	Aerotek
ICT 14C & 14D	Cleaned and adjusted low level probes	5/31/2017	Aerotek
ICT 14C	Cleaned and adjusted low level probe	6/27/2017	Aerotek
ICT 8	Clean low level probe	7/11/2017	Aerotek
ICT 2 & 14D	Cleaned and replaced level probes	7/17/2017	Aerotek
ICT 14C	Cleaned low level probe	7/24/2017	Aerotek
ICT 13A	Installed new pump and flow meter	8/8/2017	Aerotek
ICT 13C & 13B	Installed new pump and flow meter	8/9/2017	Aerotek
ICT 13B	Installed new low level probe	8/10/2017	Aerotek
ICT 11	Installed new pump and flow meter	8/11/2017	Aerotek
ICT 4	Replaced low level probe	8/11/2017	Aerotek
ICT 2	Installed rebuilt pump	9/19/2017	Aerotek
ICT 13D	Adjusted level probes	9/22/2017	

Table B-1: Extraction Equipment Maintenance Since 2011

LHAAP-16

Well I.D.	Replaced Parts	Date	Contractor
EW08	New pump	2/28/2011	Shaw
EW01	Rebuild pump	8/25/2011	Shaw
EW06	Rebuild pump	8/25/2011	Shaw
EW02	Rebuild pump	2/12/2012	Shaw
EW03	Rebuild pump	2/12/2012	Shaw
EW08	Rebuild pump	11/8/2012	AECOM
EW01	Rebuild pump	11/8/2012	AECOM
EW04	Repair pump	11/13/2012	AECOM
EW07	Rebuild pump	11/13/2012	AECOM
EW04	Installed New Pump	11/28/2012	AECOM
EW06	Installed New Pump	11/28/2012	AECOM
EW02	Installed New Pump	12/4/2012	AECOM
EW03	Installed New Pump	12/4/2012	AECOM
EW01	Installed New Pump	12/17/2012	AECOM
EW01	Replaced Low level probe	1/17/2015	AECOM
EW01	Cleaned and adjusted level probes	10/21/2016	Aerotek



Longhorn Army Base

Groundwater Potentiometric Surface Map - Shallow Zone (July 2017) LHAAP-18/24 Longhorn Army Ammunition Plant Karnack, Texas

Date 11-2017	AECOM	Figure B-1
Project No. 60274185		

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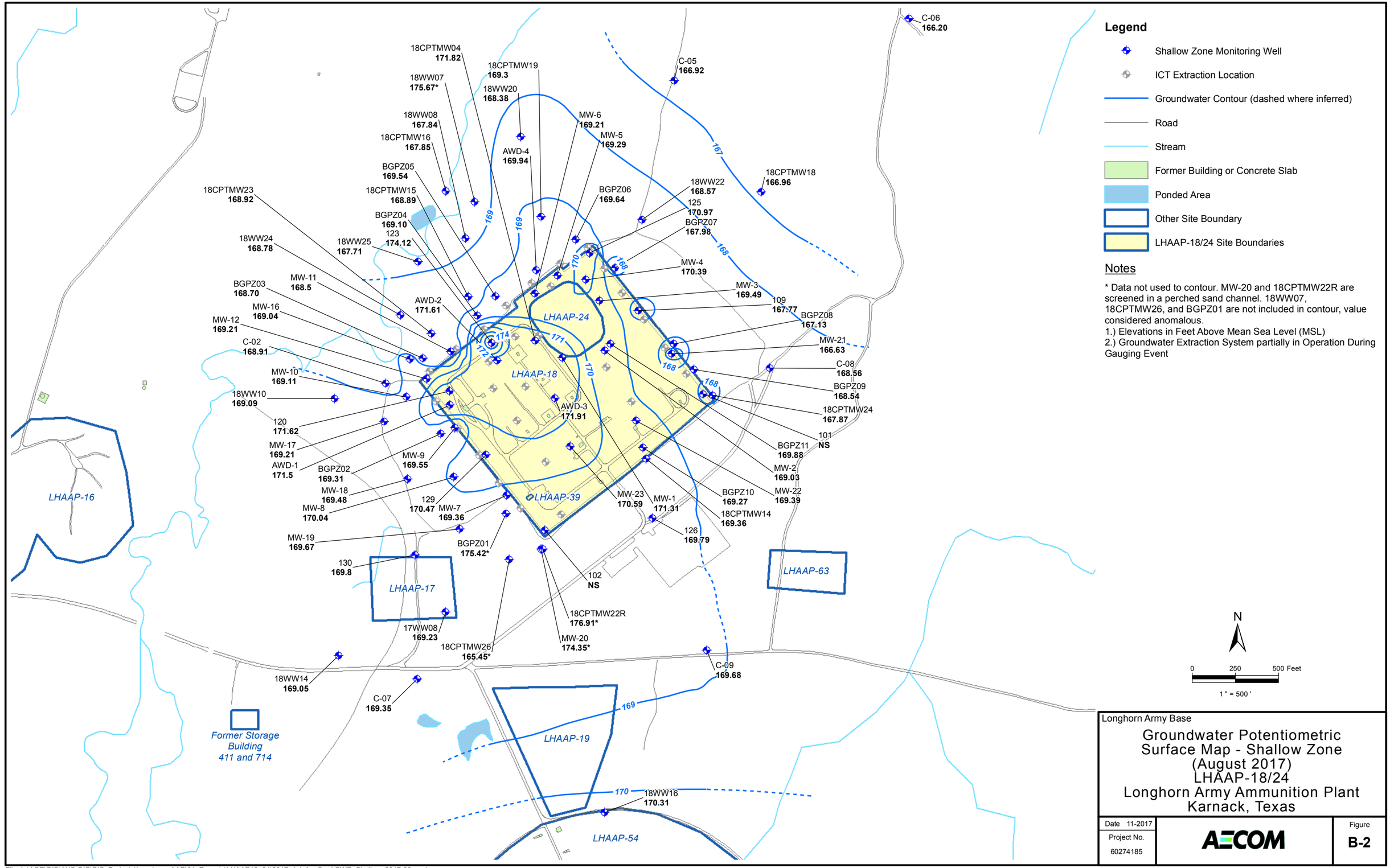

Legend

- Shallow Zone Monitoring Well
- ICT Extraction Location
- Groundwater Contour (dashed where inferred)
- Road
- Stream
- Former Building or Concrete Slab
- Ponded Area
- Other Site Boundary
- LHAAP-18/24 Site Boundaries

Notes

* Data not used to contour. MW-20 and 18CPTMW22R are screened in a perched sand channel. 18WW07, 18CPTMW26, and BGPZ01 are not included in contour, value considered anomalous.
1.) Elevations in Feet Above Mean Sea Level (MSL)
2.) Groundwater Extraction System partially in Operation During Gauging Event

N

0 250 500 Feet

1 " = 500 '

Longhorn Army Base

Groundwater Potentiometric Surface Map - Shallow Zone (August 2017) LHAAP-18/24 Longhorn Army Ammunition Plant Karnack, Texas

Date 11-2017	AECOM	Figure B-2
Project No. 60274185		

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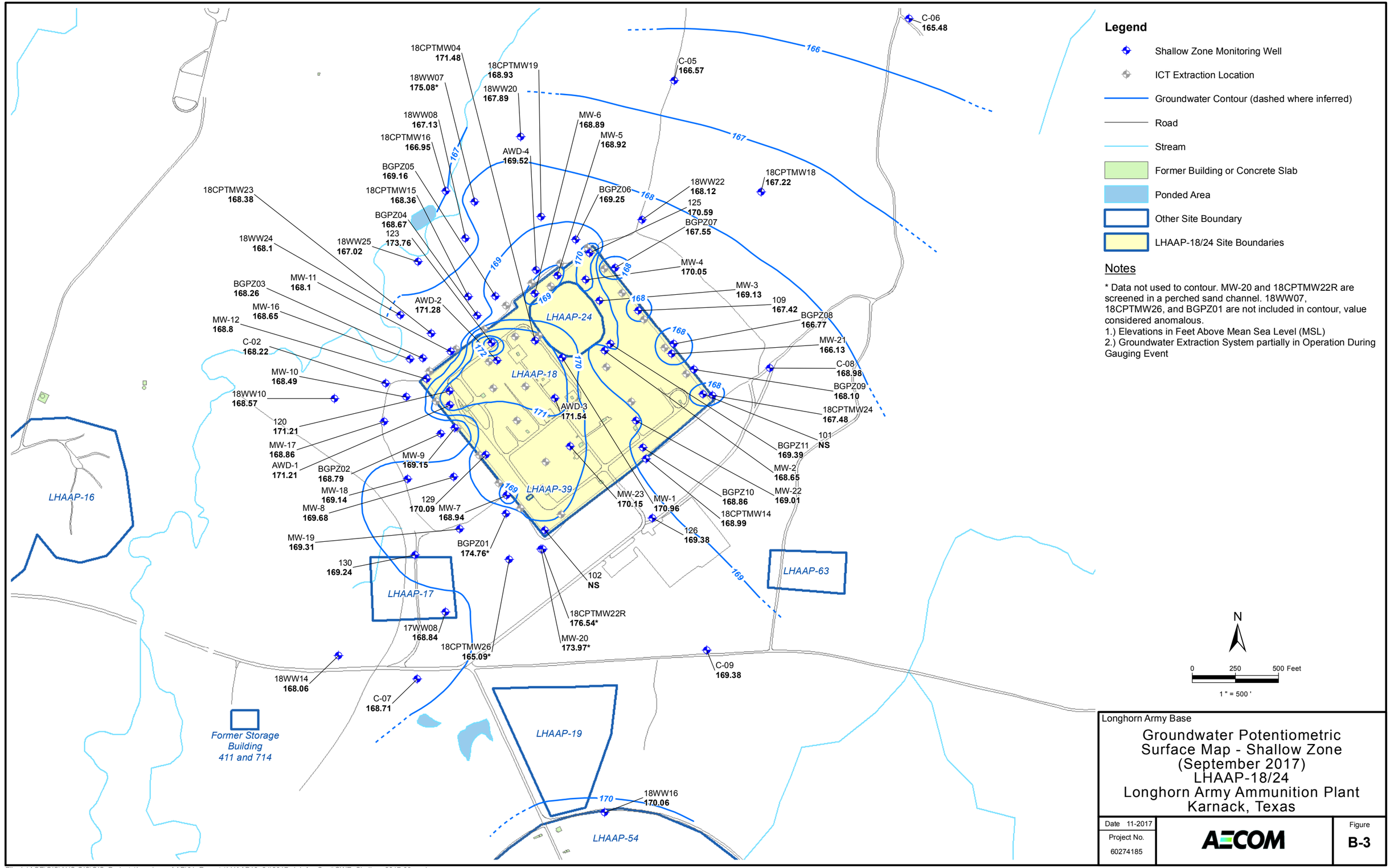

Longhorn Army Base

Groundwater Potentiometric Surface Map - Shallow Zone (September 2017) LHAAP-18/24 Longhorn Army Ammunition Plant Karnack, Texas

Date	Figure
11-2017	B-3
Project No. 60274185	AECOM

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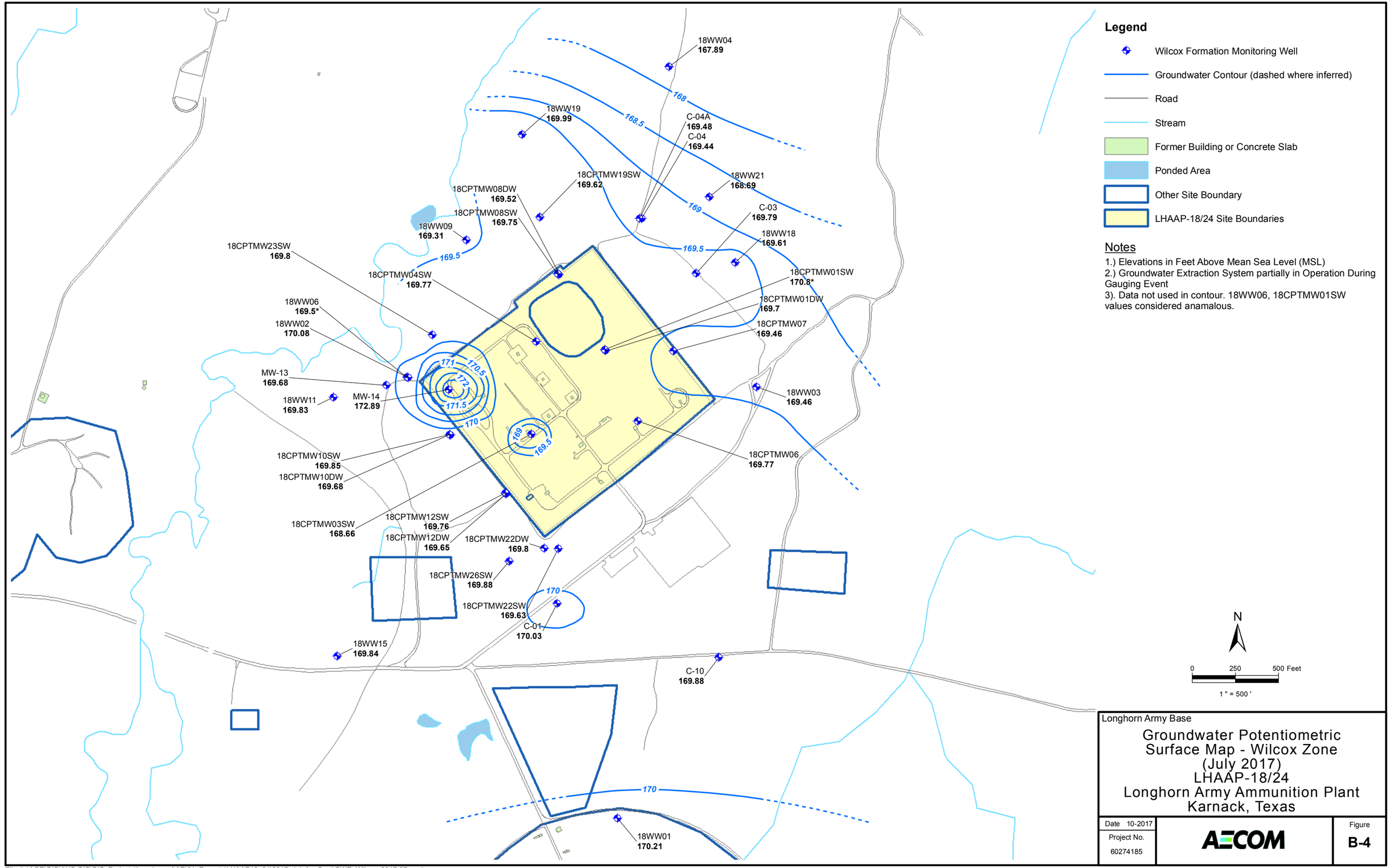

Legend

- Wilcox Formation Monitoring Well
- Groundwater Contour (dashed where inferred)
- Road
- Stream
- Former Building or Concrete Slab
- Ponded Area
- Other Site Boundary
- LHAAP-18/24 Site Boundaries

Notes

1.) Elevations in Feet Above Mean Sea Level (MSL)
2.) Groundwater Extraction System partially in Operation During Gauging Event
3). Data not used in contour. 18WW06, 18CPTMW01SW values considered anamalous.

Longhorn Army Base

Groundwater Potentiometric Surface Map - Wilcox Zone (July 2017) LHAAP-18/24 Longhorn Army Ammunition Plant Karnack, Texas

Date 10-2017	AECOM	Figure B-4
Project No. 60274185		

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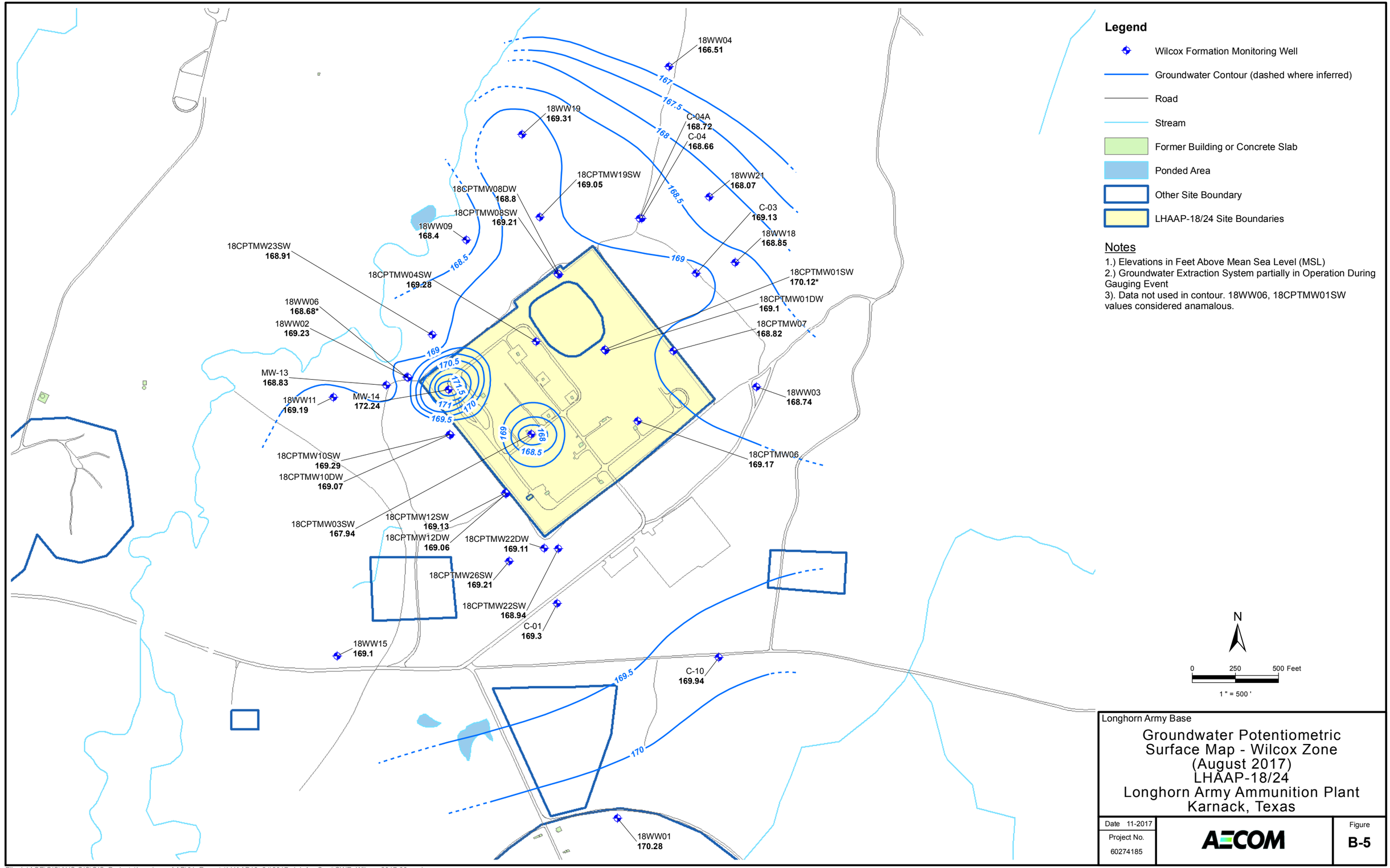

Legend

- Wilcox Formation Monitoring Well
- Groundwater Contour (dashed where inferred)
- Road
- Stream
- Former Building or Concrete Slab
- Ponded Area
- Other Site Boundary
- LHAAP-18/24 Site Boundaries

Notes

1.) Elevations in Feet Above Mean Sea Level (MSL)
2.) Groundwater Extraction System partially in Operation During Gauging Event
3). Data not used in contour. 18WW06, 18CPTMW01SW values considered anamalous.

N

0 250 500 Feet

1 " = 500 '

Longhorn Army Base

Groundwater Potentiometric Surface Map - Wilcox Zone (August 2017) LHAAP-18/24 Longhorn Army Ammunition Plant Karnack, Texas

Date 11-2017	AECOM	Figure B-5
Project No. 60274185		

File: L:\AGE\GIS\AUS GIS\GIS_Projects\Longhorn_AAP\01_Reports\LHAAP18_24\2017_JulyAugSept\GWE_Wilcox_2017-08.mxd
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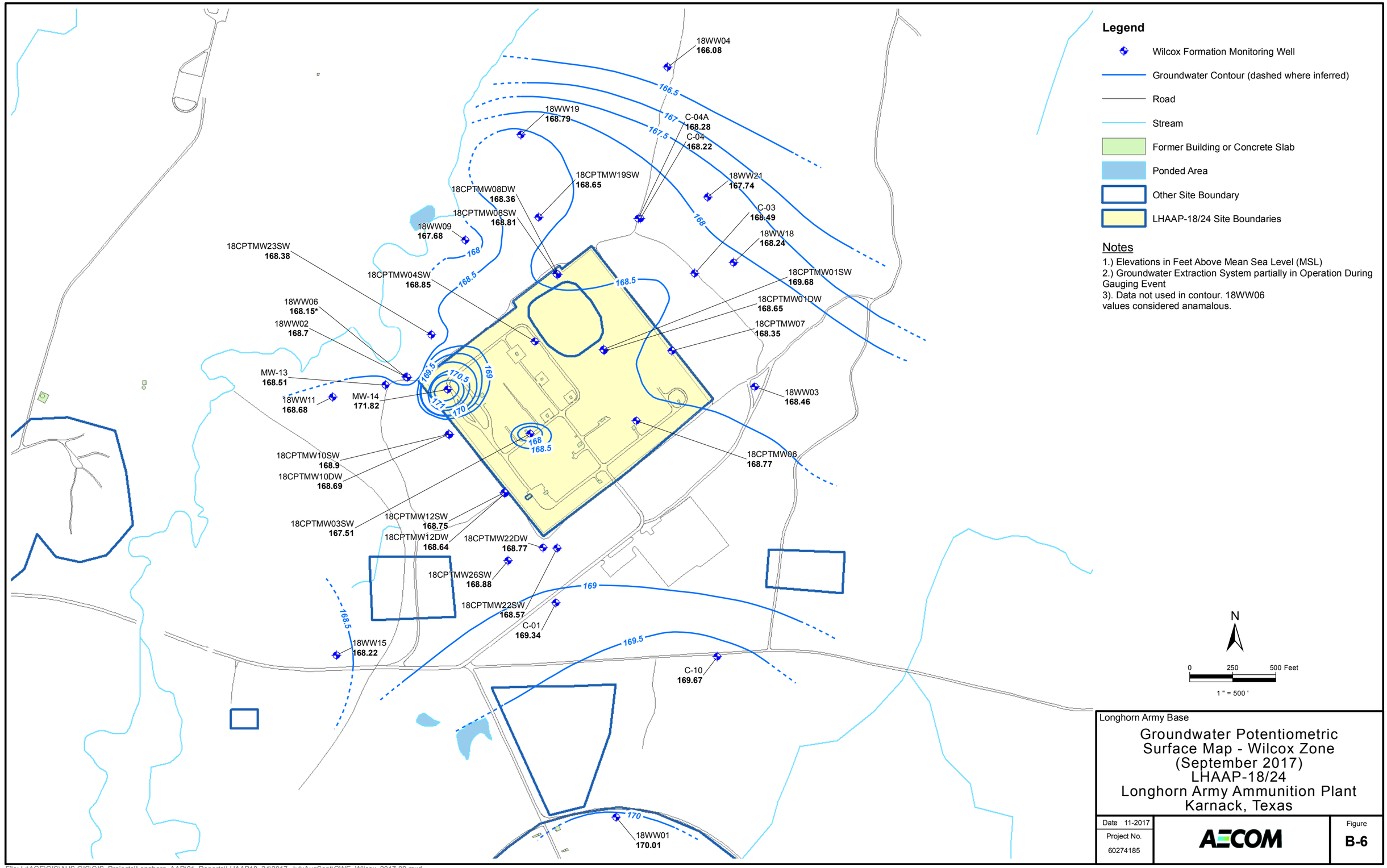

Legend

- Wilcox Formation Monitoring Well
- Groundwater Contour (dashed where inferred)
- Road
- Stream
- Former Building or Concrete Slab
- Ponded Area
- Other Site Boundary
- LHAAP-18/24 Site Boundaries

Notes

1.) Elevations in Feet Above Mean Sea Level (MSL)
2.) Groundwater Extraction System partially in Operation During Gauging Event
3). Data not used in contour. 18WW06 values considered anamalous.

N

0 250 500 Feet

1 " = 500 '

Longhorn Army Base

Groundwater Potentiometric Surface Map - Wilcox Zone (September 2017) LHAAP-18/24 Longhorn Army Ammunition Plant Karnack, Texas

Date 11-2017	AECOM	Figure B-6
Project No. 60274185		

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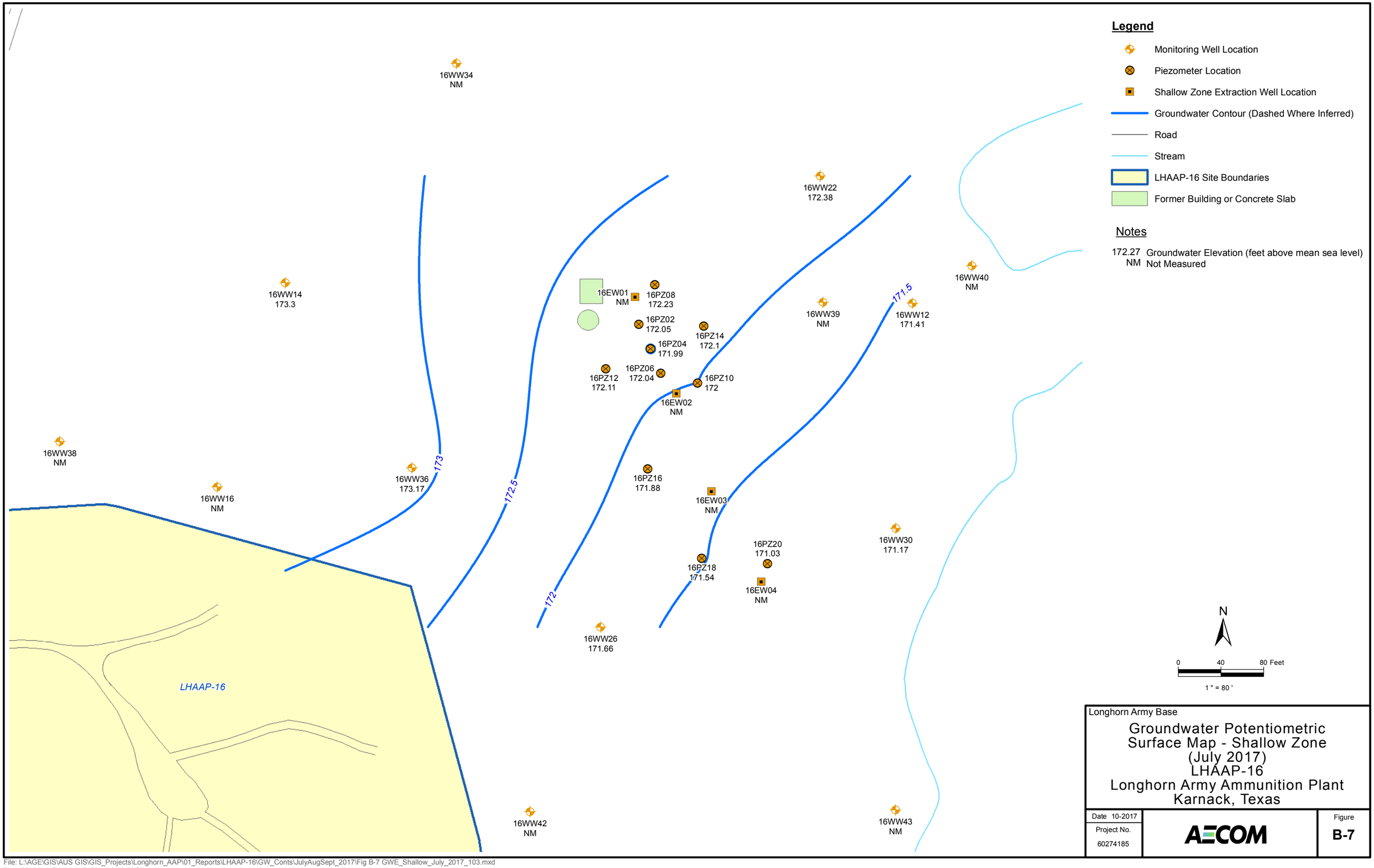

Longhorn Army Base

Groundwater Potentiometric Surface Map - Shallow Zone (July 2017) LHAAP-16 Longhorn Army Ammunition Plant Karnack, Texas

Date	Figure
10-2017	B-7
Project No. 60274185	

AECOM

File: L:\AGE\GIS\AUS GIS\GIS_Projects\Longhorn_AAP\01_Reports\LHAAP-16\GW_Conts\JulyAugSept_2017\Fig B-7 GWE_Shallow_July_2017_103.mxd
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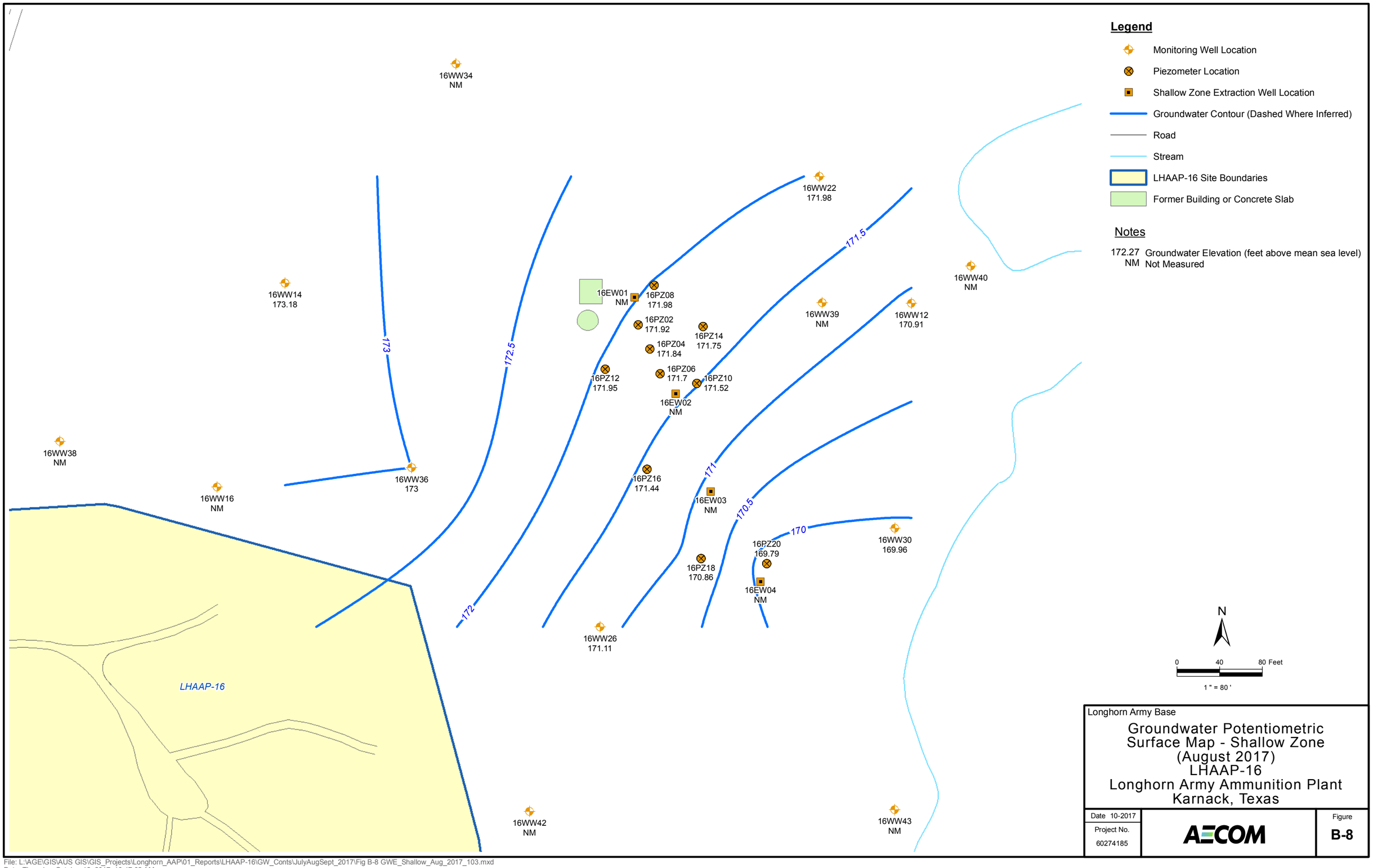

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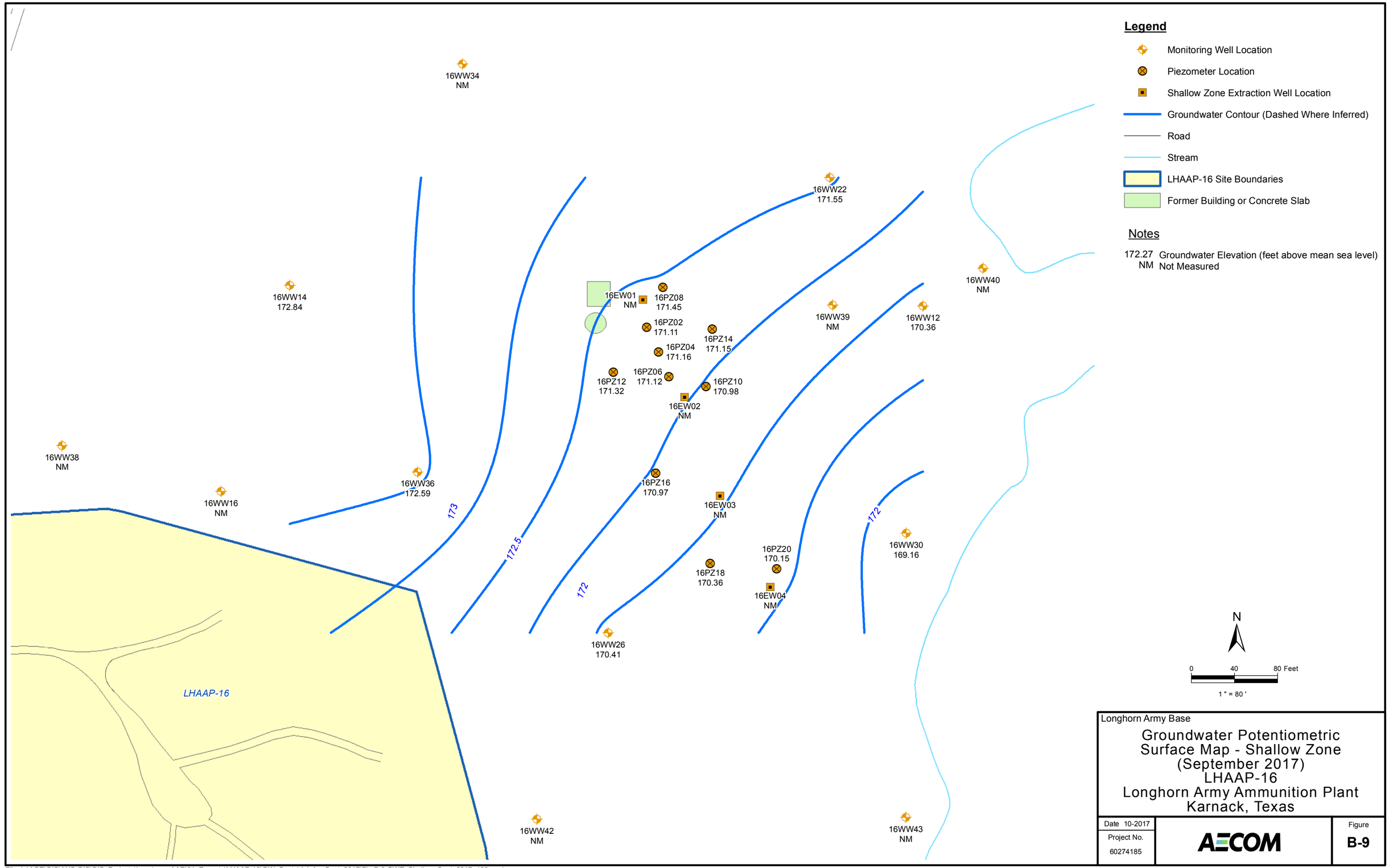

Longhorn Army Base

Groundwater Potentiometric Surface Map - Shallow Zone (September 2017) LHAAP-16 Longhorn Army Ammunition Plant Karnack, Texas

Date 10-2017	AECOM	Figure B-9
Project No. 60274185		

File: L:\AGE\GIS\AUS GIS\GIS_Projects\Longhorn_AAP\01_Reports\LHAAP-16\GW_Conts\JulyAugSept_2017\Fig B-9 GWE_Shallow_Sept_2017_103.mxd
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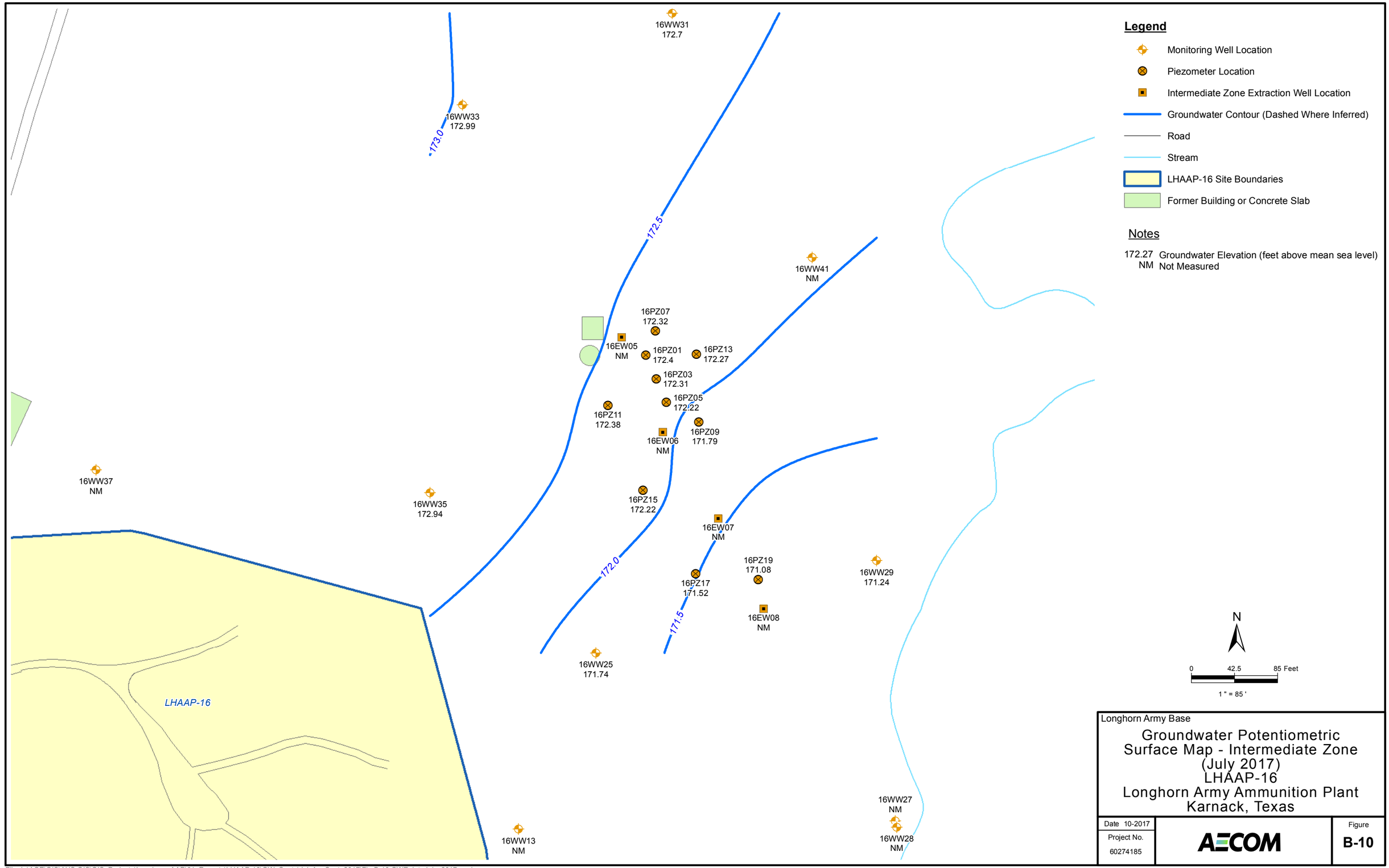

Longhorn Army Base

Groundwater Potentiometric Surface Map - Intermediate Zone (July 2017) LHAAP-16 Longhorn Army Ammunition Plant Karnack, Texas

Date 10-2017	AECOM	Figure B-10
Project No. 60274185		

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16WW31
172.44

16WW33
172.82

16WW41
NM

16PZ07
172.36

16EW05
NM

16PZ01
172.12

16PZ13
172.02

16PZ03
172.1

16PZ05
171.83

16PZ11
172.14

16PZ09
171.12

16EW06
NM

16WW37
NM

16WW35
172.77

16PZ15
171.65

16EW07
NM

16PZ19
169.76

16WW29
170.11

16PZ17
170.32

16EW08
NM

16WW25
170.3

16WW27
NM

16WW28
NM

16WW13
NM

172.5
172.0
171.5
171.0
170.5
170.0

LHAAP-16

Legend

- Monitoring Well Location
- Piezometer Location
- Intermediate Zone Extraction Well Location
- Groundwater Contour (Dashed Where Inferred)
- Road
- Stream
- LHAAP-16 Site Boundaries
- Former Building or Concrete Slab

Notes

172.27 Groundwater Elevation (feet above mean sea level)
NM Not Measured

N

0 42.5 85 Feet

1 " = 85 '

Longhorn Army Base

Groundwater Potentiometric Surface Map - Intermediate Zone (August 2017) LHAAP-16 Longhorn Army Ammunition Plant Karnack, Texas

Date 10-2017	AECOM	Figure B-11
Project No. 60274185		

File: L:\AGE\GIS\AUS GIS\GIS_Projects\Longhorn_AAP\01_Reports\LHAAP-16\GW_Conts\JulyAugSept_2017\Fig B-11 GWE_Int_Aug_2017.mxd
Date: Monday, October 16, 2017 3:39:58 PM

16WW31
172.07

16WW33
172.43

16WW41
NM

16PZ07
171.49

16EW05
NM

16PZ01
171.56

16PZ13
171.32

16PZ03
171.57

16PZ05
171.28

16PZ11
171.67

16EW06
NM

16PZ09
170.55

16WW37
NM

16WW35
172.35

16PZ15
171.1

16EW07
NM

16PZ19
168.96

16PZ17
169.64

16WW29
169.33

16EW08
NM

16WW25
169.53

16WW27
NM

16WW28
NM

16WW13
NM

172.0

171.5

171.0

170.5

170.0

169.5

169.0

LHAAP-16

Legend

- Monitoring Well Location
- Piezometer Location
- Intermediate Zone Extraction Well Location
- Groundwater Contour (Dashed Where Inferred)
- Road
- Stream
- LHAAP-16 Site Boundaries
- Former Building or Concrete Slab

Notes

172.27 Groundwater Elevation (feet above mean sea level)
NM Not Measured

N

0 42.5 85 Feet

1 " = 85 '

Longhorn Army Base

Groundwater Potentiometric Surface Map - Intermediate Zone (September 2017) LHAAP-16 Longhorn Army Ammunition Plant Karnack, Texas

Date 10-2017	AECOM	Figure B-12
Project No. 60274185		

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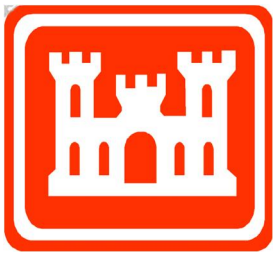
APPENDIX C: Water and Air Data Validation and Sampling Results for the 3rd Quarter 2017

QUALITY CONTROL SUMMARY REPORT
3rd QUARTER (July-September) 2017
FOR
GROUNDWATER TREATMENT PLANT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:



U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

October 2017

Table of Contents

List of Tables

1 INTRODUCTION

AECOM reviewed 25 data packages from Microbac Laboratory Services, Marietta, OH. Groundwater samples were collected July 6, 2017 through September 28, 2017 at the Groundwater Treatment Plant (GWTP) at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. Air samples were collected and sent to ALS Columbia, Simi Valley, CA. AECOM reviewed 1 air data package. Data were reviewed for conformance to the requirements of the following guidance documents: Automated Data Review by Laboratory Data Consultants (ADR.net), United States Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, (EPA, January 2017), and EPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, (EPA, January 2017).

1.1 Intended Use of Data

The objective of sampling at the GWTP is to monitor effluent streams to confirm compliance with discharge limits.

Analyses performed include:

- SW6850 or 6850M – Perchlorates
- E350.1 – Nitrogen, Ammonia
- E365.2 – Orthophosphate
- E415.1 – Total Organic Carbon
- SW8260B- Volatiles
- SW8270D- 1,4-Dioxane
- SW6010C – Al, Fe, and Se
- SW6020A – Sb, As, Ba, Cd, Cr, Co, Pb, Mn, Ni, Ag, Tl, V, Zn
- SW9056 – Common Anions
- SW7196A – Hexavalent Chromium
- E410.4 – Chemical Oxygen Demand (COD)
- E1664A – Oil and Grease (n-Hexane Extractable Material)
- TO-15- Air

Table 1 lists the sample identification numbers (IDs) and their associated laboratory IDs. **Table 2** lists qualified results with the associated quality control parameter that was exceeded.

1.2 Preservation and Holding Times

Sample identification data were evaluated for agreement with the chain-of-custody (COC). All samples were received in appropriate containers, within the proper temperature range, in good condition, and with the required signatures. The pHs of some samples were adjusted by the laboratory upon receipt (COD).

1.3 Calibrations

Initial calibration acceptance criteria are a relative standard deviation (RSD) less than or equal to 15 percent (%) or a correlation coefficient (r2) > 0.99. All calibration curves met criteria.

1.3.1 Continuing Calibration Verifications (CCV)

If the continuing calibration verification (CCV) compound exceeds 20% difference, the compound is checked in the LCS, if both are outside recovery limits, the compound is rejected, R. If only the CCV exceeds recovery criteria and is less than ± 20% difference, then the compound is qualified J or UJ.

The continuing calibration verification (CCV) criteria are 20 percent difference (%D) for VOCs and SVOCs. Metals and general chemistry has 10% D and perchlorate has 15% D.

The following samples are the exception:

The %D for chloromethane in the CCV associated with the SW8260B analyses of sample LH18/24-SP650-6463 was below 20%. This compound was not detected in this sample; and qualified as UJ. Bromomethane and chloroethane were above the 20% difference and non-detect in the sample; therefore no qualification is necessary.

The %D for acetone in the CCV associated with the SW8260B analyses of sample LH18/24-SP650-6474-GRAB was below the 20%. The compound is detected in the sample; however it is also a compound that is U qualified due to similarity to the trip blank concentration; therefore, no other qualification is needed.

All other CCVs are within acceptance criteria.

1.4 Blanks

Contamination by a target analyte of one of the various blanks was found. If the sample result for an associated sample was non-detect or less than 5X (10X for common laboratory contaminants) the analyte concentration in the blank, the corresponding sample result for the analyte was qualified U. Where the sample result for the affected analyte was greater than 5X (10x) the amount in the blank, no qualifier was applied. Analytes detected in the quality assurance (QA) blanks are summarized in the table below.

Blank	Analyte	Result	units
Trip Blank (7/12/17)	Acetone	2.83	µg/L
Trip Blank (7/26/17)	Acetone	5.59	µg/L
	Methylene chloride	0.254	µg/L
Trip Blank (8/2/17)	Acetone	3.58	µg/L
Method blank (8/15/17)	Bromomethane	0.760	µg/L
Method Blank (8/30/17)	Nitrogen, ammonia	0.0660	mg/L
Method blank (9/19/17)	Nitrogen, ammonia	0.0858	mg/L
Method blank (9/29/17)	Nitrogen, ammonia	0.0668	mg/L
Trip blank (9/25/17)	Acetone	6.84	µg/L

Blank	Analyte	Result	units
Trip Blank (9/27/17)	Acetone	5.45	µg/L
	Toluene	0.282	µg/L
Trip Blank (9/29/17)	Acetone	6.08	µg/L
	Toluene	0.326	µg/L
Trip blank (10/5/17)	Acetone	3.47	µg/L
	Toluene	0.278	µg/L

Data qualified due to these QA blank detections are shown in **Table 2**.

1.5 Surrogates

Surrogates were evaluated using limits defined by method in project-specific QAPP in Worksheet 28.

1.5.1 SW8270D

The recovery for surrogate compound 1,4-dioxane-d8 (4440%) is above the upper control limit of 129% in sample LH18/24-SP140-7472. The 1,4-dioxane result in this sample is qualified J.

Table 2 shows qualified analytical data.

1.6 Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

LCS/LCSD recoveries were evaluated using limits defined by method in project-specific QAPP in Worksheet 15.

1.6.1 SW8260B

LCS/LCSD WG625855-02 recoveries for bomomethane (176%) and chloroethane (143%) are above the upper control limits of 145% and 135%, respectively. The associated samples are non-detect for these analytes and no qualification is necessary.

LCS P171007-LCS recovery for trichlorofluoromethane (101%) is above the upper control limit of 98%. The associated samples are qualified J for trichlorofluoromethane.

Table 2 shows qualified analytical data.

1.7 Matrix Spike (MS)/Matrix Spike Duplicate Sample (MSD)

MS/MSD recoveries were evaluated using limits defined by method in project-specific QAPP in Worksheet 15. MS/MSD recoveries are within limits.

1.8 Internal Standards

If the %R for an internal standard in a sample is not within the limit, the associated sample is qualified for those analytes associated with the internal standard(s) outside of the limit.

Internal standards are within acceptance criteria.

1.9 Field Precision

Precision is the measure of variability of individual sample measurements. Evaluation of field duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. Field duplicate RPD limits were set at 0-25% for groundwater matrices. No data required qualification based field duplicate RPD outliers. Overall field precision was acceptable.

2 DATA USABILITY SUMMARY

The data are usable for the intended purposes of the project (see **Table 3**). The data quality objectives have been met for the project.

Table 1: Field Sample Identification and Laboratory Identification

Client Sample ID	Laboratory Sample ID	SW6850/ 6850M	E350.1	E365.2	E415.1	SW8270D	SW8260B	SW6010C	SW6020A	SW9056	SW7196A	E410.4	E1664A	TO-15
GWTP Samples														
LH18/24-SP650-6455-GRAB	L17070278-01		X	X	X									
LH18/24-SP140-7454-GRAB	L17070280-01	X						X	X		X			
LH18/24-SP650-6454-GRAB	L17070282-01	X				X	X	X	X		X			
TRIP BLANK	L17070282-02						X							
LH18/24-SP650-6457	L17070552-01		X	X	X									
LH18/24-SP650-6456	L17070560-01	X				X				X				
TRIP BLANK	L17070560-02					X								
LH18/24-SP650-6458	L17070961-01		X	X	X									
LH18/24-SP650-AFTER ION	L17070961-02	X												
LH18/24-SP650-BEFORE ION	L17070961-03	X												
LH18/24-SP650-6460	L17071280-01	X	X	X	X									
LH18/24-SP650-6459	L17071296-01						X			X				
TRIP BLANK	L17071296-02						X							
LH18/24-SP650-6461-GRAB	L17080162-01					X	X	X	X		X			
TRIP BLANK	L17080162-02						X							
LH18/24-SP140-7461-GRAB	L17080163-01	X						X	X		X			
LH18/24-SP650-6462	L17080164-01		X	X	X									
LH18/24-SP650-6462 BEFORE ION	L17080164-02	X												
LH18/24-SP650-6462 AFTER ION	L17080164-03	X												
LH18/24-SP650-6464	L17080534-01		X	X	X									
LH158/24-SP650-6464 BEFORE ION	L17080534-02	X												
LH18/24-SP650-6464 AFTER ION	L17080534-03	X												
LH18/24-SP650-6463	L17080580-01						X			X				
TRIP BLANK	L17080580-02						X							
LH18/24-SP650-6465	L17081328-01	X												
LH18/24-SP650-6465	L17081329-01		X	X	X									
LH18/24-SP650-6466	L17081653-01	X	X	X	X									
LH18/24-SP650-6467	L17090414-01	X	X	X	X									

Client Sample ID	Laboratory Sample ID	SW6850/ 6850M	E350.1	E365.2	E415.1	SW8270D	SW8260B	SW6010C	SW6020A	SW9056	SW7196A	E410.4	E1664A	TO-15
LH18/24-SP650-6468	L17090765-01	X	X	X	X									
LH18/24-SP650-6470	L17091185-01	X	X	X	X									
LH18/24-SP650-6469	L17091202-01						X			X				
TRIP BLANK	L17091202-02						X							
LH18/24-SP650-6473	L17091609-01	X	X	X	X									
LH18/24-SP140-7472-GRAB	L17091647-01	X				X	X	X	X	X		X	X	
TRIP BLANK	L17091647-02						X							
LH18/24-SP650-6472-GRAB	L17091648-01					X	X	X	X	X		X	X	
TRIP BLANK	L17091648-02						X							
LH18/24-SP140-7474-GRAB	L17091706-01	X						X	X		X			
LH18/24-SP650-6474-GRAB	L17091705-01	X				X	X	X	X		X			
TRIP BLANK	L17091705-02						X							
Air Samples														
LH1824-air-5471-STRIPPER	P1704815-001													X
LH18/24-air-5471-STRIPPER-DUP	P1704815-002													X
LH18/24-air-5471-GWTP	P1704815-003													X
LH18/24-air-5471-DOWNWIND NORTH	P1704815-004													X

E – U.S. Environmental Protection Agency method.
Laboratory – Micorbac Laboratories in Marietta, Ohio (groundwater) and ALS Environmental in Simi Valley, California (air).
Subcontracted Laboratory – GEL Laboratories, LLC in Charleston, South Carolina.
SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.
X – Sample analyzed for indicated parameter.

Table 2: Qualified Analytical Data

Client Sample ID	Laboratory Sample ID	Analyte Name	Data Validation Qualifier	Reason for Qualification
GWTP Samples				
LH18/24-SP650-6459	L17071296-01	Acetone	U	Similar to trip blank concentration
LH18/24-SP650--6456	L1707560-01	Acetone	U	Similar to trip blank concentration
LH18/24-SP650-6461-GRAB	L17080162-01	Acetone	U	Similar to trip blank concentration
LH18/24-SP650-6463	L17080580-01	Chloromethane	UJ	CCV below control limits
LH18/24-SP650-6469	L17091202-01	Acetone	U	Similar to trip blank concentration
LH18/24-SP140-7472	L17091647-01	1,4-Dioxane	J	Surrogate is above control limits
LH18/24-SP650-6472-GRAB	L17091648-01	Acetone	U	Similar to trip blank concentration
LH18/24-SP650-6474-GRAB	L17091705-01	Acetone	U	Similar to trip blank concentration
Air Samples				
LH18/24-AIR-5471-STRIPPER	P1704815-001	Trichlorofluoromethane	J	LCS above control limits
LH18/24-AIR-5471-STRIPPER DUP	P1704815-002	Trichlorofluoromethane	J	LCS above control limits
LH18/24-AIR-GWTP	P1704815-003	Trichlorofluoromethane	J	LCS above control limits
LH18/24-AIR-DOWNWIND-NORTH	P1704815-004	Trichlorofluoromethane	J	LCS above control limits

Table 3: Completeness by Method

Method	No. of Rejected Results	% Completeness
SW6850/6850M	0	100
E350.1	0	100
E365.2	0	100
E415.1	0	100
SW8270D	0	100
SW8260B	0	100
SW6010C	0	100
SW6020A	0	100
SW9056	0	100
SW7196A	0	100
E410.4	0	100
E1664A	0	100
TO-15	0	100

E – U.S. Environmental Protection Agency method.
SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

Microbac

Laboratory Report Number: L17070278

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on July 17 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17070278
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0013528	I	3.0		J4616881971	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)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L17070278
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP650-6455-GRAB	L17070278-01	07/06/2017 15:00	07/07/2017 09:47

Microbac Laboratories ● Ohio Valley Division
158 Starlite Drive, Marietta, OH 45750 ● T: (740)373-4071 F: (740)373-4835
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Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-17 17:35:50

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

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Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

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Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG620913	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-17 17:33:52

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG620913	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG620913	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG620913	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG620913	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG620913	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG620996	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-17 17:35:19

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG620996	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG620996	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG620996	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG620996	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070278
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG620996	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Lab Report #: L17070278
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070278-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6455-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	07/14/2017 07:40
Workgroup #:	WG621721	**Analyst:**	DCM	**Run Date:**	07/14/2017 07:48
Collect Date:	07/06/2017 15:00	**Dilution:**	10	**File ID:**	S2170714001.014
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	10.5		2.00	1.00	0.500

Certificate of Analysis

Sample #:	L17070278-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6455-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	06/07/2017 15:40
Workgroup #:	WG620913	**Analyst:**	SDC	**Run Date:**	07/07/2017 17:00
Collect Date:	07/06/2017 15:00	**Dilution:**	5	**File ID:**	00.1707071700-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	1.71		0.500	0.250	0.125

Certificate of Analysis

Sample #:	L17070278-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6455-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG620996	**Analyst:**	ADG	**Run Date:**	07/10/2017 12:31
Collect Date:	07/06/2017 15:00	**Dilution:**	5	**File ID:**	TC07102017.011
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	103		10.0	5.00	2.50

2.1 General Chemistry Data

2.1.1 Ammonia Data

2.1.1.1 Summary Data

Microbac

Lab Report #: L17070278
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070278-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6455-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	07/14/2017 07:40
Workgroup #:	WG621721	**Analyst:**	DCM	**Run Date:**	07/14/2017 07:48
Collect Date:	07/06/2017 15:00	**Dilution:**	10	**File ID:**	S2170714001.014
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	10.5		2.00	1.00	0.500

2.1.1.2 QC Summary Data

Example Ammonia Calculations

(absorbance - intercept)/(slope * dilution) = 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: 14-JUL-2017
Analyst: DCM
Analyst: NA
Method: NH3
Instrument: SC2
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG621721

Calibration/Linearity	07-14-2017
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	DCM
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
14-JUL-2017

Secondary Reviewer:
14-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-14-2017 13:57:23

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1 AAB#: WG621721

Login Number: L17070278

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
LH18/24-SP650-6455-GRAB	01	07/06/17					07/14/2017	7.7	28		07/14/17	7.7	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5384536
Report generated 07/14/2017 10:09

METHOD BLANK SUMMARY

Login Number:	L17070278	**Work Group:**	WG621721
Blank File ID:	S2170714001.011	**Blank Sample ID:**	WG621721-01
Prep Date:	07/14/17 07:44	**Instrument ID:**	SMARTCHEM2
Analyzed Date:	07/14/17 07:44	**Method:**	350.1
Analyst:	DCM		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621721-02	S2170714001.012	07/14/17 07:46	01
LCS2	WG621721-03	S2170714001.013	07/14/17 07:46	01
LH18/24-SP650-6455-GRAB	L17070278-01	S2170714001.014	07/14/17 07:48	DL01
DUP	WG621721-05	S2170714001.034	07/14/17 08:13	01

Report Name: BLANK_SUMMARY
PDF File ID: 5384537
Report generated 07/14/2017 10:09

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070278 Prep Date: 07/14/17 07:44 Sample ID: WG621721-01
Instrument ID: SMARTCHEM2 Run Date: 07/14/17 07:44 Prep Method: 350.1
File ID: S2170714001.011 Analyst: DCM Method: 350.1
Workgroup (AAB#): WG621721 Matrix: Water Units: mg/L
Contract #: Cal ID: SMARTC-14-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.200	0.0500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5384538
14-JUL-2017 10:09

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070278 Analyst: DCM Prep Method: 350.1
Instrument ID: SMARTCHEM2 Matrix: Water Method: 350.1
Workgroup (AAB#): WG621721 Units: mg/L
QC Key: DOD4 Lot #: STD80299

Sample ID: WG621721-02 LCS File ID: S2170714001.012 Run Date: 07/14/2017 07:46
Sample ID: WG621721-03 LCS2 File ID: S2170714001.013 Run Date: 07/14/2017 07:46

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.92	96.0	2.00	1.98	98.9	2.96	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5384539
Report generated: 07/14/2017 10:09

2.1 General Chemistry Data

2.1.2 Orthophosphate Data

2.1.2.1 Summary Data

Microbac

Lab Report #: L17070278
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070278-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6455-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	06/07/2017 15:40
Workgroup #:	WG620913	**Analyst:**	SDC	**Run Date:**	07/07/2017 17:00
Collect Date:	07/06/2017 15:00	**Dilution:**	5	**File ID:**	00.1707071700-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	1.71		0.500	0.250	0.125

2.1.2.2 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: 07-JUL-2017
Analyst: SDC
Analyst: NA
Method: PO4
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG620913

Calibration/Linearity	07/07/17
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	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	
Primary Reviewer	SDC
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
10-JUL-2017

Secondary Reviewer:
13-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-13-2017 15:50:14

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.2 **AAB#:** WG620913

Login Number: L17070278

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
LH18/24-SP650-6455-GRAB	01	07/06/17					07/07/2017	1.1	2		07/07/17	1.1	2	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5383284
Report generated 07/13/2017 14:19

METHOD BLANK SUMMARY

Login Number:	L17070278	**Work Group:**	WG620913
Blank File ID:	00.1707071700-03	**Blank Sample ID:**	WG620913-01
Prep Date:	07/07/17 17:00	**Instrument ID:**	UV-2600
Analyzed Date:	07/07/17 17:00	**Method:**	365.2
Analyst:	SDC		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG620913-02	00.1707071700-04	07/07/17 17:00	
LCS2	WG620913-03	00.1707071700-05	07/07/17 17:00	
LH18/24-SP650-6455-GRAB	L17070278-01	00.1707071700-06	07/07/17 17:00	
DUP	WG620913-05	00.1707071700-07	07/07/17 17:00	

Report Name: BLANK_SUMMARY
PDF File ID: 5383285
Report generated 07/13/2017 14:19

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070278 Prep Date: 07/07/17 17:00 Sample ID: WG620913-01
Instrument ID: UV-2600 Run Date: 07/07/17 17:00 Prep Method: 365.2
File ID: 00.1707071700-03 Analyst: SDC Method: 365.2
Workgroup (AAB#): WG620913 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Orthophosphate	0.0250	0.100	0.0250	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5383286
13-JUL-2017 14:19

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070278 Analyst: SDC Prep Method: 365.2
Instrument ID: UV-2600 Matrix: Water Method: 365.2
Workgroup (AAB#): WG620913 Units: mg/L
QC Key: DOD4 Lot #: STD82749

Sample ID: WG620913-02 LCS File ID: 00.1707071700-04 Run Date: 07/07/2017 17:00
Sample ID: WG620913-03 LCS2 File ID: 00.1707071700-05 Run Date: 07/07/2017 17:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Orthophosphate	1.00	0.996	99.6	1.00	1.01	101	1.12	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5383287
Report generated: 07/13/2017 14:19

2.1.2.3 Raw Data

WG616995

Curves

Parameter: PO4

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: STD79640

Concentration: 1000 mg/L

Recipe for preparation of curve standards found in:
SOP: 3653 Revision: 17 Page: 09

Second Source Stock: STD82182 (concentration: 10)

Daily Preparation: 10(100)/100

concentration = =1.0

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
1.0	50	1cm	880	0.623
0.7	↓	↓	↓	0.442
0.5				0.311
0.2				0.127
0.1				0.063
0.05				0.031
0				0
2nd Source (1.0)	50	1cm	880	0.630

Analyst: Jammy Morris

Date/Time: 6/7/17 @ 1540

DCN#126309

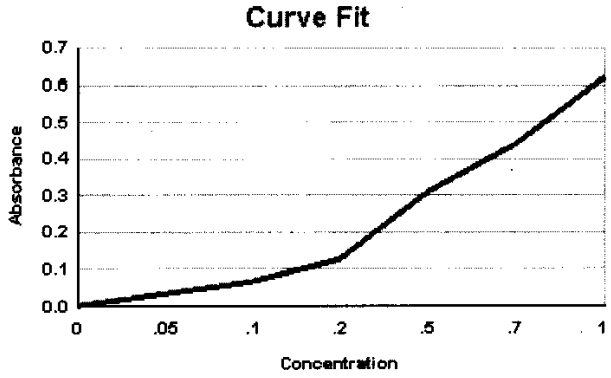
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG616995
Analytical Method:300
Instrument ID:UV-2600

Analyst:TMM
Initial Calibration Date:06/07/2017

Analyte: ORTHOPHOSPHATE
Number of Points: 7
Slope: 0.624599
Y-Intercept: 0.000610422
Coef. Of Correlation (R^2): 0.999913
Coef. Of Correlation (R): 0.999957

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00	0.00	0.00	0.000610422
0.0500	0.0310	0.00250	0.00155	0.0318404
0.100	0.0630	0.0100	0.00630	0.0630703
0.200	0.127	0.0400	0.0254	0.125530
0.500	0.311	0.250	0.156	0.312910
0.700	0.442	0.490	0.309	0.437830
1.00	0.623	1.00	0.623	0.625209



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 06/07/2017 16:24

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG616995
File ID: 00.1706071540-08
CCV ID: WG616995-08
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 06/07/2017
Run Time: 15:40
Analyst: TMM
Cal ID: UV-260 - 07-JUN-17 15:40:07

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	1	1.01	0.630	1.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 06/07/2017 16:25

[redacted]

WORKGROUP: WG620913

Orthophosphate
(orthophosphate1)

EPA 365.2 / SM4500-P E
SOP K3653 Rev 17
Color Reagent Chemicals
45280
40466
39475
Co9.18278

CCV: 82750
Daily Dilution: 5(5)/50
Daily Dilution: =0.5
Spectrophotometer: UV-2600

LCS: 82749
Daily Dilution: 1(1)/100
Daily Dilution: = 1
Curve ID: 6-7-17

82749
Spike: ~~2(10)/50~~ SOC 7-10-17
Daily Dilution: 2(10)/50
Daily Dilution:

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: mg/L	50	✓		0.320
BLK/CCB:	50	✓		0.001
LCS: ppm	50	✓		0.623
LCSD: ppm	50	✓		0.630
17-278-21	50	✓	1/5	0.214
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP: 278-21	50	✓	1/5	0.211
MS: ( ) 278-21	50	✓	1/5	0.336
MSD: ( )	50			
CCV: ( )	50	✓		0.328
CCB:	50	✓		0.003

Analyst: Shalyn Cearley
Date / Time: 7-7-17 / 1700

DCN#126907

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG620913
Analyte: ORTHOPHOSPHATE

Analyst: SDC
Date: 07/07/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG620913-01	50	50	0.00100	0.6246	0.0006104	0.00062373	0.00062373	1	mg/L
WG620913-02	50	50	0.623	0.6246	0.0006104	0.99646	0.99646	1	mg/L
WG620913-03	50	50	0.630	0.6246	0.0006104	1.0077	1.0077	1	mg/L
L17070278-01	50	50	0.214	0.6246	0.0006104	0.34164	1.7082	5	mg/L
WG620913-04	50	50	0.214	0.6246	0.0006104	0.34164	1.7082	5	mg/L
WG620913-05	50	50	0.211	0.6246	0.0006104	0.33684	1.6842	5	mg/L
WG620913-06	50	50	0.336	0.6246	0.0006104	0.53697	2.6848	5	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 07/10/2017 15:17

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG621100
File ID: 00.1707071700-01
CCV ID: WG621100-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 07/07/2017
Run Time: 17:00
Analyst: SDC
Cal ID: UV-260 - 29-JUN-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.511	0.640	2.2	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/10/2017 15:18

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG621100
File ID: 00.1707071700-09
CCV ID: WG621100-03
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 07/07/2017
Run Time: 17:00
Analyst: SDC
Cal ID: UV-260 - 29-JUN-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.524	0.656	4.8	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/10/2017 15:18

[redacted]

2.1 General Chemistry Data

2.1.3 Total Organic Carbon Data

2.1.3.1 Summary Data

Microbac

Lab Report #: L17070278
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070278-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6455-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG620996	**Analyst:**	ADG	**Run Date:**	07/10/2017 12:31
Collect Date:	07/06/2017 15:00	**Dilution:**	5	**File ID:**	TC07102017.011
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	103		10.0	5.00	2.50

2.1.3.2 QC Summary Data

Total Organic Carbon Example Calculations
(Direct Readout Parameter)

(Readout)/(dilution) = 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: 10-JUL-2017
Analyst: ADG
Analyst: NA
Method: TOC
Instrument: TOCVWP
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG620996

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	X
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	ADG
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
11-JUL-2017

Secondary Reviewer:
12-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-12-2017 11:09:55

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 415.1 **AAB#:** WG620996

Login Number: L17070278

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
LH18/24-SP650-6455-GRAB	01	07/06/17					07/10/2017	3.9	28		07/10/17	3.9	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5379716
Report generated 07/12/2017 10:15

METHOD BLANK SUMMARY

Login Number:	L17070278	**Work Group:**	WG620996
Blank File ID:	TC07102017.004	**Blank Sample ID:**	WG620996-01
Prep Date:	07/10/17 08:52	**Instrument ID:**	TOC-VWP
Analyzed Date:	07/10/17 08:52	**Method:**	415.1
Analyst:	ADG		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG620996-02	TC07102017.005	07/10/17 09:12	01
LCS2	WG620996-03	TC07102017.006	07/10/17 09:33	01
LH18/24-SP650-6455-GRAB	L17070278-01	TC07102017.011	07/10/17 12:31	DL01
DUP	WG620996-05	TC07102017.018	07/10/17 14:47	01

Report Name: BLANK_SUMMARY
PDF File ID: 5379717
Report generated 07/12/2017 10:15

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070278 Prep Date: 07/10/17 08:52 Sample ID: WG620996-01
Instrument ID: TOC-VWP Run Date: 07/10/17 08:52 Prep Method: 415.1
File ID: TC07102017.004 Analyst: ADG Method: 415.1
Workgroup (AAB#): WG620996 Matrix: Water Units: mg/L
Contract #: Cal ID: TOC-VW-10-FEB-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Total Organic Carbon	0.500	2.00	0.500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5379718
12-JUL-2017 10:15

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070278 Analyst: ADG Prep Method: 415.1
Instrument ID: TOC-VWP Matrix: Water Method: 415.1
Workgroup (AAB#): WG620996 Units: mg/L
QC Key: DOD4 Lot #: STD80787

Sample ID: WG620996-02 LCS File ID: TC07102017.005 Run Date: 07/10/2017 09:12
Sample ID: WG620996-03 LCS2 File ID: TC07102017.006 Run Date: 07/10/2017 09:33

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	27.8	111	25.0	27.8	111	0.108	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5379719
Report generated: 07/12/2017 10:15

2.1.3.3 Raw Data

Curve

~~WG602411~~ ~~WG602476~~ dm 1/13/17 WG602481

Total Organic Carbon

MAKE DAILY

CCV (TOC): _____ (5/200)(1000) = 25mg/L

LCS (TOC): _____ (5/200)(1000) = 25mg/L

CCV (TIC): _____ (5/200)(1000) = 25mg/L

MS (TOC): _____

Calibration Curve Date: _____

Reagent: RGT 38944, RGT 37673

☑ SM5310-C : Matrix 2 WG_____

☐ EPA 415.1/9060A(mod): Matrix 1 WG_____ WG_____

SOP: K 4151 Rev. ~~17~~ 18 dm 1/13/17

Instrument: Shimadza TOC-VWP/ASI

DAILY CHECK

☑ drain reservoir filled
☑ ASI water bottle full
☐ dilution water bottle full

☑ 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	all points analyzed in duplicate	
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		
45		
46		
47		
48		
49		
50		

Position	Sample ID	Dilution
51		
52	See SOP	
53	for point	
54	Preparation	
55		
56		
57		
58		
59		
60	5/200 (100) = 25	
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		

Analyst: David Merkle Date/Time: 2/10/17

DCN#123915

C:\TOC3201\Data\CURVES-02-10-2017.t32

	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

Instr.Information

System	TOCVW ASI
Detector	Wet Chemical

Cal. Curve

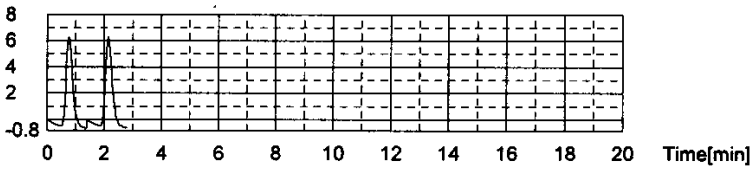
Sample Name:	TCCURVE
Sample ID:	Untitled
Cal. Curve:	TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status	Completed

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

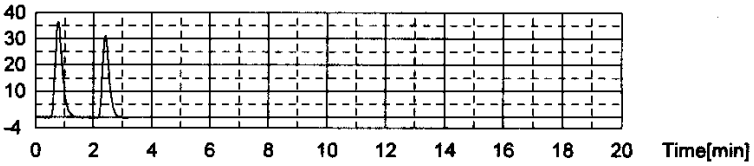
Acid Add. 0.000%
Mean Area 10.82



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

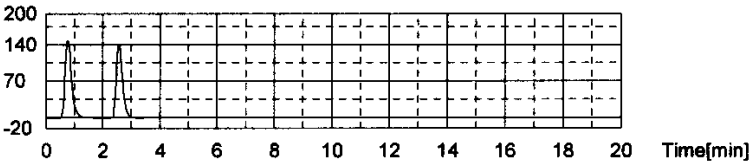
Acid Add. 0.000%
Mean Area 57.92



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

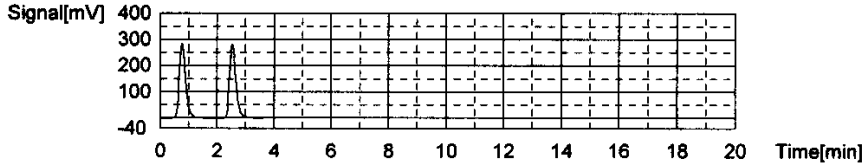
Acid Add. 0.000%
Mean Area 227.4



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

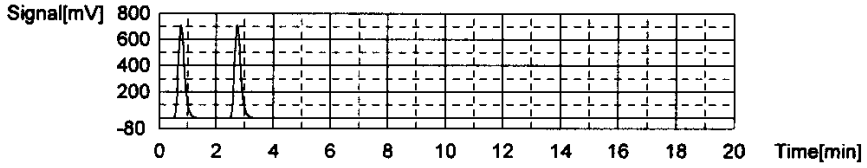
Acid Add. 0.000%
Mean Area 440.2



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

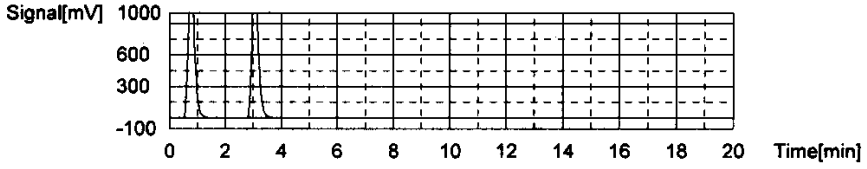
Acid Add. 0.000%
Mean Area 1092



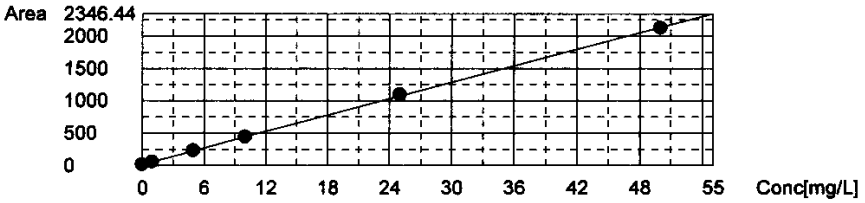
Conc: 50.00mg/L

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

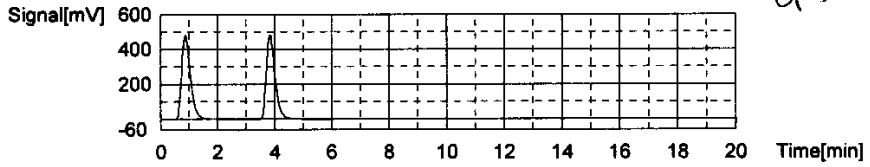
1. Det

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

95.6%

Mean Area 1029
Mean Conc. 23.90mg/L



Cal. Curve

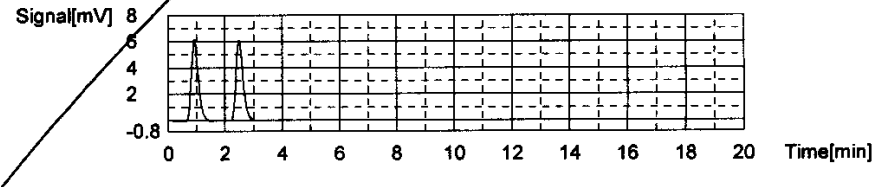
Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed

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

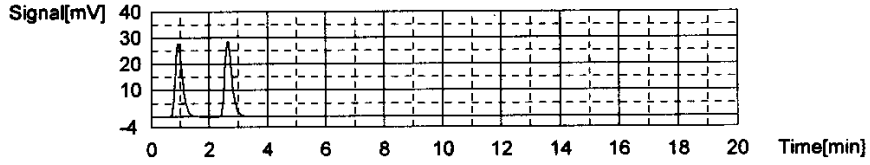
Acid Add. 3.000%
Mean Area 10.51



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

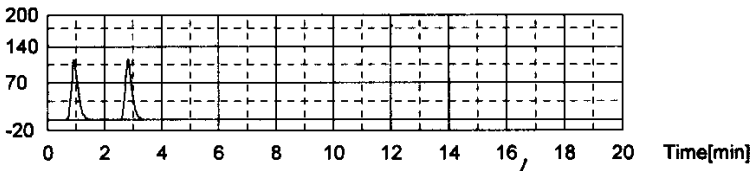


Conc: 5.000mg/L

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

dcm
3/23/17

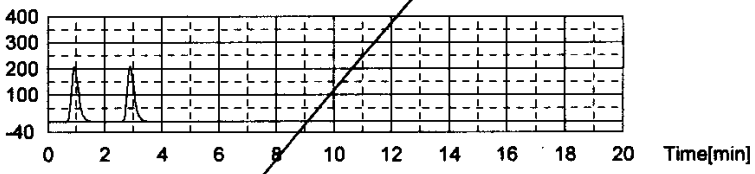
Acid Add. 3.000%
Mean Area 189.6



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

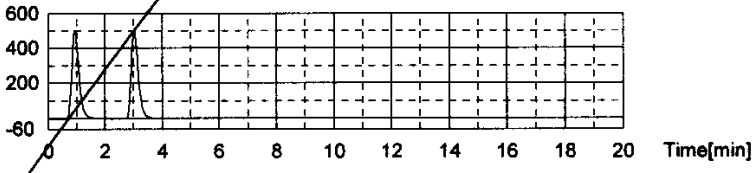
Acid Add. 3.000%
Mean Area 361.4



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

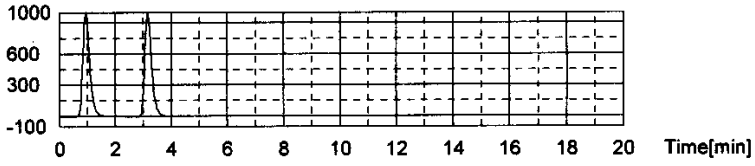
Acid Add. 3.000%
Mean Area 858.1



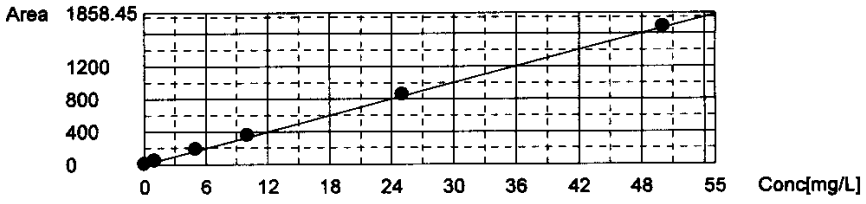
Conc: 50.00mg/L

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

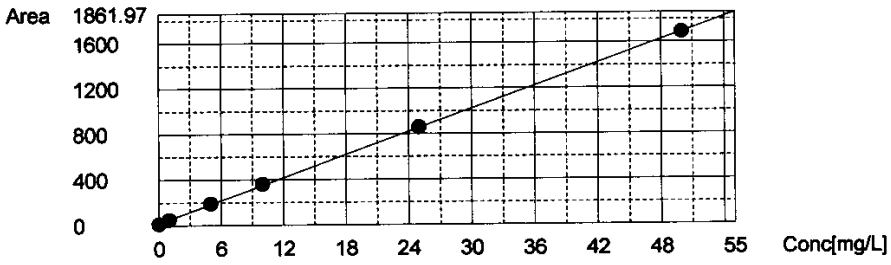
Acid Add.	3.000%
Mean Area	858.1
SD Area	1.697
CV Area	0.20%
Vial	4

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
r^2	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

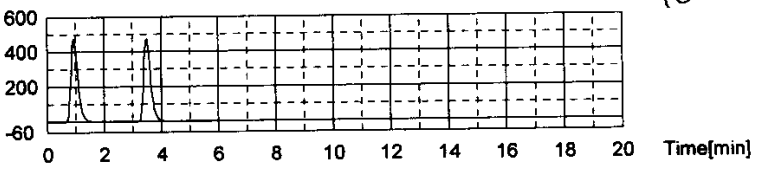
1. Det

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_1	2/10/2017 4:06:15 PM
2	814.6	24.33mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	2/10/2017 4:12:07 PM

96.9%

Mean Area 812.5
Mean Conc. 24.27mg/L



Sample

Sample Name:
Sample ID: Untitled
Origin: TCCURVE-02-10-2017.2017_02_10_14_14_25.cal
Status Completed
Chk. Result

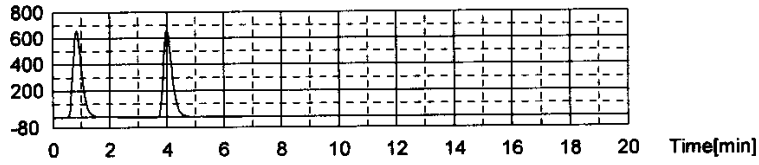
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

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	2/10/2017 4:25:42 PM
2	1411	0.000mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_14_14_2	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

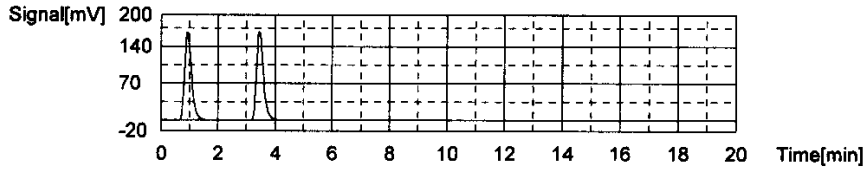
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

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_1	2/10/2017 4:37:09 PM
2	287.2	8.577mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	2/10/2017 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

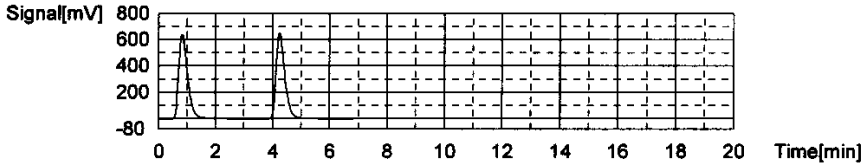
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

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_59	2/10/2017 4:55:07 PM
2	1373	32.04mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_59	2/10/2017 5:01:02 PM

Mean Area 1376
Mean Conc. 32.10mg/L



WORKGROUP WG620996

Total Organic Carbon

MAKE DAILY

CCV (TOC): 79381 / (5/200)(1000) = 25mg/L

CCV (TIC): 80414 / (5/200)(1000) = 25mg/L

Calibration Curve Date: 2-10-17

LCS (TOC): 80787 / (5/200)(1000) = 25mg/L

MS (TOC): 80787

0.4(1000)/40 = 10

Reagent: 40592

39266

☑ SM5310-C : Matrix 2 WG 620996

☐ EPA 415.1/9060A(mod): Matrix 1 WG_____

☐ SW846 9060A (4 rep) WG_____

SOP: K 1451 Rev. 18

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	LCSDup	
7	00001-01	
8	0003-01	
9	221-01	
10	236-02	
11	278-01	1/5
12	299-01	
13	303-01	
14	CCV	
15	CCB	
16	303-03	
17	05	1/2
18	221-01 Dup	
19	221-01 MS	
20	07 0007-01	070003-01
21	~~080003-01~~	070001-01
22	CCV	
23	CCB	
24		
25		

Position	Sample ID	Dilution
26		
27		
28		
29		
30		
31		
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		
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65		
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72		
73		
74		
75		

Analyst: Amber Greene Date/Time: 7/10/17 @ 0800

LOQ 1(25)/25 = 1

LOD 0.5(25)/25 = 0.5

DCN#126923

C:\TOC3201\Data\07-10-2017-ADG-TOC.t32

	Analysi	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:1.910mg/L TC:28.97mg/L IC:27.06mg/L	Completed	7/10/2017 8:22:35 AM	1
2	TOC	TOC/TIC	TOC:28.33mg/L TC:37.47mg/L IC:9.141mg/L	Completed	7/10/2017 8:35:34 AM	2
3	TOC	CCV	!!Error!! TOC:27.65mg/L TC:27.39mg/L IC:-0.2648mg/L	Completed	7/10/2017 8:47:52 AM	3
4	TOC	WG620996-01 BLK	!!Error!! TOC:0.09020mg/L TC:-0.1438mg/L IC:-0.2340mg/	Completed	7/10/2017 9:04:38 AM	0
5	TOC	WG620996-02 LCS	!!Error!! TOC:27.78mg/L TC:27.53mg/L IC:-0.2516mg/L	Completed	7/10/2017 9:25:46 AM	5
6	TOC	WG620996-03 LCSDU	!!Error!! TOC:27.81mg/L TC:27.56mg/L IC:-0.2443mg/L	Completed	7/10/2017 9:47:00 AM	6
7	TOC	<Untitled>	!!Error!! TOC:1.074mg/L TC:0.8918mg/L IC:-0.1820mg/L	Completed	7/10/2017 11:20:58 AM	7
8	TOC	<Untitled>	!!Error!! TOC:1.536mg/L TC:1.355mg/L IC:-0.1813mg/L	Completed	7/10/2017 11:40:53 AM	8
9	TOC	L17070221-01	TOC:2.665mg/L TC:4.766mg/L IC:2.101mg/L	Completed	7/10/2017 12:01:44 PM	9
10	TOC	L17070236-07	TOC:5.635mg/L TC:14.66mg/L IC:9.026mg/L	Completed	7/10/2017 12:23:21 PM	10
11	TOC	L17070278-01 (5)	TOC:20.51mg/L TC:31.11mg/L IC:10.60mg/L	Completed	7/10/2017 12:46:06 PM	11
12	TOC	L17070299-01	TOC:4.714mg/L TC:13.21mg/L IC:8.496mg/L	Completed	7/10/2017 1:08:10 PM	12
13	TOC	L17070303-01	TOC:4.245mg/L TC:18.54mg/L IC:14.30mg/L	Completed	7/10/2017 1:30:27 PM	13
14	TOC	CCV	!!Error!! TOC:26.92mg/L TC:26.72mg/L IC:-0.1907mg/L	Completed	7/10/2017 1:42:48 PM	14
15	TOC	CCB	!!Error!! TOC:0.08500mg/L TC:-0.1490mg/L IC:-0.2340mg/	Completed	7/10/2017 1:51:49 PM	0
16	TOC	L17070303-03	TOC:4.946mg/L TC:14.33mg/L IC:9.380mg/L	Completed	7/10/2017 2:13:54 PM	16
17	TOC	L17070303-05 (2)	TOC:10.36mg/L TC:49.29mg/L IC:38.93mg/L	Completed	7/10/2017 2:39:43 PM	17
18	TOC	WG620996-05 DUP	TOC:2.534mg/L TC:4.030mg/L IC:1.496mg/L	Completed	7/10/2017 3:00:29 PM	18
19	TOC	WG620996-06 MS	TOC:13.39mg/L TC:14.53mg/L IC:1.140mg/L	Completed	7/10/2017 3:21:42 PM	19
20	TOC	L17070003-01	!!Error!! TOC:1.238mg/L TC:0.9410mg/L IC:-0.2967mg/L	Completed	7/10/2017 4:15:46 PM	20
21	TOC	L17070001-01	!!Error!! TOC:0.7911mg/L TC:0.4995mg/L IC:-0.2916mg/L	Completed	7/10/2017 4:35:21 PM	21
22	TOC	CCV	!!Error!! TOC:27.50mg/L TC:27.24mg/L IC:-0.2510mg/L	Completed	7/10/2017 4:47:39 PM	22
23	TOC	CCB	!!Error!! TOC:0.09863mg/L TC:-0.1584mg/L IC:-0.2571mg/	Completed	7/10/2017 4:56:39 PM	0

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

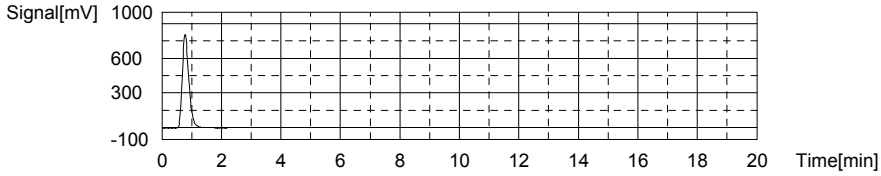
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.910mg/L TC:28.97mg/L IC:27.06mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1243	28.97mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 8:17:21 AM

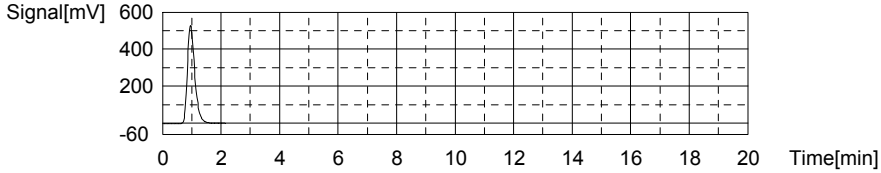
Mean Area 1243
Mean Conc. 28.97mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	924.5	27.06mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 8:22:35 AM

Mean Area 924.5
Mean Conc. 27.06mg/L



Sample

Sample Name: TOC/TIC
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

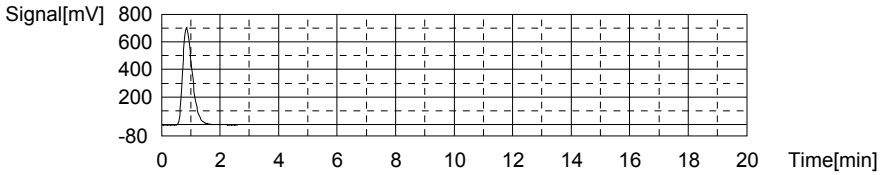
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:28.33mg/L TC:37.47mg/L IC:9.141mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1603	37.47mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 8:30:37 AM

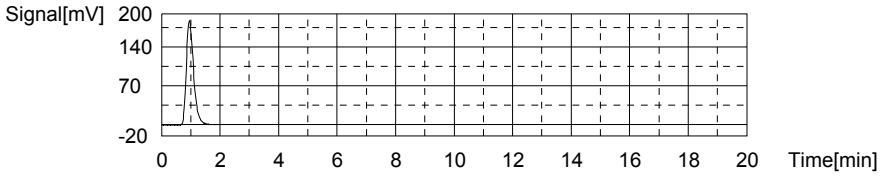
Mean Area 1603
Mean Conc. 37.47mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	324.5	9.141mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 8:35:34 AM

Mean Area 324.5
Mean Conc. 9.141mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

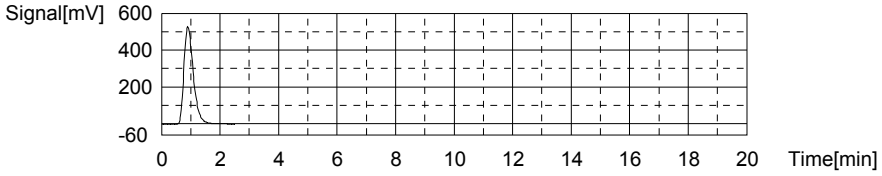
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.65mg/L TC:27.39mg/L IC:-0.2648mg/L

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_57	7/10/2017 8:43:31 AM

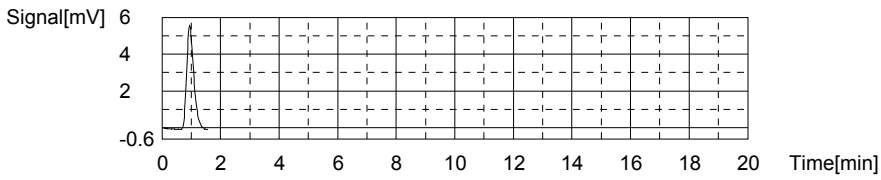
Mean Area 1176
Mean Conc. 27.39mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.549	-0.2648mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 8:47:52 AM

Mean Area 9.549
Mean Conc. -0.2648mg/L



Sample

Sample Name: WG620996-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

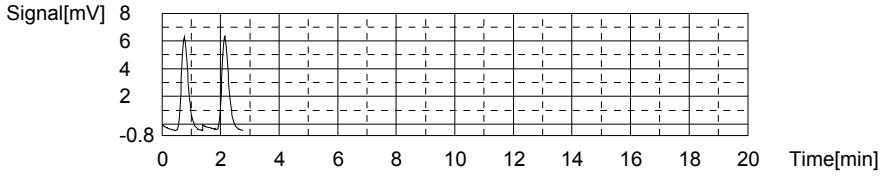
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.09020mg/L TC:-0.1438mg/L IC:-0.2340mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.81	-0.1431mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 8:52:54 AM
2	10.75	-0.1445mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 8:56:24 AM

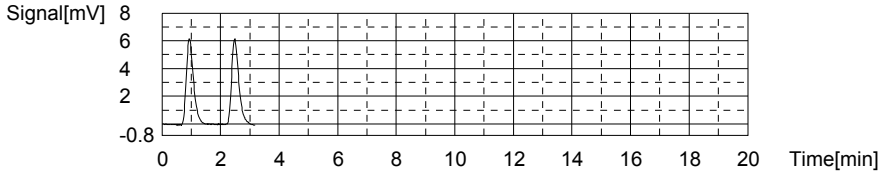
Mean Area 10.78
Mean Conc. -0.1438mg/L



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_1	7/10/2017 9:00:30 AM
2	10.53	-0.2355mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 9:04:38 AM

Mean Area 10.58
Mean Conc. -0.2340mg/L



Sample

Sample Name: WG620996-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

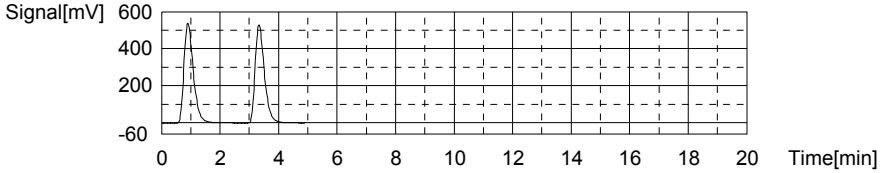
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.78mg/L TC:27.53mg/L IC:-0.2516mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1199	27.93mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 9:12:30 AM
2	1165	27.13mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 9:17:13 AM

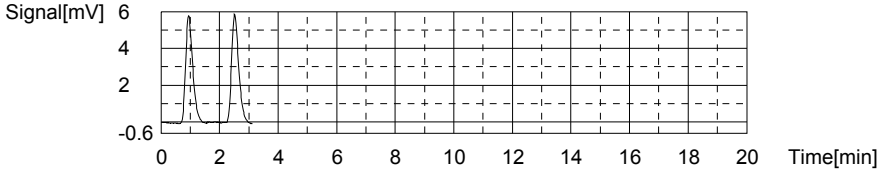
Mean Area 1182
Mean Conc. 27.53mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.02	-0.2507mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 9:21:36 AM
2	9.957	-0.2526mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 9:25:46 AM

Mean Area 9.989
Mean Conc. -0.2516mg/L



Sample

Sample Name: WG620996-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

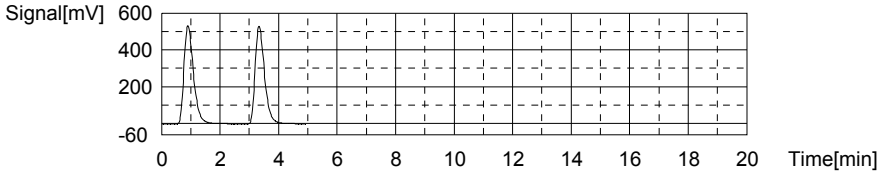
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.81mg/L TC:27.56mg/L IC:-0.2443mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1198	27.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 9:33:39 AM
2	1169	27.22mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 9:38:24 AM

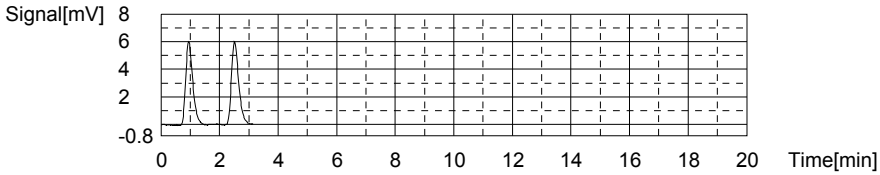
Mean Area 1184
Mean Conc. 27.56mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.24	-0.2441mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 9:42:47 AM
2	10.23	-0.2444mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 9:47:00 AM

Mean Area 10.23
Mean Conc. -0.2443mg/L



Sample

Sample Name: <Untitled>
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

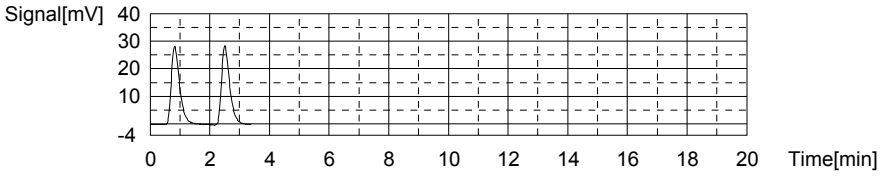
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:1.074mg/L TC:0.8918mg/L IC:-0.1820mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	54.60	0.8915mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 11:08:21 AM
2	54.62	0.8920mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 11:12:20 AM

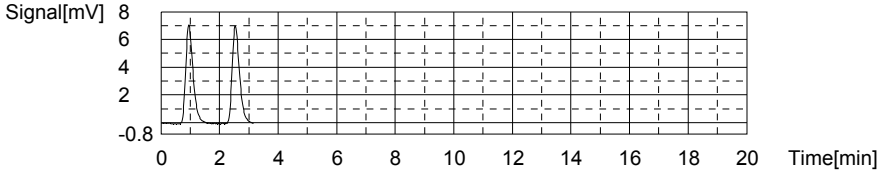
Mean Area 54.61
Mean Conc. 0.8918mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.44	-0.1784mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 11:16:46 AM
2	12.20	-0.1856mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 11:20:58 AM

Mean Area 12.32
Mean Conc. -0.1820mg/L



Sample

Sample Name: <Untitled>
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

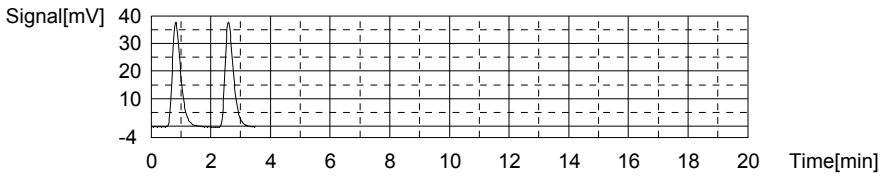
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:1.536mg/L TC:1.355mg/L IC:-0.1813mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	74.15	1.353mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 11:28:11 AM
2	74.30	1.357mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 11:32:11 AM

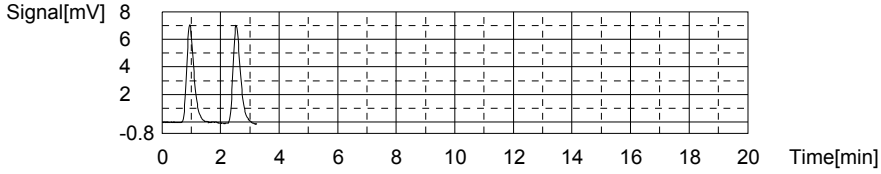
Mean Area 74.22
Mean Conc. 1.355mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.20	-0.1856mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/10/2017 11:36:37 AM
2	12.49	-0.1769mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/10/2017 11:40:53 AM

Mean Area 12.35
Mean Conc. -0.1813mg/L



Sample

Sample Name: L17070221-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

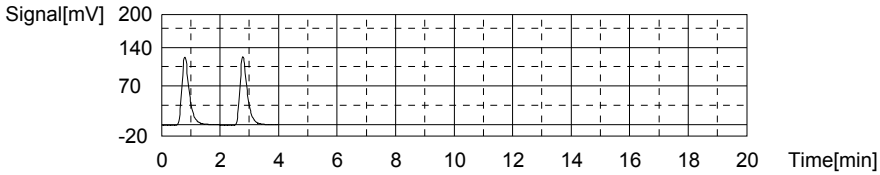
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.665mg/L TC:4.766mg/L IC:2.101mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	217.7	4.745mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 11:48:20 AM
2	219.5	4.788mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 11:52:35 AM

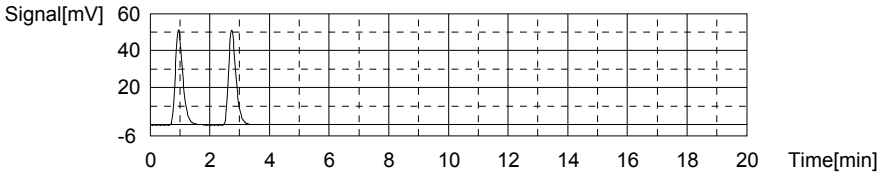
Mean Area 218.6
Mean Conc. 4.766mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	88.90	2.105mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 11:57:14 AM
2	88.66	2.098mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 12:01:44 PM

Mean Area 88.78
Mean Conc. 2.101mg/L



Sample

Sample Name: L17070236-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

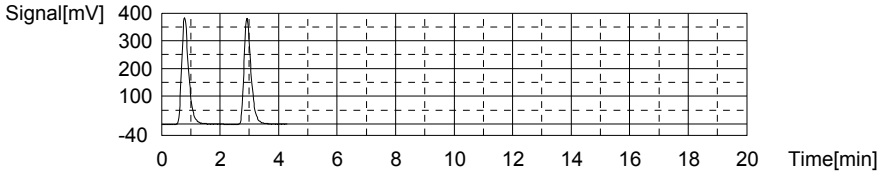
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.635mg/L TC:14.66mg/L IC:9.026mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	638.4	14.68mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 12:09:18 PM
2	636.4	14.64mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 12:13:50 PM

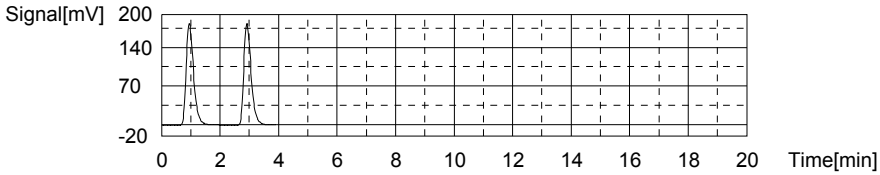
Mean Area 637.4
Mean Conc. 14.66mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	321.2	9.042mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 12:18:43 PM
2	320.1	9.009mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 12:23:21 PM

Mean Area 320.6
Mean Conc. 9.026mg/L



Sample

Sample Name: L17070278-01 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

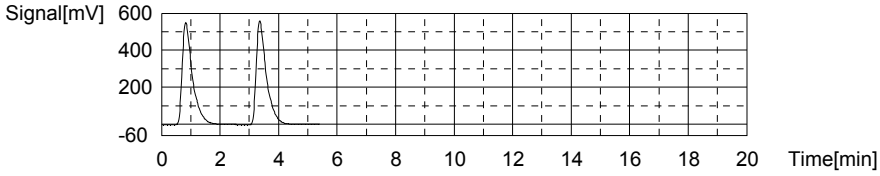
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:20.51mg/L TC:31.11mg/L IC:10.60mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1331	31.05mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 12:31:26 PM
2	1336	31.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 12:36:35 PM

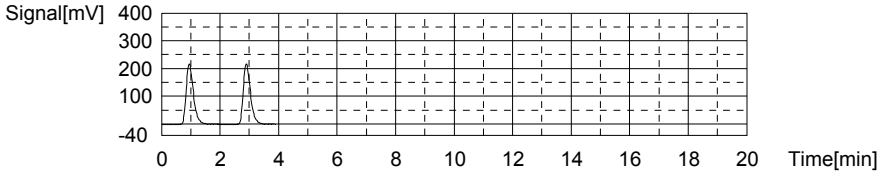
Mean Area 1334
Mean Conc. 31.11mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	373.8	10.61mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 12:41:29 PM
2	372.8	10.58mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 12:46:06 PM

Mean Area 373.3
Mean Conc. 10.60mg/L



Sample

Sample Name: L17070299-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

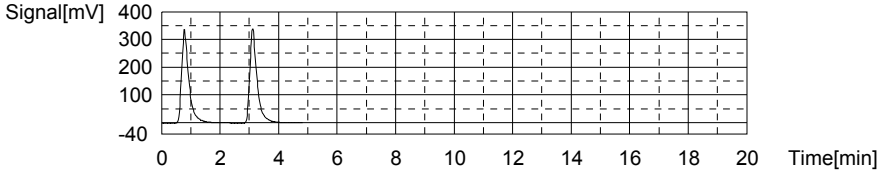
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.714mg/L TC:13.21mg/L IC:8.496mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	571.7	13.11mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 12:53:53 PM
2	580.2	13.31mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 12:58:38 PM

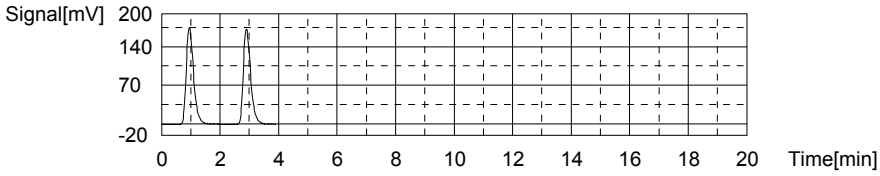
Mean Area 576.0
Mean Conc. 13.21mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	304.7	8.549mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 1:03:31 PM
2	301.1	8.442mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 1:08:10 PM

Mean Area 302.9
Mean Conc. 8.496mg/L



Sample

Sample Name: L17070303-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

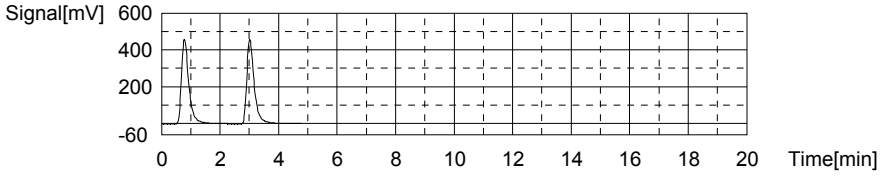
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.245mg/L TC:18.54mg/L IC:14.30mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	797.3	18.44mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 1:15:50 PM
2	805.9	18.64mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 1:20:46 PM

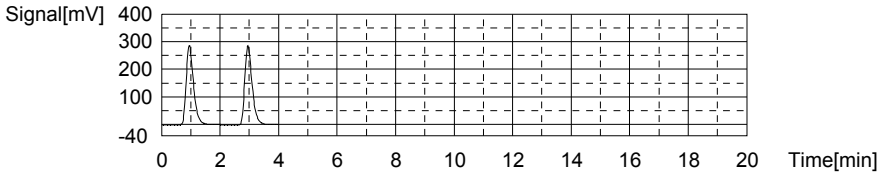
Mean Area 801.6
Mean Conc. 18.54mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	496.3	14.27mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 1:25:42 PM
2	497.9	14.32mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 1:30:27 PM

Mean Area 497.1
Mean Conc. 14.30mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

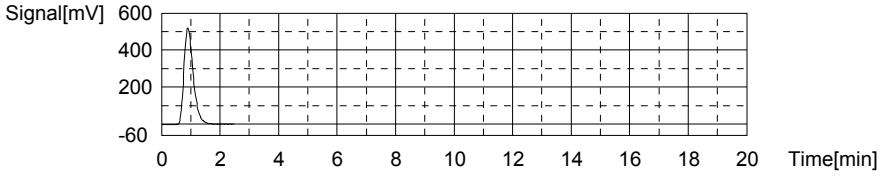
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.92mg/L TC:26.72mg/L IC:-0.1907mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1148	26.72mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 1:38:21 PM

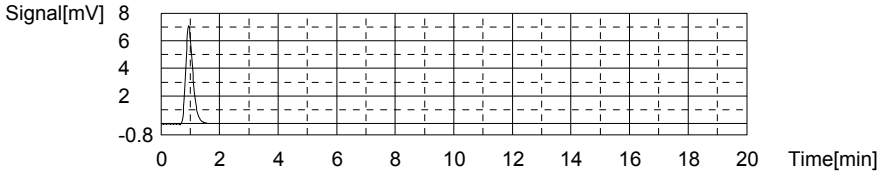
Mean Area 1148
Mean Conc. 26.72mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.03	-0.1907mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 1:42:48 PM

Mean Area 12.03
Mean Conc. -0.1907mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

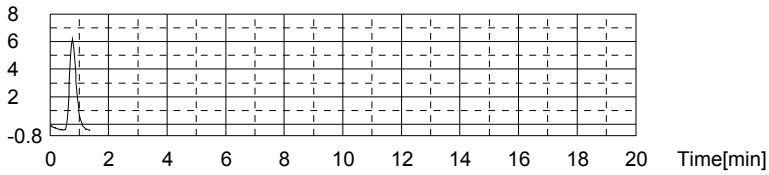
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.08500mg/L TC:-0.1490mg/L IC:-0.2340mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.56	-0.1490mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 1:47:49 PM

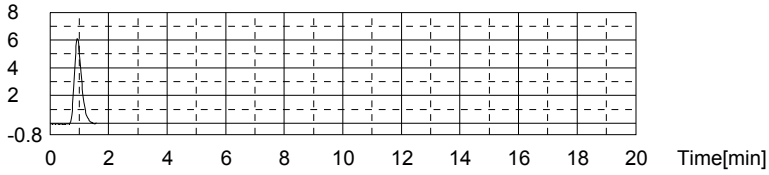
Mean Area 10.56
Mean Conc. -0.1490mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.58	-0.2340mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 1:51:49 PM

Mean Area 10.58
Mean Conc. -0.2340mg/L



Sample

Sample Name: L17070303-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

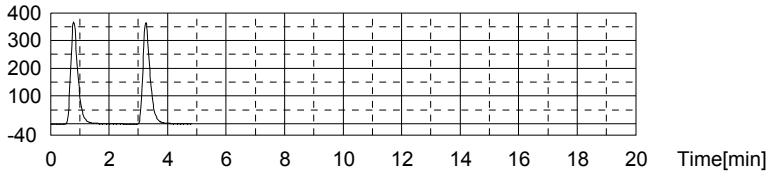
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.946mg/L TC:14.33mg/L IC:9.380mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	623.7	14.34mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 1:59:43 PM
2	622.7	14.31mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 2:04:21 PM

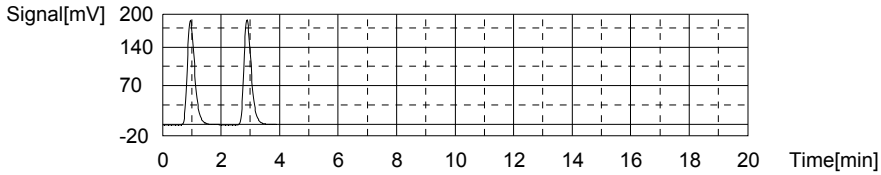
Mean Area 623.2
Mean Conc. 14.33mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	331.9	9.362mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 2:09:12 PM
2	333.1	9.398mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 2:13:54 PM

Mean Area 332.5
Mean Conc. 9.380mg/L



Sample

Sample Name: L17070303-05 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

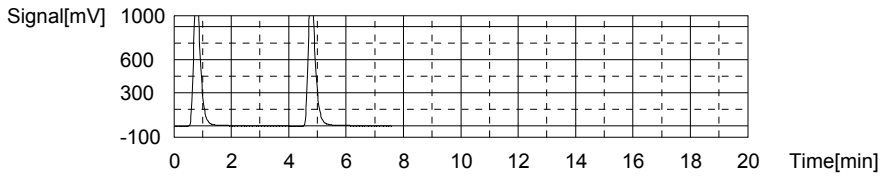
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:10.36mg/L TC:49.29mg/L IC:38.93mg/L

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_5	7/10/2017 2:23:22 PM
2	2161	50.66mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 2:29:13 PM

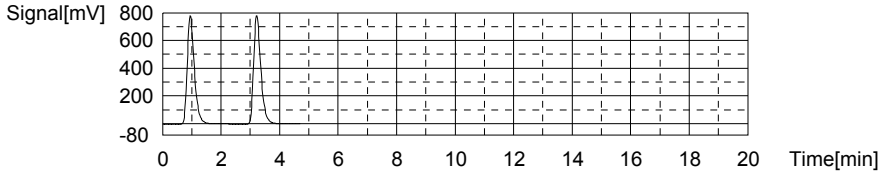
Mean Area 2103
Mean Conc. 49.29mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1310	38.57mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 2:34:34 PM
2	1334	39.29mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 2:39:43 PM

Mean Area 1322
Mean Conc. 38.93mg/L



Sample

Sample Name: WG620996-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

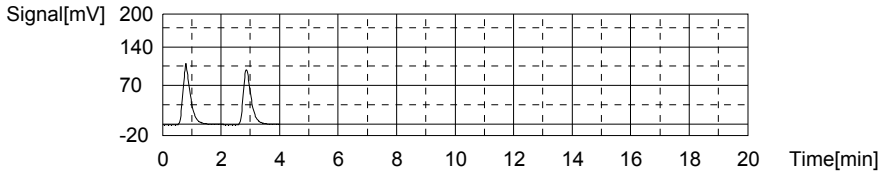
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.534mg/L TC:4.030mg/L IC:1.496mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	190.2	4.095mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 2:47:15 PM
2	184.7	3.965mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 2:51:27 PM

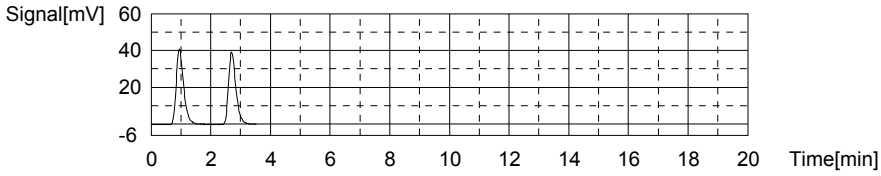
Mean Area 187.5
Mean Conc. 4.030mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	70.04	1.542mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/10/2017 2:56:06 PM
2	66.99	1.451mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/10/2017 3:00:29 PM

Mean Area 68.52
Mean Conc. 1.496mg/L



Sample

Sample Name: WG620996-06 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

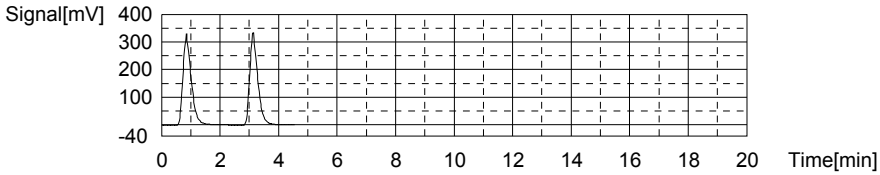
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:13.39mg/L TC:14.53mg/L IC:1.140mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	634.8	14.60mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 3:08:12 PM
2	628.8	14.46mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 3:12:44 PM

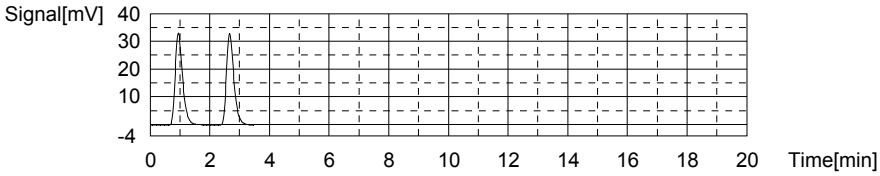
Mean Area 631.8
Mean Conc. 14.53mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	56.57	1.139mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 3:17:19 PM
2	56.63	1.141mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 3:21:42 PM

Mean Area 56.60
Mean Conc. 1.140mg/L



Sample

Sample Name: L17070003-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

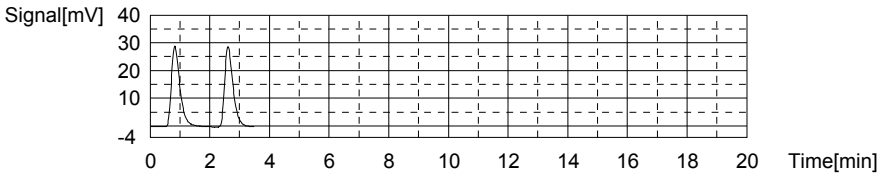
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:1.238mg/L TC:0.9410mg/L IC:-0.2967mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	57.23	0.9537mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 4:03:15 PM
2	56.16	0.9284mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 4:07:13 PM

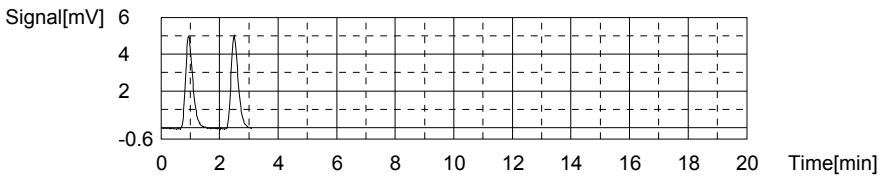
Mean Area 56.70
Mean Conc. 0.9410mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.479	-0.2967mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 4:11:37 PM
2	8.477	-0.2968mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 4:15:46 PM

Mean Area 8.478
Mean Conc. -0.2967mg/L



Sample

Sample Name: L17070001-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

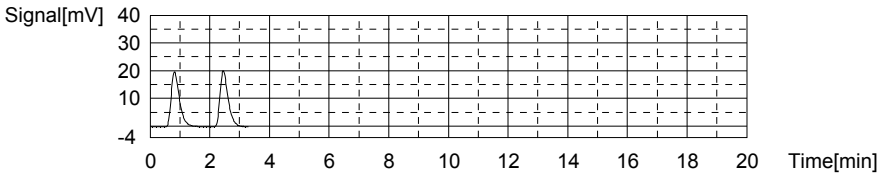
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.7911mg/L TC:0.4995mg/L IC:-0.2916mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	37.58	0.4894mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 4:22:51 PM
2	38.43	0.5095mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/10/2017 4:26:46 PM

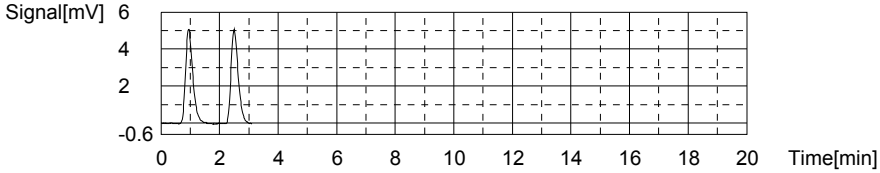
Mean Area 38.00
Mean Conc. 0.4995mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.670	-0.2910mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 4:31:11 PM
2	8.630	-0.2922mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 4:35:21 PM

Mean Area 8.650
Mean Conc. -0.2916mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

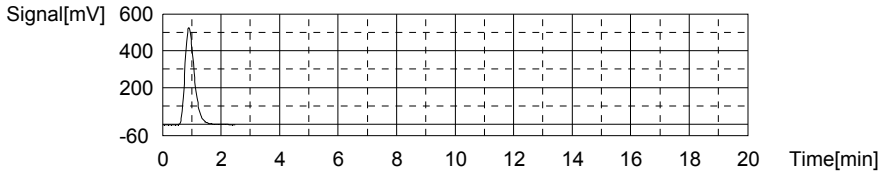
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.50mg/L TC:27.24mg/L IC:-0.2510mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1170	27.24mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 4:43:15 PM

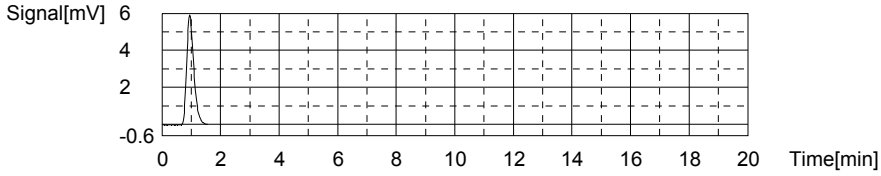
Mean Area 1170
Mean Conc. 27.24mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.01	-0.2510mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/10/2017 4:47:39 PM

Mean Area 10.01
Mean Conc. -0.2510mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

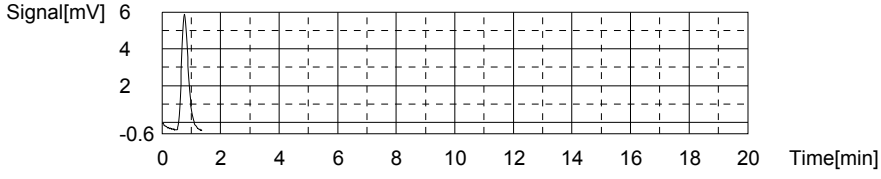
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.09863mg/L TC:-0.1584mg/L IC:-0.2571mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.16	-0.1584mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/10/2017 4:52:39 PM

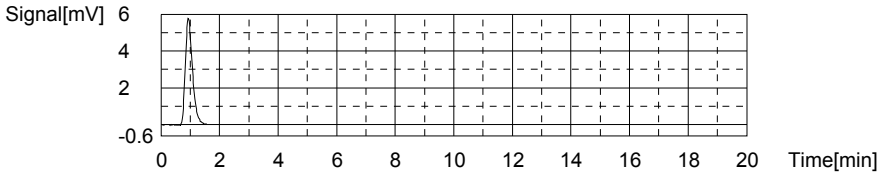
Mean Area 10.16
Mean Conc. -0.1584mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.807	-0.2571mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/10/2017 4:56:39 PM

Mean Area 9.807
Mean Conc. -0.2571mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
July 17, 2017

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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	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

Microbac Laboratories Inc.
List of Valid Qualifiers
July 17, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
July 17, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

CHAIN OF CUSTODY

Name Of Lab Shipping To: MICROBAC (740) 373-4071 ATTN: STEPHANIE MOSSBURG

Project: AECOM
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No.
60256135.GWTPT
HRUMAR16

Job:
GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES

Prepared By:
Scott Beesinger

P.O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: AMMONIA-N	Analyses: ORTHO-PHOSPHATE	Analyses: TOTAL ORGANIC CARBON	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650-6455-Grab	Water	07/06/17 / 15:00		2	X		X	H2SO4	
LH18/24-SP650-6455-Grab	Water	07/06/17 / 15:00		1		X		NONE	

Additional Remarks: **Standard TAT on all parameters** Send results to Linda Raabe at linda.raabe@aecom.com or call at 210-253-7518

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/06/17	15:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

Microbac OVD
Received: 07/07/2017 09:47
By: BRENDA GREGORY 221000103000

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC®

COOLER TEMP >6° C LOG

Cooler ID 3000

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

CJO 7/7/17

pH Exceptions

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

CJO 7/7/17

PRESERVATIVE EXCEPTIONS
✓ NONE
__ AS NOTED
CJO 7/7/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17070278
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 18-JUL-2017

Samplenum	Container ID	Products
L17070278-01	932759	PCT-S PO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	07-JUL-2017 10:54	BRG		
2	ANALYZ	L1	WET	07-JUL-2017 11:07	SDC	CLS	
3	ANALYZ	W1	A1	11-JUL-2017 08:03	AZH	SDC	

Samplenum	Container ID	Products
L17070278-01	932760	PCT-S TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	07-JUL-2017 10:54	BRG		<2
2	ANALYZ	W1	WET	10-JUL-2017 10:56	ADG	CLS	
3	STORE	WET	A1	11-JUL-2017 16:46	CLS	EPT	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	07-JUL-2017 10:54	BRG		<2

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L17070280

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on July 18 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0013528	I	3.0		J4616881971	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)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP140-7454-GRAB	L17070280-01	07/06/2017 15:00	07/07/2017 09:47

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

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-07-17 19:03:27

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6010
Prep Batch Number(s):	620984	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Kerri Buck	Kerri K Buck		2017-07-18 13:46:50

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6010
Prep Batch Number(s):	620984	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports	X				
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6010
Prep Batch Number(s):	620984	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6010
Prep Batch Number(s):	620984	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?					
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?	X				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6010
Prep Batch Number(s):	620984	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6010
Prep Batch Number(s):	620984	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Kerri Buck	Kerri K Buck		2017-07-18 13:49:24

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports	X				
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?					
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?	X				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-13 14:39:27

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

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3. NA = Not applicable;

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Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070280
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070280-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP140-7454-GRAB	**Prep Method:**	6850	**Prep Date:**	07/14/2017 09:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG621748	**Analyst:**	JWR	**Run Date:**	07/14/2017 18:15
Collect Date:	07/06/2017 15:00	**Dilution:**	10000	**File ID:**	1LM.LM40196
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	6620		4000	2000	1000

Certificate of Analysis

Sample #:	L17070280-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP140-7454-GRAB	**Prep Method:**	3015A	**Prep Date:**	07/10/2017 08:22
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	07/12/2017 09:47
Workgroup #:	WG621086	**Analyst:**	JYH	**Run Date:**	07/12/2017 13:21
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	T4.071217.132123
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Selenium, Total	7782-49-2	0.0200	U	0.0200	0.0200	0.0100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070280-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP140-7454-GRAB	**Prep Method:**	3015A	**Prep Date:**	07/10/2017 09:27
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	07/10/2017 11:08
Workgroup #:	WG621040	**Analyst:**	JYH	**Run Date:**	07/10/2017 13:04
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	NI.071017.130443
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070280-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP140-7454-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	06/05/2017 10:10
Workgroup #:	WG620845	**Analyst:**	SDC	**Run Date:**	07/07/2017 12:20
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	00.1707071220-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Hexavalent	18540-29-9	0.0100	U	0.0200	0.0100	0.00500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.1 General Chromatography Data

2.1.1 LC/MS Data (6850)

2.1.1.1 Summary Data

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070280-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP140-7454-GRAB	**Prep Method:**	6850	**Prep Date:**	07/14/2017 09:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG621748	**Analyst:**	JWR	**Run Date:**	07/14/2017 18:15
Collect Date:	07/06/2017 15:00	**Dilution:**	10000	**File ID:**	1LM.LM40196
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	6620		4000	2000	1000

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

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

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA

WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: NA

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40075	WG619865-01 CCB	1	1		06/29/17 13:13
2	1LM.LM40076	WG619865-02 STD (0.1 ug/L)	1	1	STD80232	06/29/17 13:32
3	1LM.LM40077	WG619865-03 STD (0.2 ug/L)	1	1	STD80232	06/29/17 13:51
4	1LM.LM40078	WG619865-04 STD (0.5 ug/L)	1	1	STD80232	06/29/17 14:10
5	1LM.LM40079	WG619865-05 STD (1.0 ug/L)	1	1	STD80232	06/29/17 14:29
6	1LM.LM40080	WG619865-06 STD (2.0 ug/L)	1	1	STD80232	06/29/17 14:48
7	1LM.LM40081	WG619865-07 STD (5.0 ug/L)	1	1	STD80232	06/29/17 15:07
8	1LM.LM40082	WG619865-08 STD (10 ug/L)	1	1	STD80232	06/29/17 15:26
9	1LM.LM40083	WG619865-09 SSCV (1.0 ug/L)	1	1	STD80234	06/29/17 15:45
10	1LM.LM40084	WG619609-01 CCB	1	1		06/29/17 16:04
11	1LM.LM40085	WG619609-02 CCV (1.0ug/L)	1	1	STD80232	06/29/17 16:23
12	1LM.LM40086	WG619615-05 MRL (0.2ug/L)	1	1	STD80232	06/29/17 16:42
13	1LM.LM40087	WG619615-01 MCT (0.2ug/L)	1	1	STD80234	06/29/17 17:01
14	1LM.LM40088	WG619615-02 BLANK	1	1		06/29/17 17:20
15	1LM.LM40089	WG619615-03 LCS (0.2ug/L)	1	1	STD80234	06/29/17 17:39
16	1LM.LM40090	WG619615-04 LCS2 (0.2ug/L)	1	1	STD80234	06/29/17 17:57
17	1LM.LM40091	L17061390-01 10,000X	1	10000	STD80234	06/29/17 18:16
18	1LM.LM40092	L17061390-02	1	1	STD80234	06/29/17 18:35
19	1LM.LM40093	L17061390-03 100X	1	100	STD80234	06/29/17 18:54
20	1LM.LM40094	L17061390-04	1	1	STD80234	06/29/17 19:13
21	1LM.LM40095	L17061390-05 10X	1	10		06/29/17 19:32
22	1LM.LM40096	L17061390-06	1	1		06/29/17 19:51
23	1LM.LM40097	WG619609-03 CCV (1.0ug/L)	1	1	STD80232	06/29/17 20:10
24	1LM.LM40098	WG619615-06 MRL (0.2ug/L)	1	1	STD80232	06/29/17 20:29
25	1LM.LM40099	WG619609-04 CCB	1	1		06/29/17 20:48
26	1LM.LM40100	L17061390-07	1	1		06/29/17 21:07
27	1LM.LM40101	L17061390-09 100,000X	1	100000		06/29/17 21:26
28	1LM.LM40102	L17061390-10	1	1		06/29/17 21:45
29	1LM.LM40103	L17061390-12	1	1		06/29/17 22:04
30	1LM.LM40104	L17061390-13	1	1		06/29/17 22:23
31	1LM.LM40105	L17061390-15	1	1		06/29/17 22:42
32	1LM.LM40106	L17061390-16 2X	1	2		06/29/17 23:01
33	1LM.LM40107	WG619609-05 CCV (1.0ug/L)	1	1	STD80232	06/29/17 23:20

Page: 1 Approved: 30-JUN-17

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 NA

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM40108	WG619615-07 MRL (0.2ug/L)	1	1	STD80232	06/29/17 23:39
35	1LM.LM40109	WG619609-06 CCB	1	1		06/29/17 23:57

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L17061390-01 Analyzed at a dilution based on historical data.			
19				
	L17061390-03 Analyzed at a dilution based on historical data.			
21				
	L17061390-05 Analyzed at a dilution based on historical data.			
27				
	L17061390-09 Analyzed at a dilution based on historical data.			
32				
	L17061390-16 Analyzed at a dilution based on historical data.			

Page: 2 Approved: 30-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 071417_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG621748 (waters)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (06/29/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments: Sample L17070280-01 was analyzed at a dilution based on its historical results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40188	WG621753-01 CCB	1	1		07/14/17 15:44
2	1LM.LM40189	WG621753-02 CCV (1.0ug/L)	1	1	STD80232	07/14/17 16:03
3	1LM.LM40190	WG621748-07 MRL (0.2ug/L)	1	1	STD80232	07/14/17 16:22
4	1LM.LM40191	WG621748-01 MCT (0.2ug/L)	1	1	STD80234	07/14/17 16:41
5	1LM.LM40192	WG621748-02 BLANK	1	1		07/14/17 17:00
6	1LM.LM40193	WG621748-03 LCS (0.2ug/L)	1	1	STD80234	07/14/17 17:19
7	1LM.LM40194	L17070003-01 LOQ (0.2ug/L)	1	1	STD80234	07/14/17 17:37
8	1LM.LM40195	L17070001-01 LOD (0.1ug/L)	1	1	STD80234	07/14/17 17:56
9	1LM.LM40196	L17070280-01 (10,000x)	1	10000		07/14/17 18:15
10	1LM.LM40197	L17070282-01	1	1		07/14/17 18:34
17	1LM.LM40198	L17070560-01 REF	1	1		07/14/17 18:53
12	1LM.LM40199	L17070560-01 MS	1	1	STD80234	07/14/17 19:12
13	1LM.LM40200	L17070560-01 MSD	1	1	STD80234	07/14/17 19:31
14	1LM.LM40201	WG621753-03 CCV (1.0ug/L)	1	1	STD80232	07/14/17 19:50
15	1LM.LM40202	WG621748-08 MRL (0.2ug/L)	1	1	STD80232	07/14/17 20:09
16	1LM.LM40203	WG621753-04 CCB	1	1		07/14/17 20:28

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 17-JUL-17

Microbac Laboratories Inc.

Data Checklist

Date: 29-JUN-2017
Analyst: WTD
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83086
Analytical Workgroups: L17061390

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	X
Check for completeness	X
Primary Reviewer	WTD
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:

Secondary Reviewer:
30-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-30-2017 12:54:25

Microbac Laboratories Inc.

Data Checklist

Date: 14-JUL-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83400
Analytical Workgroups: L17070001, L17070003, L17070280, L17070282, L17070560

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	TRRP
Check for completeness	X
Primary Reviewer	JWR
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:
17-JUL-2017
John Richards

Secondary Reviewer:
17-JUL-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-17-2017 15:11:34

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG621748

Login Number: L17070280

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
LH18/24-SP140-7454-GRAB	01	07/06/17					07/14/2017	7.8	28		07/14/17	.4	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5387560
Report generated 07/17/2017 15:28

METHOD BLANK SUMMARY

Login Number: L17070280
Work Group: WG621748
Blank File ID: 1LM.LM40192
Blank Sample ID: WG621748-02
Prep Date: 07/14/17 09:00
Instrument ID: LCMS1
Analyzed Date: 07/14/17 17:00
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG621748-07	1LM.LM40190	07/14/17 16:22	01
MCT	WG621748-01	1LM.LM40191	07/14/17 16:41	01
LCS	WG621748-03	1LM.LM40193	07/14/17 17:19	01
LH18/24-SP140-7454-GRAB	L17070280-01	1LM.LM40196	07/14/17 18:15	DL01
QCMRL	WG621748-08	1LM.LM40202	07/14/17 20:09	01

Report Name: BLANK_SUMMARY
PDF File ID: 5387561
Report generated 07/17/2017 15:28

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070280 Prep Date: 07/14/17 09:00 Sample ID: WG621748-02
Instrument ID: LCMS1 Run Date: 07/14/17 17:00 Prep Method: 6850
File ID: 1LM.LM40192 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5387562
17-JUL-2017 15:28

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070280 Run Date: 07/14/2017 Sample ID: WG621748-03
Instrument ID: LCMS1 Run Time: 17:19 Prep Method: 6850
File ID: 1LM.LM40193 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD80234 Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.195	97.5	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5387563
Report generated: 07/17/2017 15:28

Login Number: L17070280 **Instrument ID:** LCMS1
Analytical Method: 6850 **Initial Calibration Date:** 29-JUN-17 15:26
ICAL Workgroup: WG619865 **Column ID:** F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.454	6.38	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5387893
Report generated 07/17/2017 15:28

Login Number: L17070280
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-02			WG619865-03			WG619865-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	20800.0000	1.476	0.200	44600.0000	1.521	0.500	102000.000	1.433

INT_CAL - Modified 03/06/2008
PDF File ID: 5387893
Report generated 07/17/2017 15:28

Login Number: L17070280
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-05			WG619865-06			WG619865-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	214000.000	1.464	2.00	408000.000	1.442	5.00	981000.000	1.437

INT_CAL - Modified 03/06/2008
PDF File ID: 5387893
Report generated 07/17/2017 15:28

Login Number: L17070280
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-08		
	CONC	RESP	RF
Perchlorate	10.0	1820000.00	1.407

INT_CAL - Modified 03/06/2008
PDF File ID: 5387893
Report generated 07/17/2017 15:28

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070280 Run Date: 06/29/2017 Sample ID: WG619865-09
Instrument ID: LCMS1 Run Time: 15:45 Method: 6850
File ID: 1LM.LM40083 Analyst: WTD QC Key: DOD4
ICal Workgroup: WG619865 Cal ID: LCMS1 - 29-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.980	ug/L	1.40	2.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5387894
Report generated 07/17/2017 15:28

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070280 | Run Date: 07/14/2017 | Sample ID: WG621753-01
Instrument ID: LCMS1 | Run Time: 15:44 | Method: 6850
File ID: 1LM.LM40188 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG621748 | Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5387566
Report generated 07/17/2017 15:29

Login Number: L17070280 Run Date: 07/14/2017 Sample ID: WG621753-04
Instrument ID: LCMS1 Run Time: 20:28 Method: 6850
File ID: 1LM.LM40203 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG621748 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5387566
Report generated 07/17/2017 15:29

Login Number: L17070280 Run Date: 07/14/2017 Sample ID: WG621753-02
Instrument ID: LCMS1 Run Time: 16:03 Method: 6850
File ID: 1LM.LM40189 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG621748 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.967	ug/L	1.39	3.30	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5387565
Report generated 07/17/2017 15:29

Login Number: L17070280 Run Date: 07/14/2017 Sample ID: WG621753-03
Instrument ID: LCMS1 Run Time: 19:50 Method: 6850
File ID: 1LM.LM40201 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG621748 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.963	ug/L	1.38	3.70	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5387565
Report generated 07/17/2017 15:29

Login Number: L17070280 Run Date: 07/14/2017 Sample ID: WG621748-07
Instrument ID: LCMS1 Run Time: 16:22 Prep Method: 6850
File ID: 1LM.LM40190 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.198	99.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5387564
Report generated 07/17/2017 15:28

Login Number: L17070280 Run Date: 07/14/2017 Sample ID: WG621748-08
Instrument ID: LCMS1 Run Time: 20:09 Prep Method: 6850
File ID: 1LM.LM40202 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.187	93.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5387564
Report generated 07/17/2017 15:28

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number:L17070280
Instrument ID:LCMS1
Workgroup (AAB#):WG621748

ICAL CCV Number:WG619865-05
CAL ID: LCMS1-29-JUN-17
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG619865	NA	NA	703000
Upper Limit	NA	NA	1054500
Lower Limit	NA	NA	351500
L17070280-01	10000	DL01	689000
WG621748-02	1.00	01	635000
WG621748-03	1.00	01	667000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5387567
Report generated 07/17/2017 15:29

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**	6850	**Samplenum:**	L17070280-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40196
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 18:15	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	131000	41700	3.14	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG619865-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40076
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 13:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	20800	6780	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG619865-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40077
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 13:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44600	13700	3.26	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG619865-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40078
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	102000	31100	3.28	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG619865-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40079
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:29	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	65900	3.25	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG619865-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40080
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	408000	126000	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG619865-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40081
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	981000	306000	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG619865-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40082
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1820000	577000	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG619865-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40083
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	200000	61800	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**	6850	**Samplenum:**	WG621748-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40191
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40200	12700	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**	6850	**Samplenum:**	WG621748-02
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40192
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 17:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**	6850	**Samplenum:**	WG621748-03
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40193
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 17:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38600	12200	3.16	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**	6850	**Samplenum:**	WG621748-07
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40190
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:22	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38000	12400	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**	6850	**Samplenum:**	WG621748-08
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40202
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 20:09	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	41500	13900	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG621753-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 15:44	**File ID:**	1LM.LM40188
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 15:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	2390	959	2.49	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Microbac

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG621753-02
Instrument:	LCMS1	**Prep Date:**	07/14/2017 16:03	**File ID:**	1LM.LM40189
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:03	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	175000	54500	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG621753-03
Instrument:	LCMS1	**Prep Date:**	07/14/2017 19:50	**File ID:**	1LM.LM40201
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 19:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	59400	3.32	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070280	**Prep Method:**		**Samplenum:**	WG621753-04
Instrument:	LCMS1	**Prep Date:**	07/14/2017 20:28	**File ID:**	1LM.LM40203
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 20:28	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	732	0.000	2.3	3.8	*

2.2 Metals Data

2.2.1 Metals I C P Data

2.2.1.1 Summary Data

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070280-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP140-7454-GRAB	**Prep Method:**	3015A	**Prep Date:**	07/10/2017 08:22
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	07/12/2017 09:47
Workgroup #:	WG621086	**Analyst:**	JYH	**Run Date:**	07/12/2017 13:21
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	T4.071217.132123
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Selenium, Total	7782-49-2	0.0200	U	0.0200	0.0200	0.0100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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:	**Example:**
Cs = Concentration computed by the data system in ug/mL (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial volume (mL)	50
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cs = Concentration computed by the data system (mg/L) (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial weight (g)	1
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cx = Concentration calculated as received (wet basis)	5
Px = Percent solids of sample (%wt)	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:	**Example:**
Cs = Concentration computed by the data system in ug/mL (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial volume (mL)	50
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cs = Concentration computed by the data system (mg/L) (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial weight (g)	1
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cx = Concentration calculated as received (wet basis)	5
Px = Percent solids of sample (%wt)	80
$Cdry$ = Concentration calculated as dry weight (mg/kg)	6.25

Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup: WG620984
Analyst: ERP
Spike Analyst: ERP
Run Date: 07/10/2017 08:22
Method: 3015A
Balance: BAL019
Instrument: MW-4
Instrument Start: 07/10/2017 08:38

SOP: ME407 Revison 19
Spike Solution: STD82522
Spike Witness: VC
HNO3 Lot #: COA19798
HCL Lot #: COA19685
40 & 50 ML. DIGESTION TU COA19764
ICP FILTERS LOT#R6sa4256 RGT40011

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG620984-02	BLANK	1	40 mL	50 mL	206.296 g	206.275 g		
2	WG620984-03	LCS	1	40 mL	50 mL	211.418 g	211.404 g	5 mL	
3	L17070255-01	SAMP	1	40 mL	50 mL	206.182 g	206.151 g		07/17/17
4	L17070255-02	SAMP	1	40 mL	50 mL	208.555 g	208.527 g		07/17/17
5	L17070255-03	SAMP	1	40 mL	50 mL	204.776 g	204.761 g		07/17/17
6	L17070255-04	SAMP	1	40 mL	50 mL	207.303 g	207.271 g		07/17/17
7	L17070273-01	SAMP	1	40 mL	50 mL	207.231 g	207.206 g		07/14/17
8	L17070273-02	SAMP	1	40 mL	50 mL	204.368 g	204.339 g		07/14/17
9	L17070280-01	SAMP	1	40 mL	50 mL	203.516 g	203.484 g		07/18/17
10	L17070329-01	SAMP	1	40 mL	50 mL	207.432 g	207.412 g		07/14/17
11	L17070329-02	SAMP	1	40 mL	50 mL	204.342 g	204.324 g		07/14/17
12	L17070330-01	SAMP	1	40 mL	50 mL	205.456 g	205.431 g		07/14/17
13	L17070330-02	SAMP	1	40 mL	50 mL	204.76 g	204.731 g		07/14/17
14	L17070331-01	SAMP	1	40 mL	50 mL	204.985 g	204.954 g		07/14/17
15	L17070331-02	SAMP	1	40 mL	50 mL	206.449 g	206.424 g		07/14/17
16	L17070332-01	SAMP	1	40 mL	50 mL	203.279 g	203.256 g		07/14/17
17	L17070332-02	SAMP	1	40 mL	50 mL	205.611 g	205.591 g		07/14/17
18	L17070333-01	SAMP	1	40 mL	50 mL	205.115 g	205.099 g		07/14/17
19	L17070333-02	SAMP	1	40 mL	50 mL	203.802 g	203.779 g		07/14/17
20	L17070333-03	SAMP	1	40 mL	50 mL	206.351 g	206.335 g		07/14/17
21	L17070334-01	SAMP	1	40 mL	50 mL	204.905 g	204.878 g		07/14/17
22	WG620984-01	REF	1	40 mL	50 mL	204.545 g	204.51 g		
23	L17070334-02	SAMP	1	40 mL	50 mL	204.545 g	204.51 g		07/14/17
24	WG620984-04	MS	1	40 mL	50 mL	212.001 g	211.982 g	5 mL	
25	WG620984-05	MSD	1	40 mL	50 mL	210.863 g	210.851 g	5 mL	

L17070255-01	filtered digestate
L17070255-02	filtered digestate

Analyst: Erin Potter

Reviewer: Vicki Collins

MW_DIG - Modified 09/30/2009
PDF ID: 5374302
Report generated: 07/10/2017 09:23

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 071217T4.1
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82441 ICV Std: STD82498 Post Spike: STD82091
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT39282
CCV: STD82751 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 621311,621086,621461

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T4.071217.093237	WG621500-01	Calibration Point		1		07/12/17 09:32
2	T4.071217.093624	WG621500-02	Calibration Point		1		07/12/17 09:36
3	T4.071217.094012	WG621500-03	Calibration Point		1		07/12/17 09:40
4	T4.071217.094400	WG621500-04	Calibration Point		1		07/12/17 09:44
5	T4.071217.094728	WG621500-05	Calibration Point		1		07/12/17 09:47
6	T4.071217.095057	WG621500-06	Initial Calibration Verification		1		07/12/17 09:50
7	T4.071217.095426	WG621500-07	Initial Calib Blank		1		07/12/17 09:54
8	T4.071217.095813	WG621500-08	Low Level Initial Calibration V		1		07/12/17 09:58
9	T4.071217.100157	WG621500-09	Low Level Initial Calibration V		1		07/12/17 10:01
10	T4.071217.100538	WG621500-10	Interference Check		1		07/12/17 10:05
11	T4.071217.100928	WG621500-11	Interference Check		1		07/12/17 10:09
12	T4.071217.101309	WG621500-12	CCV		1		07/12/17 10:13
13	T4.071217.101637	WG621500-13	CCB		1		07/12/17 10:16
14	T4.071217.102026	WG621173-02	Method/Prep Blank	40/50	1		07/12/17 10:20
15	T4.071217.102412	WG621173-03	Laboratory Control S	40/50	1		07/12/17 10:24
16	T4.071217.102744	WG621057-01	Fluid Blank 1		1		07/12/17 10:27
17	T4.071217.103131	WG621057-02	Fluid Blank 2		1		07/12/17 10:31
18	T4.071217.103517	WG621173-01	Reference Sample		1	L17070183-02	07/12/17 10:35
19	T4.071217.103900	WG621173-04	Matrix Spike	5/50	1	L17070183-02	07/12/17 10:39
20	T4.071217.104230	WG621173-05	Matrix Spike Duplica	5/50	1	L17070183-02	07/12/17 10:42
21	T4.071217.104600	L17070183-04	T7G0356-02	5/50	1		07/12/17 10:46
22	T4.071217.104944	WG621311-01	Post Digestion Spike		1	L17070183-04	07/12/17 10:49
23	T4.071217.105313	WG621311-02	Serial Dilution		5	L17070183-04	07/12/17 10:53
24	T4.071217.105659	WG621500-14	CCV		1		07/12/17 10:56
25	T4.071217.110027	WG621500-15	CCB		1		07/12/17 11:00
26	T4.071217.110416	L17070282-01	LH18/24-SP650-6454-GRAB	40/50	1		07/12/17 11:04
27	T4.071217.110758	L17070300-01	7070331-01	5/50	1		07/12/17 11:07
28	T4.071217.111142	L17070300-02	7070331-02	5/50	1		07/12/17 11:11
29	T4.071217.111528	L17070300-03	7070331-03	5/50	1		07/12/17 11:15
30	T4.071217.111913	L17070309-01	SAMPLE 1	5/50	1		07/12/17 11:19
31	T4.071217.112258	L17070348-01	WEHR LATERAL - FILL SAM	40/50	1		07/12/17 11:22
32	T4.071217.112643	WG621500-16	CCV		1		07/12/17 11:26
33	T4.071217.113011	WG621500-17	CCB		1		07/12/17 11:30
34	T4.071217.113401	WG621500-18	Low Level Continuing Calibra		1		07/12/17 11:34

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Kim K Buck

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 071217T4.1
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82441 ICV Std: STD82498 Post Spike: STD82091
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT39282
CCV: STD82751 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 621311,621086,621461

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T4.071217.113745	WG621500-19	Low Level Continuing Calibra		1		07/12/17 11:37
36	T4.071217.114126	L17070364-01	39121-01-50086.000-SP1	40/50	1		07/12/17 11:41
37	T4.071217.114508	L17070364-02	39121-01-50086.000-SP1	40/50	1		07/12/17 11:45
38	T4.071217.114851	L17070364-03	39121-01-50086.000-PD1	40/50	1		07/12/17 11:48
39	T4.071217.115235	L17070364-04	39121-01-50086.000-PD1	40/50	1		07/12/17 11:52
40	T4.071217.115618	L17070396-03	TW-65S	40/50	1		07/12/17 11:56
41	T4.071217.120003	L17070396-04	TW-65S	40/50	1		07/12/17 12:00
42	T4.071217.120346	L17070396-05	SL-24	40/50	1		07/12/17 12:03
43	T4.071217.120729	L17070396-06	SL-24	40/50	1		07/12/17 12:07
44	T4.071217.121113	L17070396-07	EQ RINSE	40/50	1		07/12/17 12:11
45	T4.071217.121501	WG621500-20	CCV		1		07/12/17 12:15
46	T4.071217.121830	WG621500-21	CCB		1		07/12/17 12:18
47	T4.071217.122217	WG620984-02	Method/Prep Blank	40/50	1		07/12/17 12:22
48	T4.071217.122605	WG620984-03	Laboratory Control S	40/50	1		07/12/17 12:26
49	T4.071217.122935	WG620984-01	Reference Sample		1	L17070334-02	07/12/17 12:29
50	T4.071217.123320	WG620984-04	Matrix Spike	40/50	1	L17070334-02	07/12/17 12:33
51	T4.071217.123649	WG620984-05	Matrix Spike Duplica	40/50	1	L17070334-02	07/12/17 12:36
52	T4.071217.124019	L17070255-01	T1360	40/50	1		07/12/17 12:40
53	T4.071217.124401	L17070255-02	T1362	40/50	1		07/12/17 12:44
54	T4.071217.124744	L17070255-03	T1363	40/50	1		07/12/17 12:47
55	T4.071217.125135	WG621086-01	Post Digestion Spike		1	L17070255-03	07/12/17 12:51
56	T4.071217.125514	WG621086-02	Serial Dilution		5	L17070255-03	07/12/17 12:55
57	T4.071217.125903	WG621500-22	CCV		1		07/12/17 12:59
58	T4.071217.130231	WG621500-23	CCB		1		07/12/17 13:02
59	T4.071217.130618	WG621086-02	Serial Dilution		25	L17070255-03	07/12/17 13:06
60	T4.071217.131005	L17070255-04	T1365	40/50	1		07/12/17 13:10
61	T4.071217.131357	L17070273-01	39121-01-21022.000-SP1	40/50	1		07/12/17 13:13
62	T4.071217.131741	L17070273-02	39121-01-21022.000-SP1	40/50	1		07/12/17 13:17
63	T4.071217.132123	L17070280-01	LH18/24-SP140-7454-GRAB	40/50	1		07/12/17 13:21
64	T4.071217.132503	L17070329-01	39121-01-21042-000-SP2	40/50	1		07/12/17 13:25
65	T4.071217.132847	L17070329-02	39121-01-21042-000-SP2	40/50	1		07/12/17 13:28
66	T4.071217.133230	L17070330-01	39121-01-50058.000-SP1	40/50	1		07/12/17 13:32
67	T4.071217.133614	L17070330-02	39121-01-50058.000-SP1	40/50	1		07/12/17 13:36
68	T4.071217.133957	L17070331-01	39121-01-21022.000-SP2	40/50	1		07/12/17 13:39

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Kristi K Buck

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 071217T4.1
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82441 ICV Std: STD82498 Post Spike: STD82091
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT39282
CCV: STD82751 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 621311,621086,621461

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	T4.071217.134341	WG621500-24	CCV		1		07/12/17 13:43
70	T4.071217.134709	WG621500-25	CCB		1		07/12/17 13:47
71	T4.071217.135057	L17070331-02	39121-01-21022.000-SP2	40/50	1		07/12/17 13:50
72	T4.071217.135440	L17070332-01	39121-01-21042.000-SP1	40/50	1		07/12/17 13:54
73	T4.071217.135823	L17070332-02	39121-01-21042.000-SP1	40/50	1		07/12/17 13:58
74	T4.071217.140206	L17070333-01	1805-107-B S1	40/50	1		07/12/17 14:02
75	T4.071217.140549	L17070333-02	1805-107-B S3	40/50	1		07/12/17 14:05
76	T4.071217.140933	L17070333-03	1805-107-B P1	40/50	1		07/12/17 14:09
77	T4.071217.141318	L17070334-01	1805-129-C W1	40/50	1		07/12/17 14:13
78	T4.071217.141703	WG621500-26	CCV		1		07/12/17 14:17
79	T4.071217.142030	WG621500-27	CCB		1		07/12/17 14:20
80	T4.071217.142418	WG621500-28	Low Level Continuing Calibra		1		07/12/17 14:24
81	T4.071217.142803	WG621500-29	Low Level Continuing Calibra		1		07/12/17 14:28
82	T4.071217.143143	WG621421-02	Method/Prep Blank	40/50	1		07/12/17 14:31
83	T4.071217.143529	WG621421-03	Laboratory Control S	40/50	1		07/12/17 14:35
84	T4.071217.143859	WG621208-01	Fluid Blank 1		1		07/12/17 14:38
85	T4.071217.144246	WG621208-02	Fluid Blank 2		1		07/12/17 14:42
86	T4.071217.144632	L17070405-01	500786-DS-001		1	WG621421-01	07/12/17 14:46
87	T4.071217.145018	WG621421-04	Matrix Spike	5/50	1	L17070405-01	07/12/17 14:50
88	T4.071217.145347	WG621421-05	Matrix Spike Duplica	5/50	1	L17070405-01	07/12/17 14:53
89	T4.071217.145716	L17070373-01	J7G0486-03	5/50	1		07/12/17 14:57
90	T4.071217.150059	WG621461-01	Post Digestion Spike		1	L17070373-01	07/12/17 15:00
91	T4.071217.150428	WG621461-02	Serial Dilution		5	L17070373-01	07/12/17 15:04
92	T4.071217.150816	WG621500-30	CCV		1		07/12/17 15:08
93	T4.071217.151144	WG621500-31	CCB		1		07/12/17 15:11
94	T4.071217.151531	L17070376-01	J7G0484-03	5/50	1		07/12/17 15:15
95	T4.071217.151915	L17070380-01	J7G0485-03	5/50	1		07/12/17 15:19
96	T4.071217.152259	L17070400-01	2212-118 S2	40/50	1		07/12/17 15:22
97	T4.071217.152643	L17070400-02	2212-118 S1	40/50	1		07/12/17 15:26
98	T4.071217.153027	L17070400-03	2212-118 S4	40/50	1		07/12/17 15:30
99	T4.071217.153412	L17070400-04	2212-118 S5	40/50	1		07/12/17 15:34
100	T4.071217.153755	L17070400-05	2212-118 W2	40/50	1		07/12/17 15:37
101	T4.071217.154139	L17070400-06	2212-118 W1	40/50	1		07/12/17 15:41
102	T4.071217.154522	L17070404-01	ALAN 10 BAGS	5/50	1		07/12/17 15:45

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Kim K Buck

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 071217T4.1
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82441 ICV Std: STD82498 Post Spike: STD82091
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT39282
CCV: STD82751 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 621311,621086,621461

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
103	T4.071217.154906	L17070405-02	500786-DS-002	5/50	1		07/12/17 15:49
104	T4.071217.155252	WG621500-32	CCV		1		07/12/17 15:52
105	T4.071217.155620	WG621500-33	CCB		1		07/12/17 15:56
106	T4.071217.160008	L17070405-03	500786-DS-003	5/50	1		07/12/17 16:00
107	T4.071217.160353	L17070427-01	40123-B01-WQ-W0002	40/50	1		07/12/17 16:03
108	T4.071217.160740	L17070427-02	41834-B01-WQ-W0002	40/50	1		07/12/17 16:07
109	T4.071217.161127	L17070427-03	52107-B02-WQ-W0006	40/50	1		07/12/17 16:11
110	T4.071217.161513	L17070427-04	52107-R01-WQ-W0032	40/50	1		07/12/17 16:15
111	T4.071217.161901	L17070427-05	53603-D04-WQ-W0052	40/50	1		07/12/17 16:19
112	T4.071217.162248	WG621500-34	CCV		1		07/12/17 16:22
113	T4.071217.162617	WG621500-35	CCB		1		07/12/17 16:26
114	T4.071217.163004	WG621500-36	Low Level Continuing Calibra		1		07/12/17 16:30
115	T4.071217.163348	WG621500-37	Low Level Continuing Calibra		1		07/12/17 16:33

 Approved: July 13, 2017

Kristi K Buck

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 12-JUL-2017
Analyst: JYH
Analyst: NA
Method: 6010B/6010C/200.7
Instrument: ICP-THERMO4
Curve Workgroup: 621500
Runlog ID: 83315
Analytical Workgroups: 621311,621086,621461

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	282,396,280,373,380,405,427
Client Forms	X
Level X	
Level 3	
Level 4	282,396,280,427
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	KKB
Comments	

Primary Reviewer:
13-JUL-2017

Secondary Reviewer:
13-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-13-2017 11:36:46

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C AAB#: WG621086

Login Number: L17070280

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
LH18/24-SP140-7454-GRAB	01	07/06/17					07/10/2017	3.7	180		07/12/17	5.9	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5381207
Report generated 07/13/2017 07:54

METHOD BLANK SUMMARY

Login Number:	L17070280	**Work Group:**	WG621086
Blank File ID:	T4.071217.122217	**Blank Sample ID:**	WG620984-02
Prep Date:	07/10/17 08:22	**Instrument ID:**	ICP-THERMO4
Analyzed Date:	07/12/17 12:22	**Method:**	6010C
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG620984-03	T4.071217.122605	07/12/17 12:26	01
LH18/24-SP140-7454-GRAB	L17070280-01	T4.071217.132123	07/12/17 13:21	01

Report Name: BLANK_SUMMARY
PDF File ID: 5381208
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070280 Prep Date: 07/10/17 08:22 Sample ID: WG620984-02
Instrument ID: ICP-THERMO4 Run Date: 07/12/17 12:22 Prep Method: 3015A
File ID: T4.071217.122217 Analyst: JYH Method: 6010C
Workgroup (AAB#): WG621086 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-TH-12-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Selenium, Total	0.0100	0.0200	0.0100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5381209
13-JUL-2017 07:54

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070280 **Run Date:** 07/12/2017 **Sample ID:** WG620984-03
Instrument ID: ICP-THERMO4 **Run Time:** 12:26 **Prep Method:** 3015A
File ID: T4.071217.122605 **Analyst:** JYH **Method:** 6010C
Workgroup (AAB#): WG621086 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD82522 **Cal ID:** ICP-TH-12-JUL-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Selenium, Total	0.250	0.237	94.9	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5381210
Report generated: 07/13/2017 07:54

Loginnum:L17070280 Cal ID:ICP-THERMO4- Worknum:WG621086
Instrument ID:ICP-THERMO4 Contract #: Method:6010C
Parent ID:WG620984-01 File ID:T4.071217.122935 Dil:1 Matrix:WATER
Sample ID:WG620984-04 MS File ID:T4.071217.123320 Dil:1 Units:mg/L
Sample ID:WG620984-05 MSD File ID:T4.071217.123649 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Selenium, Total	ND	0.250	0.240	96.1	0.250	0.233	93.1	3.14	80 - 120	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: 5381211
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17070280 **Worknum:** WG621086
Instrument: ICP-THERMO4 **Method:** 6010C
Serial Dil: WG621086-02 **File ID:** T4.071217.125514 **Dil:** 5 **Units:** ug/L
Sample: L17070255-03 **File ID:** T4.071217.124744 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Selenium	ND	U	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 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: 5381205
07/13/2017 08:07

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17070280 **Worknum:** WG621086
Instrument ID: ICP-THERMO4 **Method:** 6010C
Post Spike ID: WG621086-01 **File ID:** T4.071217.125135 **Dil:** 1 **Units:** ug/L
Sample ID: L17070255-03 **File ID:** T4.071217.124744 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
SELENIUM	194		0	U	200	96.8	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: 5381206
Report generated: 07/13/2017 08:07

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17070280**	Workgroup (AAB#):	**WG621086**
Analytical Method:	**6010C**	Instrument ID:	**ICP-THERMO4**
ICAL Worknum:	**WG621500**	Initial Calibration Date:	**12-JUL-2017 09:47**

	WG621500-01		WG621500-02		WG621500-03		WG621500-04		WG621500-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
SELENIUM	0	0.0000400	NA	NA	.008	0.0000900	.4	0.00646	.8	0.0130	.999204	

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: 5381214
Report generated: 13-JUL-2017 07:54

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-07
Instrument ID: ICP-THERMO4 Run Time: 09:54 Method: 6010C
File ID: T4.071217.095426 Analyst: JYH Units: mg/L
Workgroup (AAB#): WG621086 Cal ID: ICP-THERI - 12-JUL-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SELENIUM	.008	.016	.008	U

U = Result is less than 2 x MDL
F = Result is between MDL and 2 x MDL
* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 5381216
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070280 | Run Date: 07/12/2017 | Sample ID: WG621500-13
Instrument ID: ICP-THERMO4 | Run Time: 10:16 | Method: 6010C
File ID: T4.071217.101637 | Analyst: JYH | Units: mg/L
Workgroup (AAB#): WG621086 | Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	0.00800	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: 5381219
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070280	Run Date:	07/12/2017	Sample ID:	WG621500-21
Instrument ID:	ICP-THERMO4	Run Time:	12:18	Method:	6010C
File ID:	T4.071217.121830	Analyst:	JYH	Units:	mg/L
Workgroup (AAB#):	WG621086	Cal ID:	ICP-TH - 12-JUL-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	0.00800	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: 5381219
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070280	Run Date:	07/12/2017	Sample ID:	WG621500-23
Instrument ID:	ICP-THERMO4	Run Time:	13:02	Method:	6010C
File ID:	T4.071217.130231	Analyst:	JYH	Units:	mg/L
Workgroup (AAB#):	WG621086	Cal ID:	ICP-TH - 12-JUL-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	0.00800	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: 5381219
Report generated 07/13/2017 07:54

Login Number: L17070280 | Run Date: 07/12/2017 | Sample ID: WG621500-25
Instrument ID: ICP-THERMO4 | Run Time: 13:47 | Method: 6010C
File ID: T4.071217.134709 | Analyst: JYH | Units: mg/L
Workgroup (AAB#): WG621086 | Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	0.00800	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: 5381219
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-06
Instrument ID: ICP-THERMO4 Run Time: 09:50 Method: 6010C
File ID: T4.071217.095057 Analyst: JYH Units: mg/L
Workgroup (AAB#): WG621086 Cal ID: ICP-TH - 12-JUL-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Selenium		.4	0.413	103	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5381215
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-12
Instrument ID: ICP-THERMO4 Run Time: 10:13 Method: 6010C
File ID: T4.071217.101309 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621086 Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.404	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5381218
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-20

Instrument ID: ICP-THERMO4 Run Time: 12:15 Method: 6010C

File ID: T4.071217.121501 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621086 Cal ID: ICP-TH - 12-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.401	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5381218

Report generated 07/13/2017 07:54

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-22

Instrument ID: ICP-THERMO4 Run Time: 12:59 Method: 6010C

File ID: T4.071217.125903 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621086 Cal ID: ICP-TH - 12-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.402	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5381218

Report generated 07/13/2017 07:54

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-24

Instrument ID: ICP-THERMO4 Run Time: 13:43 Method: 6010C

File ID: T4.071217.134341 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621086 Cal ID: ICP-TH - 12-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.401	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5381218

Report generated 07/13/2017 07:54

Microbac Laboratories Inc.

LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-08

Instrument ID: ICP-THERMO4 Run Time: 09:58 Method: 6010C

File ID: T4.071217.095813 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621086 Cal ID: ICP-TH - 12-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0145	mg/L	90.3	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010

PDF File ID: 5381235

Report generated 07/13/2017 07:54

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-18
Instrument ID: ICP-THERMO4 Run Time: 11:34 Method: 6010C
File ID: T4.071217.113401 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621086 Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0138	mg/L	86.3	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5381235
Report generated 07/13/2017 07:54

Login Number: L17070280 Run Date: 07/12/2017 Sample ID: WG621500-28
Instrument ID: ICP-THERMO4 Run Time: 14:24 Method: 6010C
File ID: T4.071217.142418 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621086 Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0137	mg/L	85.3	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5381235
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17070280 **Workgroup (AAB#):** WG621086
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG621500-10 **File ID:** T4.071217.100538 **Units:** mg/L
Sol. AB : WG621500-11 **File ID:** T4.071217.100928 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Selenium	NS	-0.00602	NS	0.250	0.242	96.8	

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: 5381217
Report generated 07/13/2017 07:54

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070280 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5381213
Report generated: 07/13/2017 07:54

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070280 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5381213
Report generated: 07/13/2017 07:54

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070280 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5381213
Report generated: 07/13/2017 07:54

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070280 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5381213
Report generated: 07/13/2017 07:54

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070280 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5381213
Report generated: 07/13/2017 07:54

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070280 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5381213
Report generated: 07/13/2017 07:54

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070280 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5381213
Report generated: 07/13/2017 07:54

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17070280 **Date:** 04/05/2017
Insturment ID: ICP-THERMO4 **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	4.5
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: 5381212
Report generated: 07/13/2017 07:54

2.2 Metals Data

2.2.2 Metals ICP-MS Data

2.2.2.1 Summary Data

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070280-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP140-7454-GRAB	**Prep Method:**	3015A	**Prep Date:**	07/10/2017 09:27
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	07/10/2017 11:08
Workgroup #:	WG621040	**Analyst:**	JYH	**Run Date:**	07/10/2017 13:04
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	NI.071017.130443
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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:	**Example:**
Cs = Concentration computed by the data system (ug/L)	0.1
Vf = Final volume	100
Vi = Initial volume	40
D = Dilution factor as a multiplier (10X = 10)	1
Cx = Concentration of element in (ug/L)	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:	**Example:**
Cs = Concentration computed by the data system (ug/L)	0.1
Vf = Final volume	200
Vi = Initial volume	0.5
D = Dilution factor as a multiplier (10X = 10)	1
Cx = Concentration of element in (ug/kg)	40

4.0 Adjusting the concentration to dry weight:

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

Where:	**Example:**
Cx = Concentration calculated as received (wet basis)	40
Px = Percent solids of sample (%wt)	80
$Cdry$ = Concentration calculated as dry weight (ug/kg)	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: WG620989
Analyst: VC
Spike Analyst: VC
Run Date: 07/10/2017 09:12
Method: 3015A
Balance: BAL016
Instrument: MW-3
Instrument Start: 07/10/2017 09:27

SOP: ME407 Revison 19
Spike Solution: STD80296
Spike Witness: ERP
40 & 50 ML. DIGESTION TU: COA19764
HNO3 Lot #: COA19798
ICP FILTERS LOT#R6sa4256: RGT40011
ICP-MS Water MDL SOLUT: STD82808

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG620989-02	BLANK	1	20 mL	50 mL	183.197 g	183.182 g		
2	WG620989-03	LCS	1	20 mL	50 mL	185.155 g	185.143 g	.25 mL	
3	L17070001-01	ML01	1	20 mL	50 mL	183.98 g	183.971 g	5 mL	07/17/17
4	L17070003-01	ML01	1	20 mL	50 mL	184.74 g	184.745 g	10 mL	07/17/17
5	L17070280-01	SAMP	1	20 mL	50 mL	186.123 g	186.108 g		07/18/17
6	L17070282-01	SAMP	1	20 mL	50 mL	184.906 g	184.893 g		07/18/17
7	L17070311-01	SAMP	1	20 mL	50 mL	185.185 g	185.174 g		07/18/17
8	L17070311-02	SAMP	1	20 mL	50 mL	185.161 g	185.147 g		07/18/17
9	L17070311-03	SAMP	1	20 mL	50 mL	181.832 g	181.814 g		07/18/17
10	L17070311-04	SAMP	1	20 mL	50 mL	184.925 g	184.901 g		07/18/17
11	L17070311-05	SAMP	1	20 mL	50 mL	185.548 g	185.552 g		07/18/17
12	L17070311-06	SAMP	1	20 mL	50 mL	182.838 g	182.839 g		07/18/17
13	WG620989-01	REF	1	20 mL	50 mL	186.281 g	186.286 g		
14	L17070311-07	SAMP	1	20 mL	50 mL	186.281 g	186.286 g		07/18/17
15	WG620989-04	MS	1	20 mL	50 mL	185.178 g	185.168 g	.25 mL	
16	WG620989-05	MSD	1	20 mL	50 mL	184.486 g	184.471 g	.25 mL	

L17070311-01	FILTERED DIGESTATE

Analyst: Vicki Collins

Reviewer: Erin Potter

MW_DIG - Modified 09/30/2009
PDF ID: 5374792
Report generated: 07/10/2017 10:15

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 071017A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

Calibration Std: STD82411 ICV Std: STD82815 Post Spike: STD79415
ICSA: STD82813 ICSAB: STD82814 Int. Std: RGT39300
CCV: STD82410 LLCCV: STD82816 Tuning Sol : STD82818
Stannous : Hydroxylamine :

Workgroups: 621026,621040

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.071017.105559	Blank	Blank		1		07/10/17 10:55
2	NI.071017.105904	WG621080-01	Calibration Point		1		07/10/17 10:59
3	NI.071017.110209	WG621080-02	Calibration Point		1		07/10/17 11:02
4	NI.071017.110515	WG621080-03	Calibration Point		1		07/10/17 11:05
5	NI.071017.110821	WG621080-04	Calibration Point		1		07/10/17 11:08
6	NI.071017.111128	WG621080-05	QC Std 1		1		07/10/17 11:11
7	NI.071017.111628	WG621080-06	Initial Calibration Verification		1		07/10/17 11:16
8	NI.071017.111936	WG621080-07	Initial Calib Blank		1		07/10/17 11:19
9	NI.071017.112242	WG621080-08	Low Level Initial Calibration V		1		07/10/17 11:22
10	NI.071017.112549	WG621080-09	Interference Check		1		07/10/17 11:25
11	NI.071017.112854	WG621080-10	Interference Check		1		07/10/17 11:28
12	NI.071017.113201	WG621080-11	CCV		1		07/10/17 11:32
13	NI.071017.113507	WG621080-12	CCB		1		07/10/17 11:35
14	NI.071017.113824	WG620732-02	Method/Prep Blank	20/50	1		07/10/17 11:38
15	NI.071017.114130	WG620732-03	Laboratory Control S	20/50	1		07/10/17 11:41
16	NI.071017.114435	WG620732-04	Filter Blank		1		07/10/17 11:44
17	NI.071017.114741	WG620732-01	Reference Sample		1	L17070056-05	07/10/17 11:47
18	NI.071017.115046	WG620732-05	Matrix Spike	20/50	1	L17070056-05	07/10/17 11:50
19	NI.071017.115352	WG620732-06	Matrix Spike Duplica	20/50	1	L17070056-05	07/10/17 11:53
20	NI.071017.115657	L17070056-01	SS007MWOB06-010	20/50	1		07/10/17 11:56
21	NI.071017.120003	WG621026-01	Post Digestion Spike		1	L17070056-01	07/10/17 12:00
22	NI.071017.120308	WG621026-02	Serial Dilution		5	L17070056-01	07/10/17 12:03
23	NI.071017.120614	WG621026-02	Serial Dilution		25	L17070056-01	07/10/17 12:06
24	NI.071017.120921	WG621080-13	CCV		1		07/10/17 12:09
25	NI.071017.121227	WG621080-14	CCB		1		07/10/17 12:12
26	NI.071017.121533	L17070056-02	SS007MWOB19-010	20/50	1		07/10/17 12:15
27	NI.071017.121839	L17070056-03	SS007MWOB19-010 DUP	20/50	1		07/10/17 12:18
28	NI.071017.122145	L17070056-04	SS007MWN748-010	20/50	1		07/10/17 12:21
29	NI.071017.122452	WG621080-15	CCV		1		07/10/17 12:24
30	NI.071017.122758	WG621080-16	CCB		1		07/10/17 12:27
31	NI.071017.123427	WG620989-02	Method/Prep Blank	20/50	1		07/10/17 12:34
32	NI.071017.123732	WG620989-03	Laboratory Control S	20/50	1		07/10/17 12:37
33	NI.071017.124038	L17070001-01	MDL-1	20/50	1		07/10/17 12:40
34	NI.071017.124342	L17070003-01	LOQ-1	20/50	1		07/10/17 12:43

Page: 1 Approved: July 11, 2017

Kristi K Buck

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 071017A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

Calibration Std: STD82411 ICV Std: STD82815 Post Spike: STD79415
ICSA: STD82813 ICSAB: STD82814 Int. Std: RGT39300
CCV: STD82410 LLCCV: STD82816 Tuning Sol : STD82818
Stannous : Hydroxylamine :

Workgroups: 621026,621040

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	NI.071017.124912	WG620989-01	Reference Sample		1	L17070311-07	07/10/17 12:49
36	NI.071017.125219	WG621080-17	CCV		1		07/10/17 12:52
37	NI.071017.125525	WG621080-18	CCB		1		07/10/17 12:55
38	NI.071017.125831	WG620989-04	Matrix Spike	20/50	1	L17070311-07	07/10/17 12:58
39	NI.071017.130137	WG620989-05	Matrix Spike Duplica	20/50	1	L17070311-07	07/10/17 13:01
40	NI.071017.130443	L17070280-01	LH18/24-SP140-7454-GRAB	20/50	1		07/10/17 13:04
41	NI.071017.130748	L17070282-01	LH18/24-SP650-6454-GRAB	20/50	1		07/10/17 13:07
42	NI.071017.131053	L17070311-01	TW-11D	20/50	1		07/10/17 13:10
43	NI.071017.131359	L17070311-02	TW-11D	20/50	1		07/10/17 13:13
44	NI.071017.131704	WG621040-01	Post Digestion Spike		1	L17070311-02	07/10/17 13:17
45	NI.071017.132010	WG621040-02	Serial Dilution		5	L17070311-02	07/10/17 13:20
46	NI.071017.132315	WG621040-02	Serial Dilution		25	L17070311-02	07/10/17 13:23
47	NI.071017.132622	WG621080-19	CCV		1		07/10/17 13:26
48	NI.071017.132927	WG621080-20	CCB		1		07/10/17 13:29
49	NI.071017.133233	L17070311-03	TW-11S	20/50	1		07/10/17 13:32
50	NI.071017.133538	L17070311-04	TW-16D	20/50	1		07/10/17 13:35
51	NI.071017.133844	L17070311-05	TW-16S	20/50	1		07/10/17 13:38
52	NI.071017.134149	L17070311-06	TW-63D	20/50	1		07/10/17 13:41
53	NI.071017.134456	WG621080-21	CCV		1		07/10/17 13:44
54	NI.071017.134802	WG621080-22	CCB		1		07/10/17 13:48
55	NI.071017.135109	WG621080-23	Low Level Continuing Calibra		1		07/10/17 13:51
56	NI.071017.141035	WG621080-24	CCV		1		07/10/17 14:10
57	NI.071017.141344	WG621080-25	CCB		1		07/10/17 14:13
58	NI.071017.141651	WG620989-02	Method/Prep Blank	20/50	1		07/10/17 14:16
59	NI.071017.141957	WG620989-03	Laboratory Control S	20/50	1		07/10/17 14:19
60	NI.071017.142302	L17070001-01	MDL-1	20/50	1		07/10/17 14:23
61	NI.071017.142607	L17070003-01	LOQ-1	20/50	1		07/10/17 14:26
62	NI.071017.142915	WG621080-26	CCV		1		07/10/17 14:29
63	NI.071017.143220	WG621080-27	CCB		1		07/10/17 14:32

Page: 2 Approved: July 11, 2017

Kristi K Buck

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 10-JUL-2017
Analyst: JYH
Analyst: NA
Method: 6020/6020A/200.8
Instrument: ICP-MS
Curve Workgroup: 621080
Runlog ID: 83254
Analytical Workgroups: 621026,621040

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	056,001,003,280,282,311
Client Forms	X
Level X	
Level 3	
Level 4	056,001,003,280,282,311
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	KKB
Comments	

Primary Reviewer:
10-JUL-2017

Secondary Reviewer:
11-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-11-2017 14:42:47

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6020A AAB#: WG621040

Login Number: L17070280

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
LH18/24-SP140-7454-GRAB	01	07/06/17					07/10/2017	3.8	180		07/10/17	3.9	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5375848
Report generated 07/10/2017 14:01

METHOD BLANK SUMMARY

Login Number:	L17070280	Work Group:	WG621040
Blank File ID:	NI.071017.123427	Blank Sample ID:	WG620989-02
Prep Date:	07/10/17 09:12	Instrument ID:	ICP-MS2
Analyzed Date:	07/10/17 12:34	Method:	6020A
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG620989-03	NI.071017.123732	07/10/17 12:37	01
LH18/24-SP140-7454-GRAB	L17070280-01	NI.071017.130443	07/10/17 13:04	01
LCS	WG620989-03	NI.071017.141957	07/10/17 14:19	02

Report Name: BLANK_SUMMARY
PDF File ID: 5375849
Report generated 07/10/2017 15:02

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070280 Prep Date: 07/10/17 09:12 Sample ID: WG620989-02
Instrument ID: ICP-MS2 Run Date: 07/10/17 12:34 Prep Method: 3015A
File ID: NI.071017.123427 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG621040 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-MS-10-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Silver, Total	0.000500	0.00200	0.000500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5375850
10-JUL-2017 15:02

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG620989-03
Instrument ID: ICP-MS2 Run Time: 12:37 Prep Method: 3015A
File ID: NI.071017.123732 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG621040 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD80296 Cal ID: ICP-MS-10-JUL-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Silver, Total	0.125	0.113	90.2	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5375851
Report generated: 07/10/2017 15:02

Loginnum:L17070280 Cal ID:ICP-MS2- Worknum:WG621040
Instrument ID:ICP-MS2 Contract #: Method:6020A
Parent ID:WG620989-01 File ID:NI.071017.124912 Dil:1 Matrix:WATER
Sample ID:WG620989-04 MS File ID:NI.071017.125831 Dil:1 Units:mg/L
Sample ID:WG620989-05 MSD File ID:NI.071017.130137 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Silver	ND	0.125	0.107	85.3	0.125	0.105	84.0	1.51	80 - 120	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: 5375852
Report generated 07/10/2017 15:02

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17070280 **Worknum:** WG621040
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG621040-02 **File ID:** NI.071017.132010 **Dil:** 5 **Units:** ug/L
Sample: L17070311-02 **File ID:** NI.071017.131359 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Silver	ND	U	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
PDF File ID: 5375846
07/10/2017 15:02

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17070280 **Worknum:** WG621040
Instrument ID: ICP-MS2 **Method:** 6020A
Post Spike ID: WG621040-01 **File ID:** NI.071017.131704 **Dil:** 1 **Units:** ug/L
Sample ID: L17070311-02 **File ID:** NI.071017.131359 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
SILVER	41.7		0	U	50	83.4	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: 5375847
Report generated: 07/10/2017 15:02

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17070280**	Workgroup (AAB#):	**WG621040**
Analytical Method:	**6020A**	Instrument ID:	**ICP-MS2**
ICAL Worknum:	**WG621080**	Initial Calibration Date:	**10-JUL-2017 11:08**

	WG621080-01		WG621080-02		WG621080-03		WG621080-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
SILVER	0	169	.4	590	50	399000	100	795000	1	

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: 5375855
Report generated: 10-JUL-2017 14:01

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-07
Instrument ID: ICP-MS2 Run Time: 11:19 Method: 6020A
File ID: NI.071017.111936 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG621040 Cal ID: ICP-MS2 - 10-JUL-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SILVER	.2	.8	.2	U

U = Result is less than 2 x MDL

F = Result is between MDL and 2 x MDL

* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 5375857
Report generated 07/10/2017 14:01

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-12
Instrument ID: ICP-MS2 Run Time: 11:35 Method: 6020A
File ID: NI.071017.113507 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Silver	0.200	0.800	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: 5375860
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070280	Run Date:	07/10/2017	Sample ID:	WG621080-16
Instrument ID:	ICP-MS2	Run Time:	12:27	Method:	6020A
File ID:	NI.071017.122758	Analyst:	JYH	Units:	ug/L
Workgroup (AAB#):	WG621040	Cal ID:	ICP-MS - 10-JUL-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Silver	0.200	0.800	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: 5375860
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070280	Run Date:	07/10/2017	Sample ID:	WG621080-18
Instrument ID:	ICP-MS2	Run Time:	12:55	Method:	6020A
File ID:	NI.071017.125525	Analyst:	JYH	Units:	ug/L
Workgroup (AAB#):	WG621040	Cal ID:	ICP-MS - 10-JUL-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Silver	0.200	0.800	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: 5375860
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070280	Run Date:	07/10/2017	Sample ID:	WG621080-20
Instrument ID:	ICP-MS2	Run Time:	13:29	Method:	6020A
File ID:	NI.071017.132927	Analyst:	JYH	Units:	ug/L
Workgroup (AAB#):	WG621040	Cal ID:	ICP-MS - 10-JUL-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Silver	0.200	0.800	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: 5375860
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-06
Instrument ID: ICP-MS2 Run Time: 11:16 Method: 6020A
File ID: NI.071017.111628 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Silver		50	50.9	102	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5375856
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-11

Instrument ID: ICP-MS2 Run Time: 11:32 Method: 6020A

File ID: NI.071017.113201 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.0500	0.0485	mg/L	97.1	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5375859

Report generated 07/10/2017 14:01

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-15
Instrument ID: ICP-MS2 Run Time: 12:24 Method: 6020A
File ID: NI.071017.122452 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.0500	0.0458	mg/L	91.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5375859
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-17

Instrument ID: ICP-MS2 Run Time: 12:52 Method: 6020A

File ID: NI.071017.125219 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.0500	0.0493	mg/L	98.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5375859

Report generated 07/10/2017 14:01

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-19

Instrument ID: ICP-MS2 Run Time: 13:26 Method: 6020A

File ID: NI.071017.132622 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.0500	0.0482	mg/L	96.5	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5375859

Report generated 07/10/2017 14:01

Microbac Laboratories Inc.

LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-08
Instrument ID: ICP-MS2 Run Time: 11:22 Method: 6020A
File ID: NI.071017.112242 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.400	0.370	ug/L	92.4	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5375861
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17070280 Run Date: 07/10/2017 Sample ID: WG621080-23
Instrument ID: ICP-MS2 Run Time: 13:51 Method: 6020A
File ID: NI.071017.135109 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.400	0.344	ug/L	85.9	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5375861
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17070280 **Workgroup (AAB#):** WG621040
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG621080-09 **File ID:** NI.071017.112549 **Units:** ug/L
Sol. AB : WG621080-10 **File ID:** NI.071017.112854 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Silver	NS	-0.00120	NS	100	88.6	88.6	

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: 5375858
Report generated 07/10/2017 14:01

Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L17070280 **Analytical Method:** 6020
Analytical Workgroup: WG621040 **Matrix:** 1
Instrument: ICP-MS2 **Analyst:** JYH
ICAL Date: 10-JUL-2017 10:59

			BISMUTH	GERMANIUM	INDIUM
Sample	Type	Run Date	% Rec	% Rec	% Rec
L17070280-01	SAMP	10-JUL-2017 13:04	88.494	95.847	103.745
L17070311-02	SAMP	10-JUL-2017 13:13	93.35	98.989	113.669
WG620989-02	BLANK	10-JUL-2017 12:34	101.799	100.899	107.688
WG620989-02	BLANK	10-JUL-2017 14:16	102.371	101.025	107.687
WG620989-03	LCS	10-JUL-2017 12:37	102.076	101.173	108.545
WG620989-03	LCS	10-JUL-2017 14:19	99.294	99.31	105.474
WG621040-01	PSPK	10-JUL-2017 13:17	92.85	99.509	114.817
WG621040-02	SERIAL	10-JUL-2017 13:20	92.533	92.627	106.339
WG621080-06	ICV	10-JUL-2017 11:16	98.214	100.646	101.181
WG621080-07	ICB	10-JUL-2017 11:19	100.425	100.068	102.623
WG621080-08	LLICV	10-JUL-2017 11:22	99.576	100.156	101.517
WG621080-09	ICS	10-JUL-2017 11:25	87.585	88.256	93.001
WG621080-10	ICS	10-JUL-2017 11:28	88.811	90.093	95.523
WG621080-11	CCV	10-JUL-2017 11:32	97.715	100.08	104.513
WG621080-12	CCB	10-JUL-2017 11:35	85.225	84.676	92.032
WG621080-15	CCV	10-JUL-2017 12:24	99.593	100.558	111.553
WG621080-16	CCB	10-JUL-2017 12:27	101.634	100.274	110.069
WG621080-17	CCV	10-JUL-2017 12:52	99.076	100.132	108.862
WG621080-18	CCB	10-JUL-2017 12:55	88.945	85.091	94.265
WG621080-19	CCV	10-JUL-2017 13:26	100.802	101.299	112.81
WG621080-20	CCB	10-JUL-2017 13:29	102.432	101.357	112.2
WG621080-23	LLCCV	10-JUL-2017 13:51	100.401	100.292	110.51
WG621080-24	CCV	10-JUL-2017 14:10	101.827	101.818	104.887
WG621080-25	CCB	10-JUL-2017 14:13	81.959	83.295	88.483
WG621080-26	CCV	10-JUL-2017 14:29	98.266	100.295	106.666
WG621080-27	CCB	10-JUL-2017 14:32	100.958	101.028	108.09

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: 5375854
Report generated: 07/10/2017 15:03

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17070280 **Date:** 04/12/2017
Insturment 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: 5375853
Report generated: 07/10/2017 14:01

2.3 General Chemistry Data

2.3.1 Hexavalent Chromium Data

2.3.1.1 Summary Data

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070280-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP140-7454-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	06/05/2017 10:10
Workgroup #:	WG620845	**Analyst:**	SDC	**Run Date:**	07/07/2017 12:20
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	00.1707071220-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Hexavalent	18540-29-9	0.0100	U	0.0200	0.0100	0.00500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.3.1.2 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: 07-JUL-2017
Analyst: SDC
Analyst: NA
Method: CR-6
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG620845

Calibration/Linearity	06/05/17
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	SDC
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
11-JUL-2017

Secondary Reviewer:
12-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-12-2017 11:09:56

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 7196A AAB#: WG620845

Login Number: L17070280

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
LH18/24-SP140-7454-GRAB	01	07/06/17					07/07/2017	.9	1		07/07/17	.9	1	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5379646
Report generated 07/12/2017 09:26

METHOD BLANK SUMMARY

Login Number:	L17070280	**Work Group:**	WG620845
Blank File ID:	00.1707071220-03	**Blank Sample ID:**	WG620845-01
Prep Date:	07/07/17 12:20	**Instrument ID:**	UV-2600
Analyzed Date:	07/07/17 12:20	**Method:**	7196A
Analyst:	SDC		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG620845-02	00.1707071220-04	07/07/17 12:20	
LCS2	WG620845-03	00.1707071220-05	07/07/17 12:20	
LH18/24-SP140-7454-GRAB	L17070280-01	00.1707071220-06	07/07/17 12:20	
DUP	WG620845-06	00.1707071220-08	07/07/17 12:20	

Report Name: BLANK_SUMMARY
PDF File ID: 5379647
Report generated 07/12/2017 09:26

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070280 Prep Date: 07/07/17 12:20 Sample ID: WG620845-01
Instrument ID: UV-2600 Run Date: 07/07/17 12:20 Prep Method: 7196A
File ID: 00.1707071220-03 Analyst: SDC Method: 7196A
Workgroup (AAB#): WG620845 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Chromium, Hexavalent	0.00500	0.0200	0.00500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5379648
12-JUL-2017 09:26

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070280 Analyst: SDC Prep Method: 7196A
Instrument ID: UV-2600 Matrix: Water Method: 7196A
Workgroup (AAB#): WG620845 Units: mg/L
QC Key: DOD4 Lot #: STD81994

Sample ID: WG620845-02 LCS File ID: 00.1707071220-04 Run Date: 07/07/2017 12:20
Sample ID: WG620845-03 LCS2 File ID: 00.1707071220-05 Run Date: 07/07/2017 12:20

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chromium, Hexavalent	0.100	0.0972	97.2	0.100	0.0972	97.2	0.00	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5379649
Report generated: 07/12/2017 09:26

2.3.1.3 Raw Data

Curves

Parameter: CR-6e Low

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: 80872, 82188

Concentration: 50mg/L, 5mg/L

Recipe for preparation of curve standards found in:
SOP: 2184 Revision: 22 Page: 12

Second Source Stock: 81994 (concentration: 2mg/L)

Daily Preparation: 10(2)/200

concentration = =0.1

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
0.2	100	5	540	0.822
0.1	100	5	540	0.432
0.05	100	5	540	0.209
0.02	100	5	540	0.083
0.01	100	5	540	0.041
0.00	100	5	540	0.004
		5	5	
2nd source 0.1	100	5	540	0.423

Analyst: [signature] Date/Time: 6/5/17 @ 1010

DCN#126170

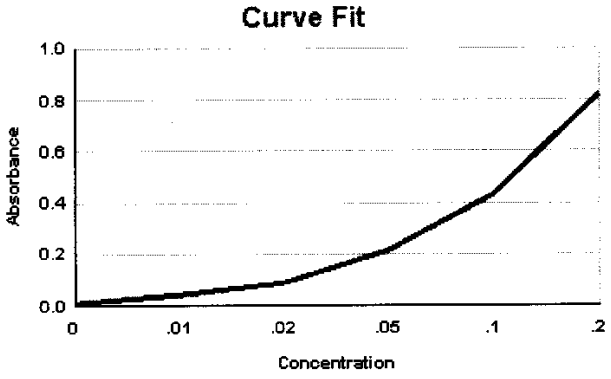
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG616556
Analytical Method:3500CR
Instrument ID:UV-2600

Analyst:ADG
Initial Calibration Date:06/05/2017

Analyte: CHROMIUM, HEXAVALENT
Number of Points: 6
Slope: 4.12523
Y-Intercept: 0.00390207
Coef. Of Correlation (R^2): 0.999348
Coef. Of Correlation (R): 0.999674

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00400	0.00	0.00	0.00390207
0.0100	0.0410	0.000100	0.000410	0.0451544
0.0200	0.0830	0.000400	0.00166	0.0864067
0.0500	0.209	0.00250	0.0105	0.210164
0.100	0.432	0.0100	0.0432	0.416425
0.200	0.822	0.0400	0.164	0.828948



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 06/05/2017 13:03

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG616556
File ID: 00.1706051010-07
CCV ID: WG616556-07
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 06/05/2017
Run Time: 10:10
Analyst: ADG
Cal ID: UV-260 - 05-JUN-17 10:10:06

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.1	0.102	4.23	2.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 06/05/2017 13:03

[redacted]

WORKGROUP: WG620845

CHROMIUM (6)

(cr6)

Standard Methods 3500 Cr-D (18th, 19th), 3500Cr-B(20th) SPEC: UV-26e90

SOP K2186 Rev. # 22 SW846 7196A Curve ID: 6-5-17

SOP OVAP K3500-Cr Rev. #_____ CCV: 82188 LCS: 81994 Spike: 80872 RGT 40510

Matrix: (Liquid) (mg/L) Daily dilution: 1(2)/100 SDC 7-7-17 Daily dilution: 10(2)/200 Daily dilution: 0.2(50)/100 RGT 39581

Soil (mg/Kg) Daily dilution: =0.05 Daily dilution: =0.1 Daily dilution: =0.1 COA 18997

Sample	Volume (mL)	pH adj. to 2 ± 0.5	Dilution	Cell size (cm)	Absorbance @ 540 nm
CCV: mg/L(1 cm)	100				
CCV: mg/L(5 cm)	100	✓		5cm	0.199
Blank/CCB:	100	✓		5cm	0.002
LCS: ppm	100	✓		5cm	0.405
LCSDUP: ppm	100	✓		5cm	0.405
07-280-01	100	✓		5cm	0.011
07-282-01	100	✓		5cm	0.012
	100				
	100				
	100				
	100				
	100				
	100				
	100				
CCV: (1 cm)	100				
CCV: (5 cm)	100				
CCB:	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
DUP: 280-01	100	✓		5cm	0.010
MS: ( ) 282-01	100	✓		5cm	0.420
MSD: ( )	100				
CCV: (1 cm)	100				
CCV: (5 cm)	100	✓		5cm	0.205
CCB:	100	✓		5cm	0.005

Analyst: Evelyn Conley Date / Time: 7-7-17 1220 SDC 7-7-17

SW846 7196 (Dup and/or MS every 10 samples)

SM3500 Cr (Dup and MS/MSD every 20 samples)

DCN#126895

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG620845
Analyte: CHROMIUM, HEXAVALENT

Analyst: SDC
Date: 07/07/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG620845-01	100	100	0.00200	4.125	0.003902	-0.00046108	-0.00046108	1	mg/L
WG620845-02	100	100	0.405	4.125	0.003902	0.097230	0.097230	1	mg/L
WG620845-03	100	100	0.405	4.125	0.003902	0.097230	0.097230	1	mg/L
L17070280-01	100	100	0.0110	4.125	0.003902	0.0017206	ND	1	mg/L
WG620845-04	100	100	0.0110	4.125	0.003902	0.0017206	0.0017206	1	mg/L
WG620845-05	100	100	0.00600	4.125	0.003902	0.00050856	0.00050856	1	mg/L
L17070282-01	100	100	0.00600	4.125	0.003902	0.00050856	ND	1	mg/L
WG620845-06	100	100	0.0100	4.125	0.003902	0.0014782	0.0014782	1	mg/L
WG620845-07	100	100	0.420	4.125	0.003902	0.10087	0.10087	1	mg/L

[redacted]

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 07/11/2017 16:36

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG621377
File ID: 00.1707071220-10
CCV ID: WG621377-03
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 07/07/2017
Run Time: 12:20
Analyst: SDC
Cal ID: UV-260 - 29-JUN-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0487	4.10	2.6	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/11/2017 16:35

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG621377
File ID: 00.1707071220-01
CCV ID: WG621377-01
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 07/07/2017
Run Time: 12:20
Analyst: SDC
Cal ID: UV-260 - 29-JUN-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0473	3.98	5.4	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/11/2017 16:35

[redacted]

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
July 18, 2017

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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	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

Microbac Laboratories Inc.
List of Valid Qualifiers
July 18, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
July 18, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

CHAIN OF CUSTODY

Name Of Lab Shipping To: MICROBAC (740) 373-4071 ATTN: STEPHANIE MOSSBURG

Project: AECOM
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No.
60256135.GWTPT
HRUMAR16

Job:
GROUNDWATER TREATMENT PLANT MONTHLY INFLUENT SAMPLES

Prepared By:
Scott Beesinger

P.O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: SILVER & SELENIUM	Analyses: HEXAVALENT CHROMIUM	Analyses: PERCHLORATE	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP140-7454-Grab	Water	07/06/17 / 15:00		1	X			HNO3	
LH18/24-SP140-7454-Grab	Water	07/06/17 / 15:00		2		X	X	NONE	

Additional Remarks: **STANDARD TURN AROUND TIME**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/06/17	15:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

Microbac OVD
Received: 07/07/2017 09:47
By: BRENDA GREGORY
221000102999

Brenda Gregory

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC®

Cooler ID 2999

COOLER TEMP >6° C LOG

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

7/7/17 CKD

pH Exceptions

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

7/7/17 CKD

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

7/7/17 CKD

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17070280
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 18-JUL-2017

Samplenum	Container ID	Products
L17070280-01	932774	PCT-S 6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	07-JUL-2017 10:58	BRG		
2	ANALYZ	W1	SEM	14-JUL-2017 08:12	JWR	CLS	
3	STORE	SEM	A1	17-JUL-2017 15:35	BRG	JWR	

Samplenum	Container ID	Products
L17070280-01	932775	PCT-S AG-MS SE-AX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	07-JUL-2017 10:58	BRG		
2	PREP	W1	DIG	07-JUL-2017 11:26	AC	CLS	
3	STORE	DIG	A1	10-JUL-2017 11:04	AZH	ERP	
4	ANALYZ*	DIG	METALS	10-JUL-2017 11:17	JYH	AC	

***Sample extract/digestate/leachate**

Samplenum	Container ID	Products
L17070280-01	932776	PCT-S CR-6

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	07-JUL-2017 10:58	BRG		
2	ANALYZ	L1	WET	07-JUL-2017 11:07	SDC	CLS	
3	ANALYZ	W1	A1	11-JUL-2017 08:03	AZH	SDC	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L17070282

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on July 18 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0013528	I	3.0		J4616881971	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)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	Yes

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP650-6454-GRAB	L17070282-01	07/06/2017 15:00	07/07/2017 09:47
TRIP BLANK	L17070282-02	07/06/2017 00:01	07/07/2017 09:47

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

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	8260
Prep Batch Number(s):	621090,621677	**Reviewer Name:**	Sarah Vandenberg
LRC Date:	2017-07-14 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Sarah Vandenberg	Sarah Vandenberg		2017-07-14 17:29:40

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	8260
Prep Batch Number(s):	621090,621677	**Reviewer Name:**	Sarah Vandenberg
LRC Date:	2017-07-14 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?	X				
Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	8260
Prep Batch Number(s):	621090,621677	**Reviewer Name:**	Sarah Vandenberg
LRC Date:	2017-07-14 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	8260
Prep Batch Number(s):	621090,621677	**Reviewer Name:**	Sarah Vandenberg
LRC Date:	2017-07-14 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	8260
Prep Batch Number(s):	621090,621677	**Reviewer Name:**	Sarah Vandenberg
LRC Date:	2017-07-14 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	8260
Prep Batch Number(s):	621090,621677	**Reviewer Name:**	Sarah Vandenberg
LRC Date:	2017-07-14 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG621079	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-07-17 12:46:40

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG621079	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?	X				
Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG621079	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG621079	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG621079	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG621079	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-07-17 19:06:26

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6010
Prep Batch Number(s):	621173	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Kerri Buck	Kerri K Buck		2017-07-18 13:59:22

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6010
Prep Batch Number(s):	621173	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports	X				
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6010
Prep Batch Number(s):	621173	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6010
Prep Batch Number(s):	621173	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?					
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?	X				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6010
Prep Batch Number(s):	621173	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6010
Prep Batch Number(s):	621173	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Kerri Buck	Kerri K Buck		2017-07-18 13:56:18

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports	X				
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?					
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?	X				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	6020
Prep Batch Number(s):	620989	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-07-18 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-13 14:40:02

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

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Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070282
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG620845	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-13 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/12/2017 16:47
Workgroup #:	WG621677	**Analyst:**	TMB	**Run Date:**	07/13/2017 21:27
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	8M420654
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	12.1		10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.679	J	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.472	J	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	98.6	70	120	
4-Bromofluorobenzene	100	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	101	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	3520C	**Prep Date:**	07/11/2017 15:05
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	07/13/2017 11:44
Workgroup #:	WG621590	**Analyst:**	LJH	**Run Date:**	07/13/2017 16:55
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	15M21550
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	17.7	J	2.20	1.10	0.549

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	52.8	20	129	

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	3520C	**Prep Date:**	07/11/2017 15:05
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	07/13/2017 11:44
Workgroup #:	WG621590	**Analyst:**	LJH	**Run Date:**	07/14/2017 13:30
Collect Date:	07/06/2017 15:00	**Dilution:**	2	**File ID:**	15M21565
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	17.7		4.40	2.20	1.10

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	51.9	20	129	

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	6850	**Prep Date:**	07/14/2017 09:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG621748	**Analyst:**	JWR	**Run Date:**	07/14/2017 18:34
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40197
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.01		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	3015A	**Prep Date:**	07/11/2017 09:09
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	07/12/2017 09:47
Workgroup #:	WG621311	**Analyst:**	JYH	**Run Date:**	07/12/2017 11:04
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	T4.071217.110416
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Selenium, Total	7782-49-2	0.0200	U	0.0200	0.0200	0.0100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	3015A	**Prep Date:**	07/10/2017 09:12
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	07/10/2017 11:08
Workgroup #:	WG621040	**Analyst:**	JYH	**Run Date:**	07/10/2017 13:07
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	NI.071017.130748
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Barium, Total	7440-39-3	0.166		0.00600	0.00300	0.00150
Lead, Total	7439-92-1	0.00100	U	0.00200	0.00100	0.000500
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	06/05/2017 10:10
Workgroup #:	WG620845	**Analyst:**	SDC	**Run Date:**	07/07/2017 12:20
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	00.1707071220-07
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Hexavalent	18540-29-9	0.0100	U	0.0200	0.0100	0.00500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	TRIP BLANK	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	06/20/2017 18:14
Workgroup #:	WG621090	**Analyst:**	JDS	**Run Date:**	07/10/2017 22:11
Collect Date:	07/06/2017 00:01	**Dilution:**	1	**File ID:**	11M19722
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	5.00	U	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.500	U	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	98.0	70	120	
4-Bromofluorobenzene	111	75	120	
Dibromofluoromethane	91.4	85	115	
Toluene-d8	102	85	120	

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

2.1 Volatiles Data

2.1.1 Volatiles GCMS Data (8260)

2.1.1.1 Summary Data

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/12/2017 16:47
Workgroup #:	WG621677	**Analyst:**	TMB	**Run Date:**	07/13/2017 21:27
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	8M420654
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	12.1		10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.679	J	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.472	J	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	98.6	70	120	
4-Bromofluorobenzene	100	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	101	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	TRIP BLANK	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	06/20/2017 18:14
Workgroup #:	WG621090	**Analyst:**	JDS	**Run Date:**	07/10/2017 22:11
Collect Date:	07/06/2017 00:01	**Dilution:**	1	**File ID:**	11M19722
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	5.00	U	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.500	U	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	98.0	70	120	
4-Bromofluorobenzene	111	75	120	
Dibromofluoromethane	91.4	85	115	
Toluene-d8	102	85	120	

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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

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

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(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 quantiation 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: HPMS8 Dataset: 041217
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 24/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54128

Internal Standard: STD81235 Surrogate Standard: STD81235
CCV: STD81397 LCS: STD81404 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG609829

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
8M418914	WG609829-01 50ng BFB STD 8260	NA	1	1	STD80989	04/12/17 10:17
8M418915	RINSE	NA	1	1	STD80989	04/12/17 10:42
8M418916	WG609829-02 5ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 11:11
8M418917	WG609829-03 20ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 11:40
8M418918	WG609829-04 50ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 12:10
8M418919	WG609829-05 100ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 12:41
8M418920	WG609829-06 200ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 13:10
8M418921	WG609829-07 300ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 13:40
8M418922	WG609829-08 400ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 14:10
8M418923	WG609829-09 500ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 14:39
8M418924	RINSE	NA	1	1		04/12/17 15:09
8M418925	RINSE	NA	1	1		04/12/17 15:39
8M418926	WG609829-10 100ug/L ALT SRC STD A9/F	NA	1	1	STD81404	04/12/17 16:10
8M418927	WG609948-01 50ug/L CCV STD 8260	NA	1	1	STD81377	04/12/17 16:39
8M418928	RINSE	NA	1	1		04/12/17 17:09

Approved: April 18, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 062017
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0

Maintenance Log ID: 54227

Internal Standard: STD82340 Surrogate Standard: STD82339
CCV: STD82436 LCS: STD82448 MS/MSD: STD82448

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618216 WG618672

Comments: Alt. Src. failed high for DCDFM. All reported samples were ND for DCDFM.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M19156	WG618216-01 BFB 50ng 8260	NA	1	1	STD82467	06/20/17 12:19
11M19157	RINSE	NA	1	1		06/20/17 12:44
11M19158	RINSE	NA	1	1		06/20/17 13:13
11M19159	WG618216-02 0.3 ug/L ICAL 8260	NA	1	1	STD82307	06/20/17 13:42
11M19160	WG618216-03 0.4 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 14:12
11M19161	WG618216-04 1 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 14:47
11M19162	WG618216-05 2 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 15:17
11M19163	WG618216-06 5 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 15:46
11M19164	WG618216-07 20 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 16:16
11M19165	WG618216-08 50 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 16:45
11M19166	WG618216-09 100 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 17:15
11M19167	WG618216-10 200 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 17:44
11M19168	WG618216-11 300 ug/L ICAL 8260	NA	1	1	STD82436	06/20/17 18:14
11M19169	RINSE	NA	1	1		06/20/17 18:43
11M19170	WG618216-12 50 ug/L ICV/ALT 8260	NA	1	1	STD82448	06/20/17 19:12
11M19171	RINSE	NA	1	1		06/20/17 19:41
11M19172	WGXXXXXX-01 100ug/L CCV 826-A9	NA	1	1	STDXXXXX	06/20/17 20:11
11M19173	WG618672-01 BLANK 8260	NA	1	1		06/20/17 20:40
11M19174	L17060898-02 A 826-SPE	<2	1	1		06/20/17 21:09
11M19175	L17060898-09 A REF 2X 826-SPE	NA	1	2		06/20/17 21:38
11M19176	L17060898-01 A 2X 826-SPE	<2	1	2		06/20/17 22:07
11M19177	L17060898-03 A 826-SPE	<2	1	1		06/20/17 22:36
11M19178	WG618672-02 20ug/L LCS 8260	NA	1	1	STD82448	06/20/17 23:05
11M19179	L17060898-10 A MS 2X 826-SPE	NA	1	2	STD82448	06/20/17 23:34
11M19180	L17060898-11 A MSD 2X 826-SPE	NA	1	2	STD82448	06/21/17 00:03
11M19181	50 ICAL PT	NA	1	1		06/21/17 00:32
11M19182	RINSE	NA	1	1		06/21/17 01:02
11M19183	RINSE	NA	1	1		06/21/17 01:31

Comments

Seq.	Rerun	Dil.	Reason	Analytes
15				
File ID: 11M19170				

Approved: June 21, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 062017
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0

Maintenance Log ID: 54227

Internal Standard: STD82340 Surrogate Standard: STD82339
CCV: STD82436 LCS: STD82448 MS/MSD: STD82448

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618216 WG618672

Comments: Alt. Src. failed high for DCDFM. All reported samples were ND for DCDFM.

Comments

Seq.	Rerun	Dil.	Reason	Analytes
WG618216-12 Alt. Src. failed high for DCDFM, iodomethane, 1-BP, and failed low for 1,3-but.				
35	X	1	Analyzed too dilute	
File ID: 11M19175				
L17060898-09 ref				
21	X	1	Analyzed too dilute	
File ID: 11M19176				
L17060898-01				
36	X	1	Analyzed too dilute	
File ID: 11M19179				
L17060898-10 MS				
37	X	1	Analyzed too dilute	
File ID: 11M19180				
L17060898-11 MSD				

Approved: June 21, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 062217
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Method: 624 SOP: MSV10 Rev: 15
Maintenance Log ID:

Internal Standard: STD82340 Surrogate Standard: STD82339
CCV: STD82436 LCS: STD82448 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618911 WG618912

Comments: Alt. Src. failed high for Acrolein. All reported samples requiring Acrolein were ND.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M19216	WG618910-01 BFB 50ng 8260	NA	1	1	STD82467	06/22/17 11:03
11M19217	WG618910-02 50ug/L CCV 8260	NA	1	1	STD82436	06/22/17 11:27
11M19218	WG618910-02 50ug/L CCV 8260	NA	1	1	STD82436	06/22/17 12:03
11M19219	WG618912-01 5ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 12:32
11M19220	WG618912-02 20ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 13:02
11M19221	WG618912-03 50ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 13:31
11M19222	WG618912-04 100ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 14:01
11M19223	WG618912-05 200ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 14:31
11M19224	WG618912-06 300ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 14:59
11M19225	WG618912-07 400ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 15:29
11M19226	WG618912-08 500ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 15:58
11M19227	RINSE	NA	1	1		06/22/17 16:27
11M19228	WG618912-09 100ug/L ICV/ALT 826-A9	NA	1	1	STD82415	06/22/17 16:57
11M19229	WG618911-01 BLANK 8260	NA	1	1		06/22/17 17:27
11M19230	WG618911-02 20ug/L LCS 8260	NA	1	1	STD82448	06/22/17 17:56
11M19231	WG618911-03 20ug/L LCS2 8260	NA	1	1	STD82448	06/22/17 18:26
11M19232	L17061104-01 A 826-BETX	<2	1	1		06/22/17 18:55
11M19233	L17061103-12 A TB 826-SPE	<2	1	1		06/22/17 19:25
11M19234	L17061103-01 A 826-SPE	<2	1	1		06/22/17 19:54
11M19235	L17061103-03 A 826-SPE	<2	1	1		06/22/17 20:23
11M19236	L17061103-05 A 826-SPE	<2	1	1		06/22/17 20:53
11M19237	L17061103-07 A 826-SPE	<2	1	1		06/22/17 21:22
11M19238	L17061103-09 A 826-SPE	<2	1	1		06/22/17 21:51
11M19239	L17061103-11 A 826-SPE	<2	1	1		06/22/17 22:20
11M19240	RINSE	NA	1	1		06/22/17 22:49
11M19241	WG618911-04 BLANK2 624	NA	2	1		06/22/17 23:18
11M19242	L17061150-01 A 624	<2	2	1		06/22/17 23:48
11M19243	L17061154-01 A 624-SPE	7	2	1		06/23/17 00:17
11M19244	L17061152-01 A 624-SPE2	6	2	1		06/23/17 00:46
11M19245	CCV	NA	2	1		06/23/17 01:15
11M19246	RINSE	NA	2	1		06/23/17 01:45
11M19247	RINSE	NA	2	1		06/23/17 02:14

Approved: June 23, 2017
Sarah Vandenberg

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 062217
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Method: 624 SOP: MSV10 Rev: 15
Maintenance Log ID:

Internal Standard: STD82340 Surrogate Standard: STD82339
CCV: STD82436 LCS: STD82448 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618911 WG618912

Comments: Alt. Src. failed high for Acrolein. All reported samples requiring Acrolein were ND.

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2	X		Check Standard Failure	
File ID: 11M19217				
WG618910-02 CCV multiple cmpds. failed low. RR				

Approved: June 23, 2017
Sarah Vandenberg

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 071017
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: STD82340 Surrogate Standard: STD82339
CCV: STD82780 LCS: STD82805 MS/MSD: STD82805

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG621090

Comments: Alt. Src. faileds low for 1,3-But.
The following samples had failing internal responses and will be reanalyzed: 07-0056-04, 07-0051-01, 07-0054-03, 07-0310-04 through 08, and 07-0282-01.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M19707	WG621088-01 50ng BFB STD 8260	NA	1	1	STD82467	07/10/17 14:53
11M19708	WG621088-02 50ug/L CCV STD 8260	NA	1	1	STD82780	07/10/17 15:18
11M19709	WG621088-02 50ug/L CCV STD 8260	NA	1	1	STD82783	07/10/17 15:52
11M19710	WG000000-01 100ug/L A9 CCV STD 8260	NA	1	1	STD82519	07/10/17 16:22
11M19711	WG621090-01 BLANK 8260	NA	1	1		07/10/17 16:51
11M19712	WG621090-02 20ug/L LCS 8260	NA	1	1	STD82805	07/10/17 17:20
11M19713	L17070056-06 B 00 MS 50X 826-SPE	<2	1	50	STD82805	07/10/17 17:49
11M19714	L17070056-07 B 00 MSD 50X 826-SPE	<2	1	50	STD82805	07/10/17 18:18
11M19715	L17070049-01 B D1 10X 826-SPE	<2	1	10		07/10/17 18:47
11M19716	L17070056-02 B A1 826-SPE	<2	1	1		07/10/17 19:16
11M19717	L17070056-05 B REF 00 50X 826-SPE	<2	1	50		07/10/17 19:46
11M19718	L17070056-04 B 00 826-SPE	<2	1	1		07/10/17 20:15
11M19719	L17070054-03 B 00 50X 826-SPE	<2	1	50		07/10/17 20:44
11M19720	L17070054-01 B A1 5X 826-SPE	<2	1	5		07/10/17 21:13
11M19721	RINSE	NA	1	1		07/10/17 21:42
11M19722	L17070282-02 A TB 826-SPE	<2	1	1		07/10/17 22:11
11M19723	L17070310-05 A 826-SPE	<2	1	1		07/10/17 22:41
11M19724	L17070310-06 A 826-SPE	<2	1	1		07/10/17 23:10
11M19725	L17070282-01 A 826-SPE	<2	1	1		07/10/17 23:39
11M19726	L17070310-04 A 826-SPE	<2	1	1		07/11/17 00:08
11M19727	L17070310-07 A 826-SPE	<2	1	1		07/11/17 00:37
11M19728	L17070310-08 A 826-SPE	<2	1	1		07/11/17 01:06
11M19729	L17070274-01 A 250X 826-SPE	<2	1	250		07/11/17 01:35
11M19730	L17070274-02 A 10X 826-SPE	3	1	10		07/11/17 02:04
11M19731	RINSE	NA	2	1		07/11/17 02:33
11M19732	WG621126-01 20ug/L LCS 624	NA	2	1	STD82805	07/11/17 03:02
11M19733	WG621126-02 20ug/L LCS2 624	NA	2	1	STD82805	07/11/17 03:31
11M19734	RINSE	NA	2	1		07/11/17 04:00
11M19735	WG621126-03 BLANK 624	NA	2	1		07/11/17 04:29
11M19736	L17070317-03 B A1 624-SPE	7	2	1		07/11/17 04:59
11M19737	L17070317-07 B A1 624-SPE	6	2	1		07/11/17 05:27
11M19738	L17070317-10 B A1 624-SPE	5	2	1		07/11/17 05:56

Approved: July 12, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 071017
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: STD82340 Surrogate Standard: STD82339
CCV: STD82780 LCS: STD82805 MS/MSD: STD82805

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG621090

Comments: Alt. Src. faileds low for 1,3-But.
The following samples had failing internal responses and will be reanalyzed: 07-0056-04, 07-0051-01, 07-0054-03, 07-0310-04 through 08, and 07-0282-01.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M19739	L17070317-11 B A1 624-SPE	5	2	1		07/11/17 06:26
11M19740	L17070317-01 B D1 10X 624-SPE	6	2	10		07/11/17 06:55
11M19741	L17070317-02 B D1 10X 624-SPE	6	2	10		07/11/17 07:24
11M19742	L17070317-06 B D1 10X 624-SPE	6	2	10		07/11/17 07:53
11M19743	CCV	NA	1	1		07/11/17 08:22
11M19744	RINSE	NA	1	1		07/11/17 08:51

Comments

Seq.	Rerun	Dil.	Reason	Analytes
3			Check Standard Failure	
File ID: 11M19709				
WG621088-02 CCV failed low for diethyl ether.				
23	X	250	Check Standard Failure	
File ID: 11M19729				
L17070274-01 1,2-but. failed low in the alt src and diethyl ether failed low in the CCV. dilutiion based on sample history.				
24	X	250	Check Standard Failure	
File ID: 11M19730				
L17070274-02 1,2-but. failed low in the alt src and diethyl ether failed low in the CCV. diethyl ether took hit above upper limit of ICAL. dilutiion based on sample history.				

Approved: July 12, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS8 Dataset: 071217
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54251

Internal Standard: STD82585 Surrogate Standard: STD82585
CCV: STD82870 LCS: STD82805 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG621442

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
8M420608	BFB CHECK	NA	1	1	STD82467	07/12/17 08:37
8M420609	BFB CHECK	NA	1	1	STD82467	07/12/17 09:10
8M420610	BFB CHECK	NA	1	1	STD82467	07/12/17 09:25
8M420611	WG621442-01 50ng BFB STD 8260	NA	1	1	STD82467	07/12/17 09:40
8M420612	RINSE	NA	1	1		07/12/17 10:11
8M420613	RINSE	NA	1	1		07/12/17 10:40
8M420614	WG621442-01 50ng BFB STD 8260	NA	1	1	STD82467	07/12/17 11:20
8M420615	RINSE	NA	1	1		07/12/17 11:45
8M420616	WG621442-02 0.3ug/L STD 8260	NA	1	1	STD82870	07/12/17 12:15
8M420617	WG621442-03 0.4ug/L STD 8260	NA	1	1	STD82870	07/12/17 12:45
8M420618	WG621442-04 1ug/L STD 8260	NA	1	1	STD82870	07/12/17 13:17
8M420619	WG621442-05 2ug/L STD 8260	NA	1	1	STD82870	07/12/17 13:46
8M420620	WG621442-06 5ug/L STD 8260	NA	1	1	STD82870	07/12/17 14:16
8M420621	WG621442-07 20ug/L STD 8260	NA	1	1	STD82870	07/12/17 14:46
8M420622	WG621442-08 50ug/L STD 8260	NA	1	1	STD82870	07/12/17 15:16
8M420623	WG621442-09 100ug/L STD 8260	NA	1	1	STD82870	07/12/17 15:47
8M420624	WG621442-10 200ug/L STD 8260	NA	1	1	STD82870	07/12/17 16:17
8M420625	WG621442-11 300ug/L STD 8260	NA	1	1	STD82870	07/12/17 16:47
8M420626	RINSE	NA	1	1		07/12/17 17:17
8M420627	RINSE	NA	1	1		07/12/17 17:47
8M420628	WG621442-12 20ug/L ALT SRC STD 8260	NA	1	1	STD82805	07/12/17 18:16
8M420629	CCV CHECK	NA	1	1	STD82870	07/12/17 18:45
8M420630	RINSE	NA	1	1		07/12/17 19:14
8M420631	RINSE	NA	1	1		07/12/17 19:44
8M420632	RINSE	NA	1	1		07/12/17 20:15
8M420633	RINSE	NA	1	1		07/12/17 20:44
8M420634	RINSE	NA	1	1		07/12/17 21:14
8M420635	RINSE	NA	1	1		07/12/17 21:43
8M420636	RINSE	NA	1	1		07/12/17 22:13
8M420637	RINSE	NA	1	1		07/12/17 22:42
8M420638	RINSE	NA	1	1		07/12/17 23:11

Comments

Approved: July 13, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS8 Dataset: 071217
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54251

Internal Standard: STD82585 Surrogate Standard: STD82585
CCV: STD82870 LCS: STD82805 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG621442

Comments:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
21	X			
File ID: 8M420628				
Bromomethane was low in the alt. source. DNR.				

Approved: July 13, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS8 Dataset: 071317
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID:

Internal Standard: STD82585 Surrogate Standard: STD82585
CCV: STD82870 LCS: STD82908 MS/MSD: STD82908

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG621677

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
8M420639	WG621676-01 50ng BFB STD 8260	NA	1	1	STD82467	07/13/17 14:10
8M420640	WG621676-02 50ug/L CCV STD 8260	NA	1	1	STD827870	07/13/17 14:37
8M420641	WG621442-12 20ug/L ALT SRC STD 8260	NA	1	1	STD827908	07/13/17 15:06
8M420642	WG000000-01 100ug/L A9 CCV STD 8260	NA	1	1	STD827519	07/13/17 15:36
8M420643	WG621677-01 0713 BLANK STD 8260	NA	1	1		07/13/17 16:05
8M420644	WG621677-02 20ug/L STD 8260	NA	1	1	STD82908	07/13/17 16:34
8M420645	L17070558-04 A MS 826-SPE1	<2	1	1	STD82908	07/13/17 17:03
8M420646	L17070558-05 A MSD 826-SPE1	<2	1	1	STD82908	07/13/17 17:33
8M420647	L17070547-03 A TB 826-BETX	<2	1	1		07/13/17 18:02
8M420648	L17070548-03 A TB 826-BETX	<2	1	1		07/13/17 18:32
8M420649	L17070558-08 A TB 826-SPE1	<2	1	1		07/13/17 19:00
8M420650	L17070558-09 A AB 826-SPE1	<2	1	1		07/13/17 19:30
8M420651	L17070558-10 A 826-SPE1	<2	1	1		07/13/17 19:58
8M420652	L17070560-02 A TB 826-SPE	<2	1	1		07/13/17 20:28
8M420653	L17070560-01 A 826-SPE	<2	1	1		07/13/17 20:57
8M420654	L17070282-01 B 826-SPE	<2	1	1		07/13/17 21:27
8M420655	L17070558-03 A RS 826-SPE1	<2	1	1		07/13/17 21:56
8M420656	L17070547-01 A 826-BETX	<2	1	1		07/13/17 22:25
8M420657	L17070548-01 A 826-BETX	<2	1	1		07/13/17 22:55
8M420658	L17070558-01 A 826-SPE1	<2	1	1		07/13/17 23:23
8M420659	L17070558-02 A 826-SPE1	<2	1	1		07/13/17 23:53
8M420660	L17070558-06 A 826-SPE1	<2	1	1		07/14/17 00:22
8M420661	L17070558-07 A 826-SPE1	<2	1	1		07/14/17 00:52
8M420662	RINSE	NA	1	1		07/14/17 01:21
8M420663	WG621677-08 0713 BLANK STD 624	NA	2	1		07/14/17 01:50
8M420664	L17070516-02 B TB 624-SPE	5	2	1		07/14/17 02:19
8M420665	L17070516-01 B 624-SPE	6	2	1		07/14/17 02:48
8M420666	L17070514-02 E 624-SPE1	6	2	1		07/14/17 03:18
8M420667	CCV	NA	1	1		07/14/17 03:48
8M420668	RINSE	NA	1	1		07/14/17 04:17

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Approved: July 14, 2017

Page: 1

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS8 Dataset: 071317
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID:

Internal Standard: STD82585 Surrogate Standard: STD82585
CCV: STD82870 LCS: STD82908 MS/MSD: STD82908

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG621677

Comments:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
4				
File ID: 8M420642				
	Not needed, DNR.			

Approved: July 14, 2017

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Microbac Laboratories Inc.

Data Checklist

Date: 12-APR-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 81580
Analytical Workgroups: WG609829

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	X
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
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	TMB
Secondary Reviewer	FJB
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:
17-APR-2017
Tiffany Bailey

Secondary Reviewer:
18-APR-2017

CHECKLIST1 - Modified 03/05/2008
Generated: APR-18-2017 13:13:22

Microbac Laboratories Inc.

Data Checklist

Date: 20-JUN-2017
Analyst: JDS
Analyst: NA
Method: 8260/624
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82893
Analytical Workgroups: WG618216 WG618672

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	NA
Calculations & Correct Factors	X
Dilutions Run	X
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	MES
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:
21-JUN-2017

Secondary Reviewer:
21-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-21-2017 17:54:41

Microbac Laboratories Inc.

Data Checklist

Date: 22-JUN-2017
Analyst: JDS
Analyst: NA
Method: 8260/624
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82939
Analytical Workgroups: WG618911

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	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	JDS
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
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	SAV
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:
23-JUN-2017

Secondary Reviewer:
23-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-23-2017 13:08:29

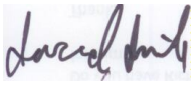
Microbac Laboratories Inc.

Data Checklist

Date: 10-JUL-2017
Analyst: JDS
Analyst: NA
Method: 8260B
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 83306
Analytical Workgroups: WG621090, WG621126

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	X
Reruns	X
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:
12-JUL-2017



Secondary Reviewer:
12-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-12-2017 15:29:51

Microbac Laboratories Inc.

Data Checklist

Date: 12-JUL-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 83334
Analytical Workgroups: WG621442

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	X
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	TMB
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:
13-JUL-2017
Tiffany Bailey

Secondary Reviewer:
13-JUL-2017
Cathy Cater

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-13-2017 14:34:01

Microbac Laboratories Inc.

Data Checklist

Date: 13-JUL-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 83361
Analytical Workgroups: WG621677

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	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
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	TMB
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:
14-JUL-2017

Secondary Reviewer:
14-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-14-2017 13:18:24

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B **AAB#:** WG621090

Login Number: L17070282

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
TRIP BLANK	02	07/06/17					07/10/2017	4.9	14		07/10/17	4.9	14	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5380934
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B **AAB#:** WG621677

Login Number: L17070282

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
LH18/24-SP650-6454-GRAB	01	07/06/17					07/13/2017	7.3	14		07/13/17	7.3	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5380934
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17070282
Instrument Id: HPMS11
Workgroup (AAB#): WG621090

Method: 8260
CAL ID: HPMS11-20-JUN-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17070282-02	1.00	01	98.0	91.4	111	102
WG621090-01	1.00	01	98.4	92.2	111	102
WG621090-02	1.00	01	95.6	92.6	110	101

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	70	-	120
2 - Dibromofluoromethane	85	-	115
3 - 4-Bromofluorobenzene	75	-	120
4 - Toluene-d8	85	-	120

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 5380942
Report generated: 07/14/2017 12:19

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17070282
Instrument Id: HPMS8
Workgroup (AAB#): WG621677

Method: 8260
CAL ID: HPMS8-12-JUL-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17070282-01	1.00	01	98.6	101	100	101
WG621677-01	1.00	01	94.8	101	98.4	101
WG621677-02	1.00	01	95.3	101	97.3	100
WG621677-08	1.00	01	95.7	99.1	101	100

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	70	-	120
2 - Dibromofluoromethane	85	-	115
3 - 4-Bromofluorobenzene	75	-	120
4 - Toluene-d8	85	-	120

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 5380942
Report generated: 07/14/2017 12:19

METHOD BLANK SUMMARY

Login Number:	L17070282	**Work Group:**	WG621090
Blank File ID:	11M19711	**Blank Sample ID:**	WG621090-01
Prep Date:	07/10/17 16:51	**Instrument ID:**	HPMS11
Analyzed Date:	07/10/17 16:51	**Method:**	8260B
Analyst:	JDS		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621090-02	11M19712	07/10/17 17:20	01
TRIP BLANK	L17070282-02	11M19722	07/10/17 22:11	01

Report Name: BLANK_SUMMARY
PDF File ID: 5380935
Report generated 07/14/2017 12:19

METHOD BLANK SUMMARY

Login Number:	L17070282	**Work Group:**	WG621677
Blank File ID:	8M420643	**Blank Sample ID:**	WG621677-01
Prep Date:	07/13/17 16:05	**Instrument ID:**	HPMS8
Analyzed Date:	07/13/17 16:05	**Method:**	8260B
Analyst:	TMB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621677-02	8M420644	07/13/17 16:34	01
LH18/24-SP650-6454-GRAB	L17070282-01	8M420654	07/13/17 21:27	01

Report Name: BLANK_SUMMARY
PDF File ID: 5380935
Report generated 07/14/2017 12:19

Login Number: L17070282 Prep Date: 07/10/17 16:51 Sample ID: WG621090-01
Instrument ID: HPMS11 Run Date: 07/10/17 16:51 Prep Method: 5030B/5030C/503
File ID: 11M19711 Analyst: JDS Method: 8260B
Workgroup (AAB#): WG621090 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS11-20-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	0.500	0.125	1	U
1,1-Dichloroethene	0.500	2.00	0.500	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	0.500	0.125	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chloroform	0.125	0.500	0.125	1	U
Ethylbenzene	0.250	1.00	0.250	1	U
Methylene chloride	0.250	1.00	0.250	1	U
m,p-Xylene	0.500	2.00	0.500	1	U
o-Xylene	0.250	1.00	0.250	1	U
Styrene	0.125	0.500	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Toluene	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	98.4	70 - 120	PASS
4-Bromofluorobenzene	111	75 - 120	PASS
Dibromofluoromethane	92.2	85 - 115	PASS
Toluene-d8	102	85 - 120	PASS

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5380936
14-JUL-2017 12:19

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070282 Prep Date: 07/13/17 16:05 Sample ID: WG621677-01
Instrument ID: HPMS8 Run Date: 07/13/17 16:05 Prep Method: 5030B/5030C/503
File ID: 8M420643 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG621677 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS8-12-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	0.500	0.125	1	U
1,1-Dichloroethene	0.500	2.00	0.500	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	0.500	0.125	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chloroform	0.125	0.500	0.125	1	U
Ethylbenzene	0.250	1.00	0.250	1	U
Methylene chloride	0.250	1.00	0.250	1	U
m,p-Xylene	0.500	2.00	0.500	1	U
o-Xylene	0.250	1.00	0.250	1	U
Styrene	0.125	0.500	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Toluene	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	94.8	70 - 120	PASS
4-Bromofluorobenzene	98.4	75 - 120	PASS
Dibromofluoromethane	101	85 - 115	PASS
Toluene-d8	101	85 - 120	PASS

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5380936
14-JUL-2017 12:19

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070282 Prep Date: 07/14/17 01:50 Sample ID: WG621677-08
Instrument ID: HPMS8 Run Date: 07/14/17 01:50 Prep Method: 5030B/5030C/503
File ID: 8M420663 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG621677 Matrix: Water 2 Units: ug/L
Contract #: Cal ID: HPMS8-12-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	0.500	0.125	1	U
1,1-Dichloroethene	0.500	2.00	0.500	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	0.500	0.125	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chloroform	0.125	0.500	0.125	1	U
Ethylbenzene	0.250	1.00	0.250	1	U
Methylene chloride	0.250	1.00	0.250	1	U
m,p-Xylene	0.500	2.00	0.500	1	U
o-Xylene	0.250	1.00	0.250	1	U
Styrene	0.125	0.500	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Toluene	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U

Surrogates	% Recovery	Surrogate Limits			Qualifier
1,2-Dichloroethane-d4	95.7	70	-	120	PASS
4-Bromofluorobenzene	101	75	-	120	PASS
Dibromofluoromethane	99.1	85	-	115	PASS
Toluene-d8	100	85	-	120	PASS

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5380936
14-JUL-2017 12:19

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621090-02
Instrument ID: HPMS11 Run Time: 17:20 Prep Method: 5030B/5030C/503
File ID: 11M19712 Analyst: JDS Method: 8260B
Workgroup (AAB#): WG621090 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD82805 Cal ID: HPMS11-20-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
1,1,1-Trichloroethane	20.0	22.5	113	65 - 130	
1,1,2-Trichloroethane	20.0	22.0	110	75 - 125	
1,1-Dichloroethane	20.0	21.7	109	70 - 135	
1,1-Dichloroethene	20.0	22.7	113	70 - 130	
1,2-Dichloroethane	20.0	22.0	110	70 - 130	
Acetone	20.0	17.9	89.7	40 - 140	
Benzene	20.0	21.7	108	80 - 120	
Carbon tetrachloride	20.0	21.2	106	65 - 140	
Chloroform	20.0	21.4	107	65 - 135	
Ethylbenzene	20.0	21.4	107	75 - 125	
Methylene chloride	20.0	21.3	106	55 - 140	
m,p-Xylene	40.0	42.3	106	75 - 130	
o-Xylene	20.0	22.2	111	80 - 120	
Styrene	20.0	22.5	112	65 - 135	
Tetrachloroethene	20.0	19.2	96.2	45 - 150	
Trichloroethene	20.0	20.2	101	70 - 125	
Toluene	20.0	21.2	106	75 - 120	
Vinyl chloride	20.0	27.8	139	50 - 145	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	95.6	70 - 120	PASS
4-Bromofluorobenzene	110	75 - 120	PASS
Dibromofluoromethane	92.6	85 - 115	PASS
Toluene-d8	101	85 - 120	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 5380944
Report generated: 07/14/2017 12:19

Login Number: L17070282 Run Date: 07/13/2017 Sample ID: WG621677-02
Instrument ID: HPMS8 Run Time: 16:34 Prep Method: 5030B/5030C/503
File ID: 8M420644 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG621677 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD82908 Cal ID: HPMS8-12-JUL-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
1,1,1-Trichloroethane	20.0	21.2	106	65 - 130	
1,1,2-Trichloroethane	20.0	19.3	96.5	75 - 125	
1,1-Dichloroethane	20.0	19.8	98.9	70 - 135	
1,1-Dichloroethene	20.0	20.3	101	70 - 130	
1,2-Dichloroethane	20.0	20.3	102	70 - 130	
Acetone	20.0	17.5	87.4	40 - 140	
Benzene	20.0	20.5	102	80 - 120	
Carbon tetrachloride	20.0	21.3	106	65 - 140	
Chloroform	20.0	19.9	99.6	65 - 135	
Ethylbenzene	20.0	19.5	97.4	75 - 125	
Methylene chloride	20.0	20.2	101	55 - 140	
m,p-Xylene	40.0	39.4	98.6	75 - 130	
o-Xylene	20.0	19.8	99.1	80 - 120	
Styrene	20.0	20.1	100	65 - 135	
Tetrachloroethene	20.0	19.8	98.8	45 - 150	
Trichloroethene	20.0	20.9	105	70 - 125	
Toluene	20.0	19.6	98.1	75 - 120	
Vinyl chloride	20.0	20.6	103	50 - 145	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	95.3	70 - 120	PASS
4-Bromofluorobenzene	97.3	75 - 120	PASS
Dibromofluoromethane	101	85 - 115	PASS
Toluene-d8	100	85 - 120	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 5380944
Report generated: 07/14/2017 12:19

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5380937
Report generated: 07/12/2017 15:23

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070282
Instrument: HPMS11
Analyst: JDS
Workgroup: WG618216

Tune ID: WG618216-01
Run Date: 06/20/2017
Run Time: 12:19
File ID: 11M19156
Cal ID: HPMS11-20-JUN-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	18.1	11670	PASS
75.0	95.0	30.0	60.0	50.9	32776	PASS
95.0	95.0	100	100	100	64450	PASS
96.0	95.0	5.00	9.00	6.47	4172	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	76.4	49261	PASS
175	174	5.00	9.00	8.39	4131	PASS
176	174	95.0	101	97.6	48077	PASS
177	176	5.00	9.00	7.14	3431	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG618216-02	STD	01	06/20/2017 13:42	
WG618216-03	STD	01	06/20/2017 14:12	
WG618216-04	STD	01	06/20/2017 14:47	
WG618216-05	STD	01	06/20/2017 15:17	
WG618216-06	STD	01	06/20/2017 15:46	
WG618216-07	STD	01	06/20/2017 16:16	
WG618216-08	STD-CCV	01	06/20/2017 16:45	
WG618216-09	STD	01	06/20/2017 17:15	
WG618216-10	STD	01	06/20/2017 17:44	
WG618216-11	STD	01	06/20/2017 18:14	
WG618216-12	SSCV	01	06/20/2017 19:12	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5380939
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070282
Instrument: HPMS11
Analyst: JDS
Workgroup: WG618910

Tune ID: WG618910-01
Run Date: 06/22/2017
Run Time: 11:03
File ID: 11M19216
Cal ID: HPMS11-20-JUN-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	18.6	11528	PASS
75.0	95.0	30.0	60.0	50.7	31472	PASS
95.0	95.0	100	100	100	62029	PASS
96.0	95.0	5.00	9.00	6.75	4187	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	76.9	47690	PASS
175	174	5.00	9.00	7.92	3778	PASS
176	174	95.0	101	96.2	45858	PASS
177	176	5.00	9.00	6.64	3043	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG618912-01	STD	01	06/22/2017 12:32	
WG618912-02	STD	01	06/22/2017 13:02	
WG618912-03	STD	01	06/22/2017 13:31	
WG618912-04	STD-CCV	01	06/22/2017 14:01	
WG618912-05	STD	01	06/22/2017 14:31	
WG618912-06	STD	01	06/22/2017 14:59	
WG618912-07	STD	01	06/22/2017 15:29	
WG618912-08	STD	01	06/22/2017 15:58	
WG618912-09	STD	01	06/22/2017 16:57	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5380939
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070282
Instrument: HPMS11
Analyst: JDS
Workgroup: WG621088

Tune ID: WG621088-01
Run Date: 07/10/2017
Run Time: 14:53
File ID: 11M19707
Cal ID: HPMS11-20-JUN-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	19.8	6384	PASS
75.0	95.0	30.0	60.0	52.2	16806	PASS
95.0	95.0	100	100	100	32213	PASS
96.0	95.0	5.00	9.00	6.70	2157	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	67.2	21638	PASS
175	174	5.00	9.00	5.87	1271	PASS
176	174	95.0	101	95.9	20752	PASS
177	176	5.00	9.00	6.52	1354	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG621088-02	CCV	01	07/10/2017 15:52	
WG621090-01	BLANK	01	07/10/2017 16:51	
WG621090-02	LCS	01	07/10/2017 17:20	
L17070282-02	TRIP BLANK	01	07/10/2017 22:11	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5380939
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070282
Instrument: HPMS8
Analyst: TMB
Workgroup: WG609829

Tune ID: WG609829-01
Run Date: 04/12/2017
Run Time: 10:17
File ID: 8M418914
Cal ID: HPMS8-12-APR-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	15.0	6807	PASS
75.0	95.0	30.0	60.0	45.8	20724	PASS
95.0	95.0	100	100	100	45280	PASS
96.0	95.0	5.00	9.00	6.80	3077	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	94.7	42898	PASS
175	174	5.00	9.00	8.05	3453	PASS
176	174	95.0	101	100	42994	PASS
177	176	5.00	9.00	6.69	2876	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG609829-02	STD	01	04/12/2017 11:11	
WG609829-03	STD	01	04/12/2017 11:40	
WG609829-04	STD	01	04/12/2017 12:10	
WG609829-05	STD-CCV	01	04/12/2017 12:41	
WG609829-06	STD	01	04/12/2017 13:10	
WG609829-07	STD	01	04/12/2017 13:40	
WG609829-08	STD	01	04/12/2017 14:10	
WG609829-09	STD	01	04/12/2017 14:39	
WG609829-10	SSCV	01	04/12/2017 16:10	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5380939
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070282
Instrument: HPMS8
Analyst: TMB
Workgroup: WG621442

Tune ID: WG621442-01
Run Date: 07/12/2017
Run Time: 11:20
File ID: 8M420614
Cal ID: HPMS8-12-JUL-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	19.5	6967	PASS
75.0	95.0	30.0	60.0	48.6	17397	PASS
95.0	95.0	100	100	100	35797	PASS
96.0	95.0	5.00	9.00	6.70	2398	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	73.2	26213	PASS
175	174	5.00	9.00	7.42	1945	PASS
176	174	95.0	101	96.2	25208	PASS
177	176	5.00	9.00	6.78	1710	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG621442-02	STD	01	07/12/2017 12:15	
WG621442-03	STD	01	07/12/2017 12:45	
WG621442-04	STD	01	07/12/2017 13:17	
WG621442-05	STD	01	07/12/2017 13:46	
WG621442-06	STD	01	07/12/2017 14:16	
WG621442-07	STD	01	07/12/2017 14:46	
WG621442-08	STD-CCV	01	07/12/2017 15:16	
WG621442-09	STD	01	07/12/2017 15:47	
WG621442-10	STD	01	07/12/2017 16:17	
WG621442-11	STD	01	07/12/2017 16:47	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5380939
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070282
Instrument: HPMS8
Analyst: TMB
Workgroup: WG621676

Tune ID: WG621676-01
Run Date: 07/13/2017
Run Time: 14:10
File ID: 8M420639
Cal ID: HPMS8-12-JUL-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	19.5	6522	PASS
75.0	95.0	30.0	60.0	49.6	16627	PASS
95.0	95.0	100	100	100	33496	PASS
96.0	95.0	5.00	9.00	7.02	2353	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	75.1	25172	PASS
175	174	5.00	9.00	6.91	1739	PASS
176	174	95.0	101	95.2	23975	PASS
177	176	5.00	9.00	6.98	1674	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG621676-02	CCV	01	07/13/2017 14:37	
WG621442-12	SSCV	01	07/13/2017 15:06	
WG621677-01	BLANK	01	07/13/2017 16:05	
WG621677-02	LCS	01	07/13/2017 16:34	
L17070282-01	LH18/24-SP650-6454-GRAB	01	07/13/2017 21:27	
WG621677-08	BLANK2	01	07/14/2017 01:50	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5380939
Report generated 07/14/2017 12:19

Calibration Table Report
Method: 8260WT.M
Title: 8260B/624 (SOP: OVL MSV01) Water 062017 HPMS11
Last Calibration: Wed Jun 21 09:55:47 2017
Curve:WG618216
Calibration Files

	Compound	0.3 11M19159.D	0.4 11M19160.D	1 11M19161.D	2 11M19162.D	5 11M19163.D	20 11M19164.D	50 11M19165.D	100 11M19166.D	200 11M19167.D	300 11M19168.D	Avg	%RSD	Linear	Quadratic
I	Fluorobenzene	ISTD													
T	Dichlorodifluoromethane			0.305	0.347	0.320	0.400	0.380	0.379	0.327		0.351	10.128		
P	Chloromethane			0.311	0.312	0.287	0.291	0.278	0.267	0.246		0.285	8.300		
C	Vinyl Chloride		0.327	0.312	0.337	0.273	0.287	0.272	0.275	0.241		0.290	11.110		
T	1,3-Butadiene				0.246	0.209	0.195	0.179	0.175			0.201	14.322		
T	Bromomethane			0.215	0.212	0.196	0.189	0.199	0.220	0.212		0.206	5.475		
T	Chloroethane			0.204	0.250	0.239	0.239	0.236	0.240	0.221		0.233	6.546		
T	Trichlorofluoromethane		0.480	0.413	0.442	0.425	0.443	0.427	0.445	0.401		0.435	5.568		
T	Diethyl ether			0.231	0.257	0.256	0.243	0.235	0.236		0.218	0.239	5.783		
T	Isoprene		0.407	0.412	0.439	0.417	0.422	0.431	0.430	0.387		0.418	3.930		
T	Acrolein			0.030	0.038	0.039	0.039	0.037	0.039		0.037	0.037	8.438		
T	1,1,2-Trichloro-1,2,2-Trifluoroet			0.216	0.237	0.217	0.234	0.232	0.244	0.233		0.230	4.520		
T	Acetone				0.097	0.079	0.078	0.073	0.073	0.071	0.067	0.077	12.558		
C	1,1-Dichloroethene		0.414	0.398	0.468	0.448	0.445	0.436	0.447	0.397		0.432	6.010		
T	Tert-Butyl Alcohol			0.021	0.024	0.027	0.027	0.027	0.028		0.029	0.026	10.370		
T	Dimethyl Sulfide		0.309	0.297	0.344	0.323	0.325	0.324	0.311	0.286		0.315	5.779		
T	Iodomethane			0.073	0.099	0.118	0.217	0.250	0.265	0.249		0.181	44.978	0.999	
T	Methyl acetate				0.229	0.225	0.230	0.222	0.220	0.203		0.222	4.423		
T	Methylene Chloride			0.277	0.326	0.309	0.306	0.300	0.298	0.272		0.298	6.259		
T	Carbon Disulfide			0.863	0.927	0.834	0.829	0.789	0.738	0.610		0.799	12.751		
T	Acrylonitrile			0.094	0.099	0.103	0.104	0.107	0.110		0.098	0.102	5.447		
T	Methyl Tert Butyl Ether		0.779	0.774	0.860	0.868	0.853	0.832	0.800	0.700		0.808	7.032		
T	trans-1,2-Dichloroethene		0.285	0.264	0.294	0.278	0.277	0.279	0.281	0.256		0.277	4.257		
T	n-Hexane				0.372	0.350	0.363	0.374	0.368	0.345		0.362	3.261		
T	Diisopropyl ether			1.033	1.056	1.020	0.941	0.883	0.808		0.704	0.921	14.189		
T	Vinyl Acetate				0.547	0.501	0.507	0.511	0.441	0.397		0.484	11.303		
P	1,1-Dichloroethane		0.554	0.547	0.606	0.572	0.576	0.555	0.538	0.467		0.552	7.297		
T	Ethyl-Tert-Butyl ether			0.891	0.948	0.931	0.867	0.821	0.756		0.665	0.840	12.035		
T	2-Butanone				0.131	0.131	0.133	0.125	0.125	0.118	0.117	0.126	5.110		
T	Propionitrile			0.033	0.037	0.038	0.039	0.039	0.040		0.039	0.038	6.558		
T	2,2-Dichloropropane		0.440	0.435	0.470	0.441	0.445	0.423	0.425	0.380		0.432	5.951		
T	cis-1,2-Dichloroethene		0.342	0.293	0.340	0.323	0.323	0.323	0.318	0.289		0.319	6.000		
C	Chloroform	0.621	0.527	0.480	0.554	0.507	0.514	0.505	0.490	0.425		0.513	10.444		
T	1-Bromopropane				0.046	0.052	0.057	0.057	0.059	0.057	0.055	0.055	8.392		
T	Bromochloromethane		0.172	0.170	0.196	0.184	0.188	0.190	0.190	0.176		0.183	5.160		
T	Tetrahydrofuran			0.076	0.086	0.090	0.088	0.087	0.089		0.085	0.086	5.236		
S	Dibromofluoromethane				0.295	0.278	0.297	0.278	0.281	0.268	0.258	0.279	4.913		
T	1,1,1-Trichloroethane		0.425	0.437	0.472	0.456	0.452	0.448	0.456	0.407		0.444	4.636		
T	Cyclohexane		0.527	0.487	0.522	0.495	0.491	0.492	0.487	0.438		0.492	5.446		
T	1,1-Dichloropropene		0.359	0.382	0.409	0.391	0.403	0.396	0.398	0.352		0.386	5.373		
T	Carbon Tetrachloride		0.410	0.333	0.387	0.371	0.392	0.384	0.397	0.361		0.379	6.353		
T	Tert-Amyl-Methyl ether			0.827	0.902	0.885	0.820	0.780	0.713		0.621	0.793	12.456		
S	1,2-Dichloroethane-d4				0.346	0.369	0.357	0.338	0.341	0.320	0.305	0.339	6.389		
T	1,2-Dichloroethane		0.356	0.363	0.438	0.426	0.416	0.407	0.397	0.350		0.394	8.584		
T	Benzene		1.278	1.161	1.268	1.198	1.161	1.074	0.976			1.159	9.192		
T	Trichloroethene		0.324	0.267	0.305	0.307	0.293	0.292	0.302	0.268		0.295	6.656		
T	Methylcyclohexane		0.528	0.502	0.505	0.480	0.489	0.483	0.473	0.426		0.486	6.136		
C	1,2-Dichloropropane		0.352	0.288	0.368	0.340	0.336	0.331	0.327	0.296		0.330	8.141		
T	1,4-Dioxane				0.002	0.002	0.003	0.003	0.003		0.003	0.003	16.632	0.997	
T	Bromodichloromethane		0.396	0.381	0.400	0.385	0.400	0.399	0.394	0.351		0.388	4.293		
T	Dibromomethane		0.157	0.160	0.179	0.182	0.179	0.183	0.182	0.169		0.174	6.100		
T	2-Chloroethyl Vinyl Ether			0.183	0.187	0.190	0.211	0.203	0.203	0.188	0.176	0.193	6.144		
T	4-Methyl-2-Pentanone					0.102	0.108	0.110	0.111	0.107	0.104	0.107	3.173		
T	cis-1,3-Dichloropropene		0.449	0.464	0.504	0.491	0.501	0.497	0.471	0.404		0.472	7.190		
T	Dimethyl Disulfide				0.272	0.265	0.289	0.298	0.295	0.271	0.250	0.277	6.326		

I	Chlorobenzene-d5	ISTD											
S	Toluene-d8				1.669	1.614	1.613	1.451	1.405	1.169		1.487	12.562
C	Toluene		2.055	1.833	1.987	1.809	1.713	1.566	1.398			1.766	13.022
T	Ethyl Methacrylate			0.452	0.512	0.521	0.556	0.546	0.526	0.457	0.434	0.501	9.233
T	trans-1,3-Dichloropropene			0.554	0.597	0.600	0.611	0.613	0.596	0.502		0.582	6.897
T	1,1,2-Trichloroethane		0.346	0.329	0.363	0.353	0.370	0.364	0.362	0.323		0.351	4.914
T	2-Hexanone					0.267	0.279	0.277	0.282	0.254	0.256	0.269	4.428
T	1,3-Dichloropropane		0.663	0.630	0.683	0.665	0.655	0.629	0.603	0.508		0.629	8.801
T	Tetrachloroethene		0.343	0.351	0.320	0.322	0.330	0.331	0.338	0.303		0.330	4.529
T	Dibromochloromethane		0.321	0.382	0.393	0.394	0.416	0.429	0.429	0.383		0.393	8.820
T	1,2-Dibromoethane		0.341	0.308	0.343	0.325	0.336	0.343	0.341	0.305		0.330	4.818
T	1-Chlorohexane		0.604	0.493	0.553	0.529	0.530	0.549	0.532	0.465	0.421	0.519	10.323
P	Chlorobenzene		1.388	1.093	1.224	1.133	1.092	1.024	0.948			1.129	12.677
T	1,1,1,2-Tetrachloroethane		0.416	0.346	0.431	0.407	0.410	0.413	0.412	0.365		0.400	7.218
C	Ethylbenzene			0.593	0.651	0.615	0.600	0.598	0.586	0.494		0.591	8.084
T	m-,p-Xylene		0.788	0.758	0.781	0.752	0.708	0.666	0.603			0.72235	9.3672
T	o-Xylene		0.747	0.715	0.770	0.747	0.736	0.721	0.695	0.578		0.714	8.344
T	Styrene		1.213	1.104	1.270	1.229	1.212	1.154	1.071	0.842		1.137	11.987
P	Bromoform			0.207	0.236	0.244	0.263	0.284	0.298	0.276		0.258	12.134
T	Isopropylbenzene		1.977	1.789	2.041	1.873	1.793	1.625	1.464			1.794	11.097
I	1,4-Dichlorobenzene-d4	ISTD											
P	1,1,2,2-Tetrachloroethane		1.014	0.739	0.903	0.854	0.852	0.823	0.828	0.721		0.842	10.940
S	p-Bromofluorobenzene				1.133	1.168	1.177	1.076	1.104	0.993	0.930	1.083	8.465
T	1,2,3-Trichloropropane			0.193	0.239	0.239	0.251	0.246	0.257	0.234		0.237	8.878
T	trans-1,4-Dichloro-2-Butene			0.148	0.202	0.234	0.237	0.233	0.245	0.235	0.213	0.218	14.591
T	n-Propylbenzene		4.844	4.169	4.689	4.263	4.115	3.510	3.117			4.101	14.923
T	Bromobenzene	0.910	0.891	0.959	0.919	0.961	0.932	0.900	0.891	0.767		0.903	6.356
T	1,3,5-Trimethylbenzene		3.298	2.807	3.200	3.082	2.896	2.600	2.408			2.899	11.108
T	2-Chlorotoluene		3.398	2.951	3.252	3.011	2.833	2.495	2.274			2.888	13.749
T	4-Chlorotoluene		2.877	2.423	2.585	2.443	2.334	2.083	1.921			2.381	13.235
T	a-Methylstyrene					1.530	1.599	1.501	1.442	1.153		1.445	11.961
T	tert-Butylbenzene			0.561	0.662	0.641	0.647	0.614	0.644	0.562		0.619	6.725
T	1,2,4-Trimethylbenzene			2.930	3.305	3.147	3.016	2.650	2.418			2.911	11.232
T	sec-Butylbenzene			3.680	3.969	3.751	3.616	3.161	2.868			3.508	11.707
T	p-Isopropyltoluene			3.047	3.258	3.147	3.094	2.715	2.495			2.960	9.857
T	1,3-Dichlorobenzene		2.055	1.661	1.804	1.728	1.674	1.592	1.543	1.218		1.659	14.321
T	1,4-Dichlorobenzene		2.144	1.747	1.855	1.716	1.682	1.582	1.537			1.752	11.555
T	n-Butylbenzene			2.673	2.829	2.805	2.823	2.585	2.407			2.687	6.261
T	1,2-Dichlorobenzene	2.127	1.960	1.653	1.807	1.735	1.681	1.573	1.515			1.756	11.591
T	1,2-Dibromo-3-Chloropropane				0.149	0.169	0.175	0.183	0.193	0.173		0.174	8.385
T	1,2,4-Trichlorobenzene		1.458	1.091	1.185	1.170	1.201	1.184	1.155	0.959		1.175	11.808
T	Hexachlorobutadiene		0.561	0.442	0.552	0.555	0.567	0.568	0.614	0.552		0.551	8.790
T	Naphthalene		3.212	2.632	3.050	2.964	2.879	2.601	2.307			2.807	11.039
T	1,2,3-Trichlorobenzene	1.367	1.306	1.077	1.177	1.152	1.169	1.150	1.124	0.952		1.164	10.359

Wed Jun 21 11:28:03 2017

Calibration Table Report
Method: A9FOOWT.M
Title: Appendix IX (SOP:OVL MSV01) Water 062217 HPMS11
Last Calibration: Fri Jun 23 09:50:47 2017
Curve: WG618912
Calibration Files

	Compound	5 11M19219.D	20 11M19220.D	50 11M19221.D	100 11M19222.D	200 11M19223.D	300 11M19224.D	400 11M19225.D	500 11M19226.D	Avg	%RSD	Linear	Quadratic
I	Fluorobenzene	ISTD											
T	Acetonitrile	0.036	0.036	0.034	0.036	0.037	0.037	0.035	0.035	0.036	3.083		
T	3-Chloro-1-propene	0.486	0.499	0.493	0.472	0.427	0.395	0.358		0.447	12.268		
T	2-Chloro-1,3-butadiene	0.394	0.417	0.416	0.399	0.375	0.350	0.322	0.294	0.371	12.213		
T	Methacrylonitrile	0.171	0.182	0.179	0.183	0.177	0.170	0.155	0.149	0.171	7.403		
T	Isobutyl Alcohol		0.006	0.006	0.008	0.010	0.011	0.011	0.012	0.009	25.809	0.993	
T	1-Butanol			0.001	0.003	0.004	0.005	0.005	0.005	0.004	42.424	0.996	
T	Cyclohexanone			0.009	0.010	0.011	0.011	0.010	0.010	0.010	6.640		
T	2-Nitropropane			0.074	0.078	0.081	0.080	0.075	0.075	0.077	3.841		
T	Ethyl Acetate	0.239	0.260	0.249	0.254	0.242	0.225	0.203	0.193	0.233	10.353		
T	Methyl methacrylate	0.230	0.251	0.246	0.247	0.236	0.221	0.200	0.188	0.227	10.105		
I	Chlorobenzene-d5	ISTD											
I	1,4-Dichlorobenzene-d4	ISTD											

Fri Jun 23 10:01:47 2017

Calibration Table Report
Method: A9FOOWT.M
Title: A9-FOO Water SOP:MSV01 04-12-17 HPMS8
Last Calibration: Thu Apr 13 16:40:13 2017
Curve: WG609829
Calibration Files

	Compound	5 8M418916.D	20 8M418917.D	50 8M418918.D	100 8M418919.D	200 8M418920.D	300 8M418921.D	400 8M418922.D	500 8M418923.D	Avg	%RSD
I	Fluorobenzene	ISTD									
T	Acetonitrile		0.013	0.012	0.013	0.013	0.012	0.013	0.013	0.013	3.572
T	3-Chloro-1-propene	0.312	0.315	0.327	0.337	0.346	0.341	0.344	0.341	0.333	3.984
T	2-Chloro-1,3-butadiene	0.285	0.299	0.317	0.330	0.340	0.336	0.337	0.336	0.322	6.267
T	Ethyl Acetate	0.099	0.101	0.098	0.101	0.108	0.103	0.106	0.109	0.103	4.045
T	Methacrylonitrile	0.052	0.059	0.057	0.059	0.064	0.061	0.063	0.065	0.060	7.025
T	Isobutyl Alcohol			0.003	0.004	0.004	0.004	0.005	0.005	0.004	12.096
T	1-Butanol									0.000	0.000
T	Methyl methacrylate	0.096	0.101	0.103	0.107	0.116	0.112	0.116	0.121	0.109	7.922
T	2-Nitropropane		0.027	0.028	0.031	0.034	0.034	0.035	0.037	0.032	11.358
I	Chlorobenzene-d5	ISTD									
I	1,4-Dichlorobenzene-d4	ISTD									
T	Cyclohexanone		0.006	0.006	0.007	0.008	0.007	0.008	0.009	0.007	13.841

Mon Apr 17 15:45:45 2017

Calibration Table Report
Method: 8260WT.M
Title: Method 8260B/624 WTR-SOP:OVLMSV01 071217 HPMS8
Last Calibration: Thu Jul 13 12:10:35 2017
Curve: WG621442
Calibration Files

	Compound	0.3 8M420616.D	0.4 8M420617.D	1 8M420618.D	2 8M420619.D	5 8M420620.D	20 8M420621.D	50 8M420622.D	100 8M420623.D	200 8M420624.D	300 8M420625.D	Avg	%RSD	Linear	Quad
I	Fluorobenzene	ISTD													
T	Dichlorodifluoromethane			0.385	0.382	0.388	0.430	0.443	0.426	0.444		0.414	6.778		
P	Chloromethane			0.538	0.507	0.471	0.460	0.466	0.441	0.431		0.473	7.927		
C	Vinyl Chloride		0.371	0.385	0.375	0.358	0.357	0.354	0.332	0.327		0.357	5.613		
T	1,3-Butadiene				0.310	0.265	0.253	0.174	0.139	0.136	0.124	0.200	37.262		1.000
T	Bromomethane			0.209	0.211	0.207	0.204	0.213	0.217	0.242		0.215	5.950		
T	Chloroethane		0.161	0.190	0.186	0.187	0.189	0.195	0.194	0.204		0.188	6.558		
T	Trichlorofluoromethane		0.399	0.480	0.462	0.457	0.454	0.473	0.471	0.499		0.462	6.322		
T	Diethyl ether			0.202	0.195	0.199	0.199	0.202	0.209		0.213	0.203	3.044		
T	Isoprene					0.364	0.383	0.379	0.379	0.393	0.393	0.382	2.853		
T	Acrolein				0.026	0.028	0.028	0.030	0.030		0.031	0.029	6.351		
T	1,1,2-Trichloro-1,2,2-Trifluoroethane			0.232	0.234	0.235	0.232	0.244	0.243	0.256		0.240	3.692		
T	Acetone					0.060	0.054	0.053	0.048	0.052	0.050	0.053	7.922		
C	1,1-Dichloroethene		0.377	0.392	0.379	0.390	0.375	0.387	0.382	0.401		0.385	2.293		
T	Tert-Butyl Alcohol				0.015	0.016	0.016	0.016	0.017		0.018	0.016	6.802		
T	Dimethyl Sulfide					0.272	0.283	0.283	0.284	0.295	0.293	0.285	2.834		
T	Iodomethane			0.270	0.268	0.275	0.298	0.301	0.292	0.297	0.249	0.281	6.573		
T	Methyl acetate					0.142	0.146	0.143	0.146	0.148	0.146	0.145	1.584		
T	Methylene Chloride			0.267	0.274	0.264	0.264	0.272	0.270	0.277		0.270	1.872		
T	Carbon Disulfide			0.941	0.874	0.830	0.856	0.838	0.828	0.836	0.779	0.848	5.485		
T	Acrylonitrile			0.062	0.064	0.067	0.068	0.074	0.076		0.068	0.068	7.172		
T	Methyl Tert Butyl Ether			0.577	0.601	0.618	0.622	0.649	0.639	0.640		0.621	4.080		
T	trans-1,2-Dichloroethene		0.340	0.385	0.379	0.366	0.362	0.370	0.366	0.372		0.368	3.660		
T	n-Hexane					0.347	0.344	0.352	0.347	0.368	0.360	0.353	2.584		
T	Diisopropyl ether			0.935	0.917	0.903	0.888	0.898	0.888		0.846	0.896	3.121		
T	Vinyl Acetate					0.419	0.438	0.408	0.414	0.426	0.415	0.420	2.534		
P	1,1-Dichloroethane		0.458	0.482	0.470	0.465	0.466	0.479	0.471	0.477		0.471	1.723		
T	Ethyl-Tert-Butyl ether			0.831	0.816	0.820	0.816	0.829	0.828		0.796	0.819	1.465		
T	2-Butanone					0.079	0.083	0.082	0.082	0.083	0.083	0.082	2.114		
T	Propionitrile			0.022	0.023	0.023	0.024	0.025	0.025		0.026	0.024	6.135		
T	2,2-Dichloropropane		0.385	0.437	0.430	0.425	0.404	0.417	0.409	0.416		0.415	3.882		
T	cis-1,2-Dichloroethene		0.276	0.303	0.284	0.280	0.287	0.294	0.291	0.296		0.289	3.055		
C	Chloroform	0.548	0.511	0.510	0.480	0.479	0.478	0.486	0.476	0.475		0.494	5.035		
T	1-Bromopropane			0.036	0.044	0.053	0.051	0.052	0.052	0.053	0.053	0.049	12.042		
T	Bromochloromethane		0.139	0.169	0.162	0.169	0.169	0.173	0.172	0.173		0.166	6.800		
T	Tetrahydrofuran			0.047	0.049	0.051	0.051	0.053	0.054		0.053	0.051	4.851		
S	Dibromofluoromethane				0.255	0.264	0.266	0.266	0.266	0.269	0.268	0.265	1.768		
T	1,1,1-Trichloroethane		0.387	0.427	0.428	0.424	0.419	0.434	0.430	0.442		0.424	3.895		
T	Cyclohexane			0.436	0.431	0.430	0.429	0.430	0.426	0.451	0.434	0.433	1.756		
T	1,1-Dichloropropene			0.365	0.356	0.362	0.353	0.364	0.361	0.371		0.362	1.660		
T	Tert-Amyl-Methyl ether			0.683	0.698	0.704	0.702	0.713	0.715		0.689	0.701	1.642		
T	Carbon Tetrachloride		0.336	0.355	0.363	0.371	0.376	0.392	0.389	0.4		0.3729	5.70358		
S	1,2-Dichloroethane-d4				0.266	0.289	0.29	0.287	0.284	0.281	0.281	0.2827	2.90242		
T	Heptane											0	0		
T	1,2-Dichloroethane		0.321	0.337	0.349	0.348	0.346	0.357	0.35	0.351		0.3449	3.1896		
T	Benzene		1.061	1.098	1.043	1.045	1.021	1.048	1.01	0.974		1.0374	3.55109		
T	Trichloroethene		0.249	0.275	0.273	0.273	0.273	0.283	0.278	0.287		0.2738	4.13144		
T	Methylcyclohexane					0.409	0.416	0.414	0.413	0.433	0.428	0.4189	2.24967		
C	1,2-Dichloropropane		0.226	0.268	0.268	0.261	0.262	0.27	0.266	0.274		0.2618	5.75286		
T	Bromodichloromethane		0.326	0.344	0.346	0.351	0.368	0.382	0.378	0.385		0.36	5.92766		
T	1,4-Dioxane					0.002	0.002	0.002	0.002		0.002	0.0018	5.8085		
T	Dibromomethane		0.12	0.152	0.147	0.147	0.153	0.16	0.158	0.16		0.1498	8.62705		
T	2-Chloroethyl Vinyl Ether			0.143	0.128	0.136	0.152	0.149	0.149	0.156	0.155	0.1461	6.681		
T	4-Methyl-2-Pentanone					0.068	0.072	0.073	0.073	0.077	0.077	0.0732	4.81586		
T	cis-1,3-Dichloropropene		0.41	0.422	0.423	0.416	0.426	0.446	0.439	0.446		0.4285	3.20463		

T	Dimethyl Disulfide					0.212	0.247	0.255	0.258	0.27	0.268	0.2518	8.461	
I	Chlorobenzene-d5	ISTD												
S	Toluene-d8				1.209	1.229	1.218	1.223	1.212	1.199	1.203	1.2134	0.870637	
C	Toluene		1.576	1.564	1.512	1.501	1.454	1.475	1.416	1.317		1.4768	5.67274	
T	Ethyl Methacrylate			0.322	0.35	0.352	0.389	0.387	0.389	0.396	0.401	0.3733	7.61268	
T	Paraldehyde											0	0	
T	trans-1,3-Dichloropropene			0.46	0.487	0.48	0.494	0.521	0.516	0.519		0.4966	4.62266	
T	1,1,2-Trichloroethane		0.235	0.271	0.269	0.261	0.269	0.28	0.277	0.281		0.2678	5.51806	
T	2-Hexanone					0.079	0.089	0.091	0.091	0.094	0.096	0.09	6.57886	
T	1,3-Dichloropropane		0.425	0.457	0.466	0.471	0.477	0.489	0.478	0.482		0.4682	4.24144	
T	Tetrachloroethene		0.256	0.307	0.306	0.299	0.289	0.298	0.297	0.313		0.2957	5.98593	
T	Dibromochloromethane		0.286	0.291	0.312	0.315	0.338	0.36	0.366	0.376		0.3306	10.4902	
T	1,2-Dibromoethane		0.26	0.273	0.284	0.282	0.28	0.289	0.288	0.292		0.2811	3.69636	
T	1-Chlorohexane		0.498	0.528	0.502	0.5	0.503	0.501	0.495	0.51	0.511	0.5055	1.96961	
P	Chlorobenzene		0.994	1.032	0.999	0.981	0.98	1.006	1	0.99		0.9977	1.66654	
T	1,1,1,2-Tetrachloroethane		0.315	0.342	0.331	0.346	0.353	0.378	0.385			0.35	7.04542	
C	Ethylbenzene		0.497	0.559	0.545	0.532	0.538	0.56	0.57	0.603		0.5505	5.62169	
T	m-,p-Xylene		0.637	0.698	0.675	0.659	0.654	0.674	0.667	0.636		0.6625	3.10245	
T	o-Xylene			0.658	0.65	0.645	0.643	0.658	0.659	0.682		0.6563	1.99517	
T	Styrene		1.04	1.096	1.11	1.095	1.112	1.152	1.132	1.1		1.1046	2.93765	
P	Bromoform			0.156	0.178	0.182	0.211	0.232	0.236	0.248		0.2062	16.8025	0.998
T	Isopropylbenzene		1.595	1.718	1.656	1.678	1.626	1.654	1.592	1.472		1.6238	4.56954	
I	1,4-Dichlorobenzene-d4	ISTD												
P	1,1,2,2-Tetrachloroethane		0.503	0.605	0.615	0.596	0.615	0.637	0.628	0.637		0.6044	7.19732	
S	p-Bromofluorobenzene				1	1.006	0.993	1.003	1.004	0.99	1.016	1.0017	0.856243	
T	1,2,3-Trichloropropane			0.18	0.171	0.18	0.18	0.187	0.183	0.187		0.1812	3.02083	
T	trans-1,4-Dichloro-2-Butene			0.155	0.15	0.162	0.195	0.199	0.201	0.205	0.188	0.1818	12.3835	
T	n-Propylbenzene		3.751	4.164	3.974	3.916	3.865	3.827	3.586	3.056		3.7675	8.82548	
T	Bromobenzene	0.877	0.724	0.801	0.82	0.775	0.803	0.822	0.813	0.815		0.8056	5.10084	
T	1,3,5-Trimethylbenzene		2.7	2.875	2.787	2.736	2.699	2.72	2.626	2.428		2.6962	4.84181	
T	2-Chlorotoluene		2.519	2.616	2.532	2.423	2.545	2.501	2.296	2.175		2.4509	5.9892	
T	4-Chlorotoluene		2.298	2.484	2.445	2.457	2.258	2.367	2.383	2.111		2.3503	5.28147	
T	a-Methylstyrene					1.465	1.551	1.538	1.54	1.545	1.46	1.5167	2.77782	
T	tert-Butylbenzene			0.556	0.552	0.545	0.547	0.569	0.568	0.597		0.5621	3.23821	
T	1,2,4-Trimethylbenzene		2.651	2.908	2.895	2.778	2.787	2.824	2.731	2.499		2.759	4.85936	
T	sec-Butylbenzene			3.53	3.41	3.359	3.314	3.32	3.171	2.858		3.2804	6.57291	
T	p-Isopropyltoluene			2.921	2.813	2.777	2.73	2.787	2.71	2.503		2.7486	4.65415	
T	1,3-Dichlorobenzene		1.549	1.651	1.569	1.555	1.543	1.574	1.557	1.533		1.5665	2.33558	
T	1,4-Dichlorobenzene	1.689	1.472	1.575	1.58	1.534	1.55	1.568	1.543	1.52		1.559	3.78008	
T	n-Butylbenzene			2.866	2.764	2.744	2.656	2.671	2.57	2.338		2.6584	6.37542	
T	1,2-Dichlorobenzene	1.549	1.433	1.498	1.496	1.471	1.444	1.458	1.444	1.425		1.4687	2.70191	
T	1,2-Dibromo-3-Chloropropane				0.094	0.101	0.117	0.125	0.124	0.128		0.1147	12.2244	
T	1,2,4-Trichlorobenzene		1.068	1.141	1.146	1.088	1.108	1.136	1.126	1.112		1.1155	2.43717	
T	Hexachlorobutadiene		0.451	0.486	0.45	0.454	0.445	0.451	0.45	0.454		0.4552	2.79191	
T	Naphthalene		1.927	2.007	2.102	2.048	2.112	2.16	2.073	1.921		2.0438	4.24414	
T	1,2,3-Trichlorobenzene	1.146	0.956	1.017	1.032	1.006	0.993	1.032	1.021	1.011		1.0238	5.02675	

Thu Jul 13 12:28:55 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070282 Run Date: 06/20/2017 Sample ID: WG618216-12
Instrument ID: HPMS11 Run Time: 19:12 Method: 8260B
File ID: 11M19170 Analyst: JDS QC Key: DOD4
ICal Workgroup: WG618216 Cal ID: HPMS11 - 20-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	47.8	ug/L	0.412	4.40	20	
Chloroform	CCC	50.0	48.3	ug/L	0.496	3.40	20	
Ethylbenzene	CCC	50.0	51.9	ug/L	0.614	3.80	20	
Toluene	CCC	50.0	44.7	ug/L	1.58	10.7	20	
Vinyl Chloride	CCC	50.0	51.6	ug/L	0.300	3.20	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	50.7	ug/L	0.853	1.30	20	
Chloromethane	SPCC	50.0	56.7	ug/L	0.323	13.4	20	
Bromoform	SPCC	50.0	53.1	ug/L	0.274	6.20	20	
Chlorobenzene	SPCC	50.0	47.9	ug/L	1.08	4.20	20	
1,1-Dichloroethane	SPCC	50.0	47.1	ug/L	0.520	5.70	20	
1,1,1-Trichloroethane		50.0	50.1	ug/L	0.445	0.100	20	
1,1,2-Trichloroethane		50.0	52.2	ug/L	0.367	4.50	20	
1,2-Dichloroethane		50.0	50.0	ug/L	0.394	0	20	
Acetone		50.0	45.7	ug/L	0.0702	8.60	20	
Benzene		50.0	46.0	ug/L	1.07	8.00	20	
Carbon Tetrachloride		50.0	49.3	ug/L	0.374	1.50	20	
Methylene Chloride		50.0	47.4	ug/L	0.283	5.20	20	
m-,p-Xylene		100	92.7	ug/L	0.693	7.30	20	
o-Xylene		50.0	52.8	ug/L	0.754	5.70	20	
Styrene		50.0	53.2	ug/L	1.21	6.50	20	
Tetrachloroethene		50.0	50.2	ug/L	0.331	0.400	20	
Trichloroethene		50.0	48.9	ug/L	0.288	2.20	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5380938
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070282 Run Date: 07/13/2017 Sample ID: WG621442-12
Instrument ID: HPMS8 Run Time: 15:06 Method: 8260B
File ID: 8M420641 Analyst: TMB QC Key: DOD4
ICal Workgroup: WG621442 Cal ID: HPMS8 - 12-JUL-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	20.4	ug/L	0.392	1.80	20	
Chloroform	CCC	20.0	19.9	ug/L	0.492	0.400	20	
Ethylbenzene	CCC	20.0	19.5	ug/L	0.536	2.60	20	
Toluene	CCC	20.0	19.5	ug/L	1.44	2.40	20	
Vinyl Chloride	CCC	20.0	20.4	ug/L	0.364	1.80	20	
1,1,2,2-Tetrachloroethane	SPCC	20.0	18.5	ug/L	0.558	7.70	20	
Chloromethane	SPCC	20.0	20.5	ug/L	0.484	2.30	20	
Bromoform	SPCC	20.0	17.4	ug/L	0.204	12.9	20	
Chlorobenzene	SPCC	20.0	19.9	ug/L	0.991	0.700	20	
1,1-Dichloroethane	SPCC	20.0	19.6	ug/L	0.462	2.00	20	
1,1,1-Trichloroethane		20.0	21.4	ug/L	0.454	7.10	20	
1,1,2-Trichloroethane		20.0	19.6	ug/L	0.262	2.20	20	
1,2-Dichloroethane		20.0	20.4	ug/L	0.352	2.00	20	
Acetone		20.0	17.1	ug/L	0.0454	14.5	20	
Benzene		20.0	20.6	ug/L	1.07	3.10	20	
Carbon Tetrachloride		20.0	21.7	ug/L	0.404	8.30	20	
Methylene Chloride		20.0	20.1	ug/L	0.271	0.400	20	
m-,p-Xylene		40.0	39.4	ug/L	0.653	1.50	20	
o-Xylene		20.0	19.7	ug/L	0.646	1.60	20	
Styrene		20.0	19.9	ug/L	1.10	0.400	20	
Tetrachloroethene		20.0	20.0	ug/L	0.296	0.200	20	
Trichloroethene		20.0	21.1	ug/L	0.289	5.60	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5380938
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621088-02
Instrument ID: HPMS11 Run Time: 15:52 Method: 8260B
File ID: 11M19709 Analyst: JDS QC Key: DOD4
Workgroup (AAB#): WG621090 Cal ID: HPMS11 - 20-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	49.4	ug/L	0.326	1.19	20	
1,1-Dichloroethene	CCC	50.0	51.2	ug/L	0.442	2.31	20	
Chloroform	CCC	50.0	48.1	ug/L	0.494	3.75	20	
Ethylbenzene	CCC	50.0	49.8	ug/L	0.588	0.453	20	
Toluene	CCC	50.0	46.0	ug/L	1.62	8.07	20	
Vinyl Chloride	CCC	50.0	51.0	ug/L	0.296	2.03	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	48.8	ug/L	0.822	2.39	20	
Bromoform	SPCC	50.0	45.5	ug/L	0.235	9.08	20	
Chlorobenzene	SPCC	50.0	45.4	ug/L	1.03	9.14	20	
Chloromethane	SPCC	50.0	48.2	ug/L	0.274	3.62	20	
1,1-Dichloroethane	SPCC	50.0	49.8	ug/L	0.550	0.315	20	
Xylenes		150	141	ug/L	0.683	5.81	20	
1,1,1-Trichloroethane		50.0	50.0	ug/L	0.444	0.0944	20	
1,1,2-Trichloroethane		50.0	48.5	ug/L	0.341	3.06	20	
1,2-Dichloroethane		50.0	49.9	ug/L	0.394	0.133	20	
Acetone		50.0	44.0	ug/L	0.0677	12.0	20	
Benzene		50.0	46.3	ug/L	1.07	7.30	20	
Carbon Tetrachloride		50.0	49.8	ug/L	0.378	0.371	20	
Methylene Chloride		50.0	48.6	ug/L	0.290	2.86	20	
m-,p-Xylene		100	92.3	ug/L	0.667	7.67	20	
o-Xylene		50.0	49.0	ug/L	0.699	2.09	20	
Styrene		50.0	50.8	ug/L	1.15	1.50	20	
Tetrachloroethene		50.0	45.1	ug/L	0.297	9.87	20	
Trichloroethene		50.0	46.0	ug/L	0.271	7.93	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5380940
Report generated 07/14/2017 12:19

Login Number: L17070282 Run Date: 07/13/2017 Sample ID: WG621676-02
Instrument ID: HPMS8 Run Time: 14:37 Method: 8260B
File ID: 8M420640 Analyst: TMB QC Key: DOD4
Workgroup (AAB#): WG621677 Cal ID: HPMS8 - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	51.1	ug/L	0.268	2.20	20	
1,1-Dichloroethene	CCC	50.0	51.7	ug/L	0.399	3.46	20	
Chloroform	CCC	50.0	49.8	ug/L	0.492	0.386	20	
Ethylbenzene	CCC	50.0	50.3	ug/L	0.554	0.695	20	
Toluene	CCC	50.0	49.4	ug/L	1.46	1.14	20	
Vinyl Chloride	CCC	50.0	52.9	ug/L	0.379	5.89	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	42.1	ug/L	0.509	15.8	20	
Bromoform	SPCC	50.0	42.5	ug/L	0.203	15.0	20	
Chlorobenzene	SPCC	50.0	49.3	ug/L	0.984	1.37	20	
Chloromethane	SPCC	50.0	50.6	ug/L	0.479	1.24	20	
1,1-Dichloroethane	SPCC	50.0	51.5	ug/L	0.485	2.91	20	
Xylenes		150	149	ug/L	0.654	0.360	20	
1,1,1-Trichloroethane		50.0	53.6	ug/L	0.454	7.18	20	
1,1,2-Trichloroethane		50.0	45.6	ug/L	0.244	8.88	20	
1,2-Dichloroethane		50.0	49.0	ug/L	0.338	2.06	20	
Acetone		50.0	44.0	ug/L	0.0467	12.0	20	
Benzene		50.0	51.4	ug/L	1.07	2.88	20	
Carbon Tetrachloride		50.0	55.9	ug/L	0.417	11.7	20	
Methylene Chloride		50.0	50.1	ug/L	0.270	0.183	20	
m-,p-Xylene		100	101	ug/L	0.666	0.560	20	
o-Xylene		50.0	48.9	ug/L	0.642	2.20	20	
Styrene		50.0	50.2	ug/L	1.11	0.417	20	
Tetrachloroethene		50.0	50.7	ug/L	0.300	1.48	20	
Trichloroethene		50.0	53.0	ug/L	0.290	5.94	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5380940
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17070282
Instrument ID: HPMS11
Workgroup (AAB#): WG621090

ICAL CCV Number: WG618216-08
CAL ID: HPMS11-20-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG618216-08	NA	NA	192803	348286	493119
Upper Limit	NA	NA	385606	696572	986238
Lower Limit	NA	NA	96402	174143	246560
L17070282-02	1.00	01	96643	199012	299028
WG621090-01	1.00	01	100278	207881	311674
WG621090-02	1.00	01	101661	207705	303955

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

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5380941
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17070282
Instrument ID: HPMS8
Workgroup (AAB#): WG621677

ICAL CCV Number: WG621442-08
CAL ID: HPMS8-12-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG621442-08	NA	NA	281846	537042	703614
Upper Limit	NA	NA	563692	1074084	1407228
Lower Limit	NA	NA	140923	268521	351807
L17070282-01	1.00	01	230451	442935	554807
WG621677-01	1.00	01	265719	502425	633311
WG621677-02	1.00	01	275882	514336	642018

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

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5380941
Report generated 07/14/2017 12:19

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17070282
Instrument ID: HPMS11
Workgroup (AAB#): WG621090

ICAL CCV Number: WG618216-08
CAL ID: HPMS11-20-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG618216-08	NA	NA	16.94	14.12	10.49
Upper Limit	NA	NA	17.44	14.62	10.99
Lower Limit	NA	NA	16.44	13.62	9.99
L17070282-02	1.00	01	16.94	14.12	10.49
WG621090-01	1.00	01	16.94	14.12	10.49
WG621090-02	1.00	01	16.94	14.12	10.49

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

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5380943
Report generated: 07/14/2017 12:19

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17070282
Instrument ID: HPMS8
Workgroup (AAB#): WG621677

ICAL CCV Number: WG621442-08
CAL ID: HPMS8-12-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG621442-08	NA	NA	17.79	14.77	10.91
Upper Limit	NA	NA	18.29	15.27	11.41
Lower Limit	NA	NA	17.29	14.27	10.41
L17070282-01	1.00	01	17.79	14.77	10.9
WG621677-01	1.00	01	17.79	14.77	10.91
WG621677-02	1.00	01	17.79	14.77	10.89

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

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5380943
Report generated: 07/14/2017 12:19

2.2 General Chromatography Data

2.2.1 LC/MS Data (6850)

2.2.1.1 Summary Data

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	6850	**Prep Date:**	07/14/2017 09:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG621748	**Analyst:**	JWR	**Run Date:**	07/14/2017 18:34
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40197
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.01		0.400	0.200	0.100

2.2.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

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

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: NA

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40075	WG619865-01 CCB	1	1		06/29/17 13:13
2	1LM.LM40076	WG619865-02 STD (0.1 ug/L)	1	1	STD80232	06/29/17 13:32
3	1LM.LM40077	WG619865-03 STD (0.2 ug/L)	1	1	STD80232	06/29/17 13:51
4	1LM.LM40078	WG619865-04 STD (0.5 ug/L)	1	1	STD80232	06/29/17 14:10
5	1LM.LM40079	WG619865-05 STD (1.0 ug/L)	1	1	STD80232	06/29/17 14:29
6	1LM.LM40080	WG619865-06 STD (2.0 ug/L)	1	1	STD80232	06/29/17 14:48
7	1LM.LM40081	WG619865-07 STD (5.0 ug/L)	1	1	STD80232	06/29/17 15:07
8	1LM.LM40082	WG619865-08 STD (10 ug/L)	1	1	STD80232	06/29/17 15:26
9	1LM.LM40083	WG619865-09 SSCV (1.0 ug/L)	1	1	STD80234	06/29/17 15:45
10	1LM.LM40084	WG619609-01 CCB	1	1		06/29/17 16:04
11	1LM.LM40085	WG619609-02 CCV (1.0ug/L)	1	1	STD80232	06/29/17 16:23
12	1LM.LM40086	WG619615-05 MRL (0.2ug/L)	1	1	STD80232	06/29/17 16:42
13	1LM.LM40087	WG619615-01 MCT (0.2ug/L)	1	1	STD80234	06/29/17 17:01
14	1LM.LM40088	WG619615-02 BLANK	1	1		06/29/17 17:20
15	1LM.LM40089	WG619615-03 LCS (0.2ug/L)	1	1	STD80234	06/29/17 17:39
16	1LM.LM40090	WG619615-04 LCS2 (0.2ug/L)	1	1	STD80234	06/29/17 17:57
17	1LM.LM40091	L17061390-01 10,000X	1	10000	STD80234	06/29/17 18:16
18	1LM.LM40092	L17061390-02	1	1	STD80234	06/29/17 18:35
19	1LM.LM40093	L17061390-03 100X	1	100	STD80234	06/29/17 18:54
20	1LM.LM40094	L17061390-04	1	1	STD80234	06/29/17 19:13
21	1LM.LM40095	L17061390-05 10X	1	10		06/29/17 19:32
22	1LM.LM40096	L17061390-06	1	1		06/29/17 19:51
23	1LM.LM40097	WG619609-03 CCV (1.0ug/L)	1	1	STD80232	06/29/17 20:10
24	1LM.LM40098	WG619615-06 MRL (0.2ug/L)	1	1	STD80232	06/29/17 20:29
25	1LM.LM40099	WG619609-04 CCB	1	1		06/29/17 20:48
26	1LM.LM40100	L17061390-07	1	1		06/29/17 21:07
27	1LM.LM40101	L17061390-09 100,000X	1	100000		06/29/17 21:26
28	1LM.LM40102	L17061390-10	1	1		06/29/17 21:45
29	1LM.LM40103	L17061390-12	1	1		06/29/17 22:04
30	1LM.LM40104	L17061390-13	1	1		06/29/17 22:23
31	1LM.LM40105	L17061390-15	1	1		06/29/17 22:42
32	1LM.LM40106	L17061390-16 2X	1	2		06/29/17 23:01
33	1LM.LM40107	WG619609-05 CCV (1.0ug/L)	1	1	STD80232	06/29/17 23:20

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Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 NA

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM40108	WG619615-07 MRL (0.2ug/L)	1	1	STD80232	06/29/17 23:39
35	1LM.LM40109	WG619609-06 CCB	1	1		06/29/17 23:57

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L17061390-01 Analyzed at a dilution based on historical data.			
19				
	L17061390-03 Analyzed at a dilution based on historical data.			
21				
	L17061390-05 Analyzed at a dilution based on historical data.			
27				
	L17061390-09 Analyzed at a dilution based on historical data.			
32				
	L17061390-16 Analyzed at a dilution based on historical data.			

Page: 2 Approved: 30-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 071417_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG621748 (waters)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (06/29/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments: Sample L17070280-01 was analyzed at a dilution based on its historical results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40188	WG621753-01 CCB	1	1		07/14/17 15:44
2	1LM.LM40189	WG621753-02 CCV (1.0ug/L)	1	1	STD80232	07/14/17 16:03
3	1LM.LM40190	WG621748-07 MRL (0.2ug/L)	1	1	STD80232	07/14/17 16:22
4	1LM.LM40191	WG621748-01 MCT (0.2ug/L)	1	1	STD80234	07/14/17 16:41
5	1LM.LM40192	WG621748-02 BLANK	1	1		07/14/17 17:00
6	1LM.LM40193	WG621748-03 LCS (0.2ug/L)	1	1	STD80234	07/14/17 17:19
7	1LM.LM40194	L17070003-01 LOQ (0.2ug/L)	1	1	STD80234	07/14/17 17:37
8	1LM.LM40195	L17070001-01 LOD (0.1ug/L)	1	1	STD80234	07/14/17 17:56
9	1LM.LM40196	L17070280-01 (10,000x)	1	10000		07/14/17 18:15
10	1LM.LM40197	L17070282-01	1	1		07/14/17 18:34
17	1LM.LM40198	L17070560-01 REF	1	1		07/14/17 18:53
12	1LM.LM40199	L17070560-01 MS	1	1	STD80234	07/14/17 19:12
13	1LM.LM40200	L17070560-01 MSD	1	1	STD80234	07/14/17 19:31
14	1LM.LM40201	WG621753-03 CCV (1.0ug/L)	1	1	STD80232	07/14/17 19:50
15	1LM.LM40202	WG621748-08 MRL (0.2ug/L)	1	1	STD80232	07/14/17 20:09
16	1LM.LM40203	WG621753-04 CCB	1	1		07/14/17 20:28

Comments

Seq.	Rerun	Dil.	Reason	Analytes

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Microbac Laboratories Inc.

Data Checklist

Date: 29-JUN-2017
Analyst: WTD
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83086
Analytical Workgroups: L17061390

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	X
Check for completeness	X
Primary Reviewer	WTD
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:

Secondary Reviewer:
30-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-30-2017 12:54:25

Microbac Laboratories Inc.

Data Checklist

Date: 14-JUL-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83400
Analytical Workgroups: L17070001, L17070003, L17070280, L17070282, L17070560

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	TRRP
Check for completeness	X
Primary Reviewer	JWR
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:
17-JUL-2017
John Richards

Secondary Reviewer:
17-JUL-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-17-2017 15:11:34

Microbac

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 AAB#: WG621748

Login Number: L17070282

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
LH18/24-SP650-6454-GRAB	01	07/06/17					07/14/2017	7.8	28		07/14/17	.4	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5387568
Report generated 07/17/2017 15:29

METHOD BLANK SUMMARY

Login Number: L17070282
Work Group: WG621748
Blank File ID: 1LM.LM40192
Blank Sample ID: WG621748-02
Prep Date: 07/14/17 09:00
Instrument ID: LCMS1
Analyzed Date: 07/14/17 17:00
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG621748-07	1LM.LM40190	07/14/17 16:22	01
MCT	WG621748-01	1LM.LM40191	07/14/17 16:41	01
LCS	WG621748-03	1LM.LM40193	07/14/17 17:19	01
LH18/24-SP650-6454-GRAB	L17070282-01	1LM.LM40197	07/14/17 18:34	01
QCMRL	WG621748-08	1LM.LM40202	07/14/17 20:09	01

Report Name: BLANK_SUMMARY
PDF File ID: 5387569
Report generated 07/17/2017 15:29

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070282 Prep Date: 07/14/17 09:00 Sample ID: WG621748-02
Instrument ID: LCMS1 Run Date: 07/14/17 17:00 Prep Method: 6850
File ID: 1LM.LM40192 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5387570
17-JUL-2017 15:29

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070282 **Run Date:** 07/14/2017 **Sample ID:** WG621748-03
Instrument ID: LCMS1 **Run Time:** 17:19 **Prep Method:** 6850
File ID: 1LM.LM40193 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG621748 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD80234 **Cal ID:** LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.195	97.5	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5387571
Report generated: 07/17/2017 15:29

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17070282
Analytical Method: 6850
ICAL Workgroup: WG619865

Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.454	6.38	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5387895
Report generated 07/17/2017 15:29

Login Number: L17070282
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-02			WG619865-03			WG619865-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	20800.0000	1.476	0.200	44600.0000	1.521	0.500	102000.000	1.433

INT_CAL - Modified 03/06/2008
PDF File ID: 5387895
Report generated 07/17/2017 15:29

Login Number: L17070282
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-05			WG619865-06			WG619865-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	214000.000	1.464	2.00	408000.000	1.442	5.00	981000.000	1.437

INT_CAL - Modified 03/06/2008
PDF File ID: 5387895
Report generated 07/17/2017 15:29

Login Number: L17070282
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-08		
	CONC	RESP	RF
Perchlorate	10.0	1820000.00	1.407

INT_CAL - Modified 03/06/2008
PDF File ID: 5387895
Report generated 07/17/2017 15:29

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070282 Run Date: 06/29/2017 Sample ID: WG619865-09
Instrument ID: LCMS1 Run Time: 15:45 Method: 6850
File ID: 1LM.LM40083 Analyst: WTD QC Key: DOD4
ICal Workgroup: WG619865 Cal ID: LCMS1 - 29-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.980	ug/L	1.40	2.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5387897
Report generated 07/17/2017 15:29

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070282 | Run Date: 07/14/2017 | Sample ID: WG621753-01
Instrument ID: LCMS1 | Run Time: 15:44 | Method: 6850
File ID: 1LM.LM40188 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG621748 | Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5387574
Report generated 07/17/2017 15:30

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070282	Run Date:	07/14/2017	Sample ID:	WG621753-04
Instrument ID:	LCMS1	Run Time:	20:28	Method:	6850
File ID:	1LM.LM40203	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG621748	Cal ID:	LCMS1 - 29-JUN-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5387574
Report generated 07/17/2017 15:30

Login Number: L17070282 Run Date: 07/14/2017 Sample ID: WG621753-02
Instrument ID: LCMS1 Run Time: 16:03 Method: 6850
File ID: 1LM.LM40189 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG621748 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.967	ug/L	1.39	3.30	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5387573
Report generated 07/17/2017 15:29

Login Number: L17070282 Run Date: 07/14/2017 Sample ID: WG621753-03
Instrument ID: LCMS1 Run Time: 19:50 Method: 6850
File ID: 1LM.LM40201 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG621748 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.963	ug/L	1.38	3.70	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5387573
Report generated 07/17/2017 15:29

Login Number: L17070282 Run Date: 07/14/2017 Sample ID: WG621748-07
Instrument ID: LCMS1 Run Time: 16:22 Prep Method: 6850
File ID: 1LM.LM40190 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.198	99.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5387572
Report generated 07/17/2017 15:29

Login Number: L17070282 Run Date: 07/14/2017 Sample ID: WG621748-08
Instrument ID: LCMS1 Run Time: 20:09 Prep Method: 6850
File ID: 1LM.LM40202 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.187	93.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5387572
Report generated 07/17/2017 15:29

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L17070282
Instrument ID: LCMS1
Workgroup (AAB#): WG621748

ICAL CCV Number: WG619865-05
CAL ID: LCMS1-29-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG619865	NA	NA	703000
Upper Limit	NA	NA	1054500
Lower Limit	NA	NA	351500
L17070282-01	1.00	01	624000
WG621748-02	1.00	01	635000
WG621748-03	1.00	01	667000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5387575
Report generated 07/17/2017 15:30

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**	6850	**Samplenum:**	L17070282-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40197
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 18:34	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	181000	57900	3.13	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG619865-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40076
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 13:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	20800	6780	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG619865-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40077
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 13:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44600	13700	3.26	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG619865-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40078
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	102000	31100	3.28	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG619865-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40079
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:29	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	65900	3.25	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG619865-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40080
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	408000	126000	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG619865-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40081
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	981000	306000	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG619865-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40082
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1820000	577000	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG619865-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40083
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	200000	61800	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**	6850	**Samplenum:**	WG621748-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40191
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40200	12700	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**	6850	**Samplenum:**	WG621748-02
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40192
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 17:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**	6850	**Samplenum:**	WG621748-03
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40193
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 17:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38600	12200	3.16	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**	6850	**Samplenum:**	WG621748-07
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40190
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:22	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38000	12400	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**	6850	**Samplenum:**	WG621748-08
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40202
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 20:09	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	41500	13900	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG621753-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 15:44	**File ID:**	1LM.LM40188
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 15:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	2390	959	2.49	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG621753-02
Instrument:	LCMS1	**Prep Date:**	07/14/2017 16:03	**File ID:**	1LM.LM40189
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:03	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	175000	54500	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG621753-03
Instrument:	LCMS1	**Prep Date:**	07/14/2017 19:50	**File ID:**	1LM.LM40201
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 19:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	59400	3.32	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070282	**Prep Method:**		**Samplenum:**	WG621753-04
Instrument:	LCMS1	**Prep Date:**	07/14/2017 20:28	**File ID:**	1LM.LM40203
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 20:28	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	732	0.000	2.3	3.8	*

2.2 Semivolatiles Data

2.2.2 GC/MS Semivolatiles Data (827 Dioxane)

2.2.2.1 Summary Data

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	3520C	**Prep Date:**	07/11/2017 15:05
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	07/13/2017 11:44
Workgroup #:	WG621590	**Analyst:**	LJH	**Run Date:**	07/13/2017 16:55
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	15M21550
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	17.7	J	2.20	1.10	0.549

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	52.8	20	129	

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	3520C	**Prep Date:**	07/11/2017 15:05
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	07/13/2017 11:44
Workgroup #:	WG621590	**Analyst:**	LJH	**Run Date:**	07/14/2017 13:30
Collect Date:	07/06/2017 15:00	**Dilution:**	2	**File ID:**	15M21565
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	17.7		4.40	2.20	1.10

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	51.9	20	129	

2.2.2.2 QC Summary Data

Example 8270 Calculations

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

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

where:	Example
Ax = Area of the characteristic ion for the compound being measured:	1261197
Cis = Concentration of the specific internal standard (ug/mL)	40
Ais = Area of the characteristic ion of the specific internal standard	608044
Cx = Concentration of the compound in the standard being measured (ug/mL)	50
RF = Calculated Response Factor	**1.65935**

2.0 Calculating the concentration (C) of a compound in water using the data from the prep log and quantitation report: *

Cx = [(Ax) (Cis) (Vf) (D)] / [(Ais) (RF) (Vi)]

where:	Example
Ax = Area of the characteristic ion for the compound being measured	367250
Cis = Concentration of the specific internal standard (ug/mL)	40
Vf = Final volume of sample extract from prep log (mL)	1
D = Dilution factor for sample as a multiplier (10x = 10)	1
Ais = Area of the characteristic ion of the specific internal standard	511641
RF = Average RF from the ICAL	1.65935
Vi = Initial volume of sample extracted from prep log (mL)	1021
Cx = Concentration of the compound in the sample being measured (ug/mL)	0.016947
Cx = Concentration of the compound in the sample being measured (ug/L)	**16.947**

3.0 Calculating the concentration (C) of a compound in soil using the data from the prep log and quantitation report: *

Cx = [(Ax) (Cis) (Vf) (D)] / [(Ais) (RF) (Wi)]

where:	Example
Ax = Area of the characteristic ion for the compound being measured	367250
Cis = Concentration of the specific internal standard (ug/mL)	40
Vf = Final volume of sample extract from prep log (mL)	1
D = Dilution factor for sample as a multiplier (10x = 10)	1
Ais = Area of the characteristic ion of the specific internal standard	511641
RF = Average RF from the ICAL	1.65935
Wi = Initial weight of sample extracted (g) from prep log	30
Cx = Concentration of the compound in the sample being measured (ug/g)	0.576763
Cx = Concentration of the compound in the sample being measured (ug/kg)	**576.7627**

Dry weight correction:

Percent solids (PCT_S)	50
Cd = (Cx) (100)/PCT_S	**1153.525** ug/kg

* 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 plot

b = intercept from curve plot

Step 2: Calculate y from Quantitation Report

y = 16790/784838 = 0.02139

Step 3: Solve for x

x = (y - b)/m = [(0.02139 -(- 0.0435)]/ 0.0783 = 0.829

Step 4: Solve for analyte concentration Cx

Cx = Cis (x) = (25.0)(0.829) = 20.72 ug/L

Example Spreadsheet Calculation:

Slope from curve, m:	0.0783	
Intercept from curve, b:	-0.0435	
Area of analyte, Ax:	16790	
Area of Internal Standard , Ais:	784484	
Concentration of IS, Cis	25.00	ug/L
Response Ratio (y) :	0.021403	
Amount Ratio:	0.828897	
Concentration (Cx):	20.72241	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

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

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(Amount ratio)

Example Spreadsheet Calculation:

Value of A from plot:	**0.0259**	
Value of B from plot:	**0.0596**	
Value of C from plot:	**-0.0165**	
Area of analyte from quantitation report:	**203233**	
Area of IS from quantiation report:	**1425653**	
Response ratio, y:	**0.142554**	
C - y:	**-0.15905**	
Root 1 - Computed amount ratio , X1:	**-3.88278**	
Root 2 - Computed amount ratio , X2:	**1.581623**	use this solution
Concentration of IS, Cis:	**40.00**	
Concentration of analyte, Cx:	**63.26**	ug/L

Microbac Laboratories Inc.
Continuous Sample Extract Log

Workgroup: WG621079
Analyst: CPD
Spike Analyst: CPD
Method: 3520C
Run Date: 07/11/2017 15:05
SOP: EXB01 Revison 20
Spike Witness: AC
Surr Solution: STD80323

TIME ON: 15:55 OFF: 10:00 ON: _____ OFF: _____
METHYLENE CHLORIDE Lot #: COA19844
Na2SO4, Anhydrous, Granular Lot #: COA19759
1:1 H2SO4 Lot #: RGT40290

	SAMPLE #	Type	Reference	Prod	pH	Init Amnt	Surr Amnt	Spike Amnt	Spike Sol	Final Vol	Color
1	L17070001-01	ML01		827-DIOXANE	<2	1000 mL	.05 mL	.005 mL	STD79978	1 mL	Transparent
2	L17070003-01	ML01		827-DIOXANE	<2	1000 mL	.05 mL	.1 mL	STD79978	1 mL	Transparent
3	L17070053-01	SAMP		827-DIOXANE	<2	1000 mL	.05 mL			1 mL	Colored
4	L17070282-01	SAMP		827-DIOXANE	<2	910 mL	.05 mL			1 mL	Colored
5	WG621079-01	BLANK		827-DIOXANE	<2	1000 mL	.05 mL			1 mL	Transparent
6	WG621079-02	LCS		827-DIOXANE	<2	1000 mL	.05 mL	.05 mL	STD79978	1 mL	Transparent
7	WG621079-03	LCS2		827-DIOXANE	<2	1000 mL	.05 mL	.05 mL	STD79978	1 mL	Transparent

Due to insufficient sample volume, this preparation batch failed to include the method prescribed MS and MSD.
pH 0-3 Lot#230515
TV3P5,6

L17070001-01	LOD
L17070003-01	LOQ
L17070053-01	RE-EXT OUT OF HOLD, SEWER ODOR

Analyst: _____

Reviewer: _____

EXTRACT - Modified 01/23/2009
PDF ID: 5381564
Report generated: 07/13/2017 09:03

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 071317
Analyst1: LJH Analyst2: NA
Method: 8270C/D SOP: MSS01 Rev: 28

Maintenance Log ID: Syringe Filter Lot#:
Eluent ID#:

Workgroups: Column 1 ID: RXI-5MS Column 2 ID: NA
WG621601, WG621590, WG621573 (ICAL)
Internal STD: STD81998 Surrogate STD: NA Calibration STD
CCV STD: STD80097 LCS STD: MS/MSD STD:

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	15M21532	BAKE OUT	1	1		07/13/17 08:18
2	15M21533	WG621573-01 5PPM DFTPP STD	1	1	STD80383	07/13/17 08:37
3	15M21534	WG621573-01 5PPM DFTPP STD	1	1	STD80383	07/13/17 09:32
4	15M21535	WG621573-02 5PPM DIOXANE STD	1	1	STD80097	07/13/17 09:51
5	15M21536	WG621573-03 10PPM DIOXANE STD	1	1	STD80097	07/13/17 10:14
6	15M21537	WG621573-04 7.5PPM DIOXANE STD	1	1	STD80097	07/13/17 10:37
7	15M21538	WG621573-05 2.5PPM DIOXANE STD	1	1	STD80097	07/13/17 10:59
8	15M21539	WG621573-06 1PPM DIOXANE STD	1	1	STD80097	07/13/17 11:22
9	15M21540	WG621573-07 0.4PPM DIOXANE STD	1	1	STD80097	07/13/17 11:44
10	15M21541	WG621573-08 5PPM ALT DIOXANE STD	1	1	STD80098	07/13/17 12:07
11	15M21542	WG621354-01 BLANK 827-DIOXANE	7	1	SOIL	07/13/17 13:54
12	15M21543	WG621079-01 BLANK 827-DIOXANE	1	1		07/13/17 14:16
13	15M21544	WG621079-02 LCS 827-DIOXANE	1	1		07/13/17 14:39
14	15M21545	WG621079-03 LCS2 827-DIOXANE	1	1		07/13/17 15:02
15	15M21546	L17070002-11 827-DIOXANE	7	1	SOIL	07/13/17 15:25
16	15M21547	L17070004-11 827-DIOXANE	7	1	SOIL	07/13/17 15:47
17	15M21548	L17070001-01 827-DIOXANE	1	1		07/13/17 16:10
18	15M21549	L17070003-01 827-DIOXANE	1	1		07/13/17 16:33
19	15M21550	L17070282-01 827-DIOXANE	1	1		07/13/17 16:55
20	15M21551	L17070053-01 RE 827-DIOXANE	1	1		07/13/17 17:18
21	15M21552	BAKE OUT	1	1		07/13/17 17:41
22	15M21553	BAKE OUT	1	1		07/13/17 18:03
23	15M21554	BAKE OUT	1	1		07/13/17 18:26

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
	WG621573-01 5PPM DFTPP STD had an ion failure, RR, NR.			
19	X	2	Over Calibration Range	1,4-DIOXANE
	L17070282-01 827-DIOXANE			

 Approved: 14-JUL-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 071417
Analyst1: LJH Analyst2: NA
Method: 8270C/D SOP: MSS01 Rev: 28

Maintenance Log ID: Syringe Filter Lot#:
Eluent ID#:
Column 1 ID: RXI-5MS Column 2 ID: NA
Workgroups: WG621590
Internal STD: STD81998 Surrogate STD: NA Calibration STD
CCV STD: STD80097 LCS STD: MS/MSD STD:

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	15M21555	BAKE OUT	1	1		07/14/17 08:29
2	15M21556	WG621741-01 5PPM DFTPP STD	1	1	STD80383	07/14/17 08:49
3	15M21557	WG621741-01 5PPM DFTPP STD	1	1	STD80383	07/14/17 09:06
4	15M21558	WG621741-01 5PPM DFTPP STD	1	1	STD80383	07/14/17 09:48
5	15M21559	WG621740-01 5PPM DIOXANE STD	1	1	STD80097	07/14/17 10:06
6	15M21560	WG621741-02 5PPM DIOXANE STD	1	1	STD80097	07/14/17 10:28
7	15M21561	L17070282-01 2X 827-DIOXANE	1	2		07/14/17 10:56
8	15M21562	BAKE OUT	1	1		07/14/17 11:18
9	15M21563	BAKE OUT	1	1		07/14/17 11:41
10	15M21564	BAKE OUT	1	1		07/14/17 12:04
11	15M21565	L17070282-01 2X 827-DIOXANE	1	2		07/14/17 13:30

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
	WG621741-01 5PPM DFTPP STD ion failure, NR, RR.			
3				
	WG621741-01 5PPM DFTPP STD ion failure, NR, RR. Changed liner.			
5				
	WG621740-01 5PPM DIOXANE STD NR, RR MS shut off.			
7				
	L17070282-01 2X 827-DIOXANE failed high for the ICAL IS, NR, remix and RR.			

Page: 1 Approved: 14-JUL-17

Microbac Laboratories Inc.

Data Checklist

Date: 13-JUL-2017
Analyst: LJH
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: WG621573
Runlog ID: 83366
Analytical Workgroups: L17070001, 0002, 0003, 0004, L17070053, L17070282

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	X
Endrin/DDT breakdown (8081/MS)	X
Pentachlorophenol/benzidine tailing (MS)	X
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	X
Average RF	X
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	NA
% D/% Drift	NA
Minimum response factors (MS)	X
Continuing calibration blank (CCB) (IC)	NA
Special standards	X
Blanks	X
TCL hits	X
Surrogate recoveries	X
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	X
MS/MSD/Sample duplicates	NA
Recoveries	NA
%RPD	NA
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	X
Surrogate recoveries	X
Internal standard areas (MS)	X
Library searches (MS)	NA
Calculations & correct factors	X
Compounds above calibration range	X
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	LJH
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: 14-JUL-2017
Secondary Reviewer: 14-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-14-2017 14:05:48

Microbac Laboratories Inc.

Data Checklist

Date: 14-JUL-2017
Analyst: LJH
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: NA
Runlog ID: 83370
Analytical Workgroups: L17070282

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	X
Endrin/DDT breakdown (8081/MS)	X
Pentachlorophenol/benzidine tailing (MS)	X
Eluent check (IC)/system pressure (HPLC)	NA
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)	X
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	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	X
Surrogate recoveries	X
Internal standard areas (MS)	X
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	
Check for completeness	X
Primary Reviewer	LJH
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	MES

Primary Reviewer:
14-JUL-2017

Secondary Reviewer:
14-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-14-2017 14:37:51

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8270D **AAB#:** WG621590

Login Number: L17070282

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
LH18/24-SP650-6454-GRAB	01	07/06/17					07/11/2017	5	7		07/14/17	2.9	40	
LH18/24-SP650-6454-GRAB	01	07/06/17					07/11/2017	5	7		07/13/17	2.1	40	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5385079
Report generated 07/17/2017 08:28

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17070282
Instrument Id: HPMS15
Workgroup (AAB#): WG621590

Method: 827-DIOXANE
CAL ID: HPMS15-13-JUL-17
Matrix: Water

Sample Number	Dilution	Tag	1
L17070282-01	1.00	01	52.8
L17070282-01	2.00	DL01	51.9
WG621079-01	1.00	01	39.4
WG621079-02	1.00	01	39.1
WG621079-03	1.00	01	49.8

Surrogates	Surrogate Limits
1 - 1,4-Dioxane-d8	20 - 129

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 5385088
Report generated: 07/17/2017 08:29

METHOD BLANK SUMMARY

Login Number: L17070282
Work Group: WG621590
Blank File ID: 15M21543
Blank Sample ID: WG621079-01
Prep Date: 07/11/17 15:05
Instrument ID: HPMS15
Analyzed Date: 07/13/17 14:16
Method: 8270D
Analyst: LJH

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621079-02	15M21544	07/13/17 14:39	01
LCS2	WG621079-03	15M21545	07/13/17 15:02	01
LH18/24-SP650-6454-GRAB	L17070282-01	15M21550	07/13/17 16:55	01
LH18/24-SP650-6454-GRAB	L17070282-01	15M21565	07/14/17 13:30	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5385080
Report generated 07/17/2017 08:28

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070282 Prep Date: 07/11/17 15:05 Sample ID: WG621079-01
Instrument ID: HPMS15 Run Date: 07/13/17 14:16 Prep Method: 3520C
File ID: 15M21543 Analyst: LJH Method: 8270D
Workgroup (AAB#): WG621590 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS15-13-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
1,4-Dioxane	0.500	2.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,4-Dioxane-d8	39.4	20 - 129	PASS

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5385081
17-JUL-2017 08:28

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070282 Analyst: LJH Prep Method: 3520C
Instrument ID: HPMS15 Matrix: Water Method: 8270D
Workgroup (AAB#): WG621590 Units: ug/L
QC Key: DOD4 Lot #: STD79978

Sample ID: WG621079-02 LCS File ID: 15M21544 Run Date: 07/13/2017 14:39
Sample ID: WG621079-03 LCS2 File ID: 15M21545 Run Date: 07/13/2017 15:02

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,4-Dioxane	5.00	2.01	40.2	5.00	2.55	51.0	23.8	30 - 104	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,4-Dioxane-d8	39.1	49.8	20 - 129	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5385082
Report generated: 07/17/2017 08:28

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17070282
Instrument: HPMS15
Analyst: LJH
Workgroup: WG621573

Tune ID: WG621573-01
Run Date: 07/13/2017
Run Time: 09:32
File ID: 15M21534
Cal ID: HPMS15-13-JUL-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	50.6	43979	PASS
68.0	69.0	0	2.00	1.87	749	PASS
69.0	198	0	100	46.1	40060	PASS
70.0	69.0	0	2.00	1.41	564	PASS
127	198	40.0	60.0	55.2	48053	PASS
197	198	0	1.00	0.788	685	PASS
198	198	100	100	100	86984	PASS
199	198	5.00	9.00	6.94	6036	PASS
275	198	10.0	30.0	28.0	24328	PASS
365	198	1.00	100	3.69	3209	PASS
441	443	0.0100	100	73.5	12184	PASS
442	198	40.0	100	98.6	85787	PASS
443	442	17.0	23.0	19.3	16572	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG621573-02	STD-CCV	01	07/13/2017 09:51	
WG621573-03	STD	01	07/13/2017 10:14	
WG621573-04	STD	01	07/13/2017 10:37	
WG621573-05	STD	01	07/13/2017 10:59	
WG621573-06	STD	01	07/13/2017 11:22	
WG621573-07	STD	01	07/13/2017 11:44	
WG621573-08	SSCV	01	07/13/2017 12:07	
WG621079-01	BLANK	01	07/13/2017 14:16	
WG621079-02	LCS	01	07/13/2017 14:39	
WG621079-03	LCS2	01	07/13/2017 15:02	
L17070282-01	LH18/24-SP650-6454-GRAB	01	07/13/2017 16:55	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5385085
Report generated 07/17/2017 08:29

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17070282
Instrument: HPMS15
Analyst: LJH
Workgroup: WG621741

Tune ID: WG621741-01
Run Date: 07/14/2017
Run Time: 09:48
File ID: 15M21558
Cal ID: HPMS15-13-JUL-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	47.8	54998	PASS
68.0	69.0	0	2.00	0.774	386	PASS
69.0	198	0	100	43.3	49879	PASS
70.0	69.0	0	2.00	0	0	PASS
127	198	40.0	60.0	53.6	61701	PASS
197	198	0	1.00	0.0148	17	PASS
198	198	100	100	100	115136	PASS
199	198	5.00	9.00	6.98	8040	PASS
275	198	10.0	30.0	26.0	29952	PASS
365	198	1.00	100	3.32	3823	PASS
441	443	0.0100	100	76.0	14540	PASS
442	198	40.0	100	88.2	101536	PASS
443	442	17.0	23.0	18.8	19134	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG621741-02	CCV	01	07/14/2017 10:28	
L17070282-01	LH18/24-SP650-6454-GRAB	DL01	07/14/2017 13:30	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5385085
Report generated 07/17/2017 08:29

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17070282
Analytical Method: 8270D
ICAL Workgroup: WG621573

Instrument ID: HPMS15
Initial Calibration Date: 13-JUL-17 11:44
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
1,4-Dioxane		0.3416	1.36		

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5385083
Report generated 07/17/2017 08:28

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17070282
Analytical Method: 8270D
Instrument ID: HPMS15
Initial Calibration Date: 13-JUL-17 11:44
Column ID: F

Analyte	WG621573-02			WG621573-03			WG621573-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,4-Dioxane	5.00	165518.000	0.3423	10.0	262886.000	0.3481	7.50	217268.000	0.3439

INT_CAL - Modified 03/06/2008
PDF File ID: 5385083
Report generated 07/17/2017 08:28

Login Number: L17070282
Analytical Method: 8270D
Instrument ID: HPMS15
Initial Calibration Date: 13-JUL-17 11:44
Column ID: F

Analyte	WG621573-05			WG621573-06			WG621573-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,4-Dioxane	2.50	68202.0000	0.3378	1.00	24159.0000	0.3425	0.400	11424.0000	0.3349

INT_CAL - Modified 03/06/2008
PDF File ID: 5385083
Report generated 07/17/2017 08:28

Method Path : C:\msdchem\1\methods\
Method File : DIOXANE_D8.M
Title : OVD MSS01 SIM 1,4-dioxane ICAL 071317
Last Update : Thu Jul 13 13:47:42 2017
Response Via : Initial Calibration
Curve: WG621573
Calibration Files
10 =15M21536.D 7.5 =15M21537.D 5 =15M21535.D 2.5 =15M21538.D 1 =15M21539.D
0.4 =15M21540.D

	Compound	10	7.5	5	2.5	1	0.4	Avg	%RSD
1) I	1,4-Dichlorobenzen...	----------ISTD----------							
2)	1,4-Dioxane	0.348	0.344	0.342	0.338	0.342	0.335	0.342	1.36
3) S	1,4-Dioxane-d8	0.373	0.369	0.367	0.363	0.368	0.361	0.367	1.12
4) S	Nitrobenzene-d5	1.035	1.014	1.013	0.925	0.843	0.761	0.932	11.88
5) S	2-Fluorobiphenyl	2.145	2.131	2.112	2.100	2.111	2.020	2.103	2.08
6) S	p-Terphenyl-d14	2.223	2.227	1.734	2.155	2.128	2.033	2.083	8.90

(#) = Out of Range

DIOXANE_D8.M Fri Jul 14 11:52:50 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070282 Run Date: 07/13/2017 Sample ID: WG621573-08
Instrument ID: HPMS15 Run Time: 12:07 Method: 8270D
File ID: 15M21541 Analyst: LJH QC Key: DOD4
ICal Workgroup: WG621573 Cal ID: HPMS15 - 13-JUL-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,4-Dioxane		5000	4540	ug/L	0.310	9.10	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5385084
Report generated 07/17/2017 08:29

Login Number: L17070282 Run Date: 07/14/2017 Sample ID: WG621741-02
Instrument ID: HPMS15 Run Time: 10:28 Method: 8270D
File ID: 15M21560 Analyst: LJH QC Key: DOD4
Workgroup (AAB#): WG621590 Cal ID: HPMS15 - 13-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,4-Dioxane		5000	4810	ug/L	0.328	3.86	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5385086
Report generated 07/17/2017 08:29

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L17070282
Instrument ID: HPMS15
Workgroup (AAB#): WG621590

CCV Number: WG621573-02
CAL ID: HPMS15-13-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG621573-02	NA	NA	96722
Upper Limit	NA	NA	193444
Lower Limit	NA	NA	48361
L17070282-01	1.00	01	98990
WG621079-01	1.00	01	105105
WG621079-02	1.00	01	100098
WG621079-03	1.00	01	96128

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD - Modified 03/06/2008
PDF File ID: 5385087
Report generated 07/14/2017 12:15

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17070282
Instrument ID: HPMS15
Workgroup (AAB#): WG621590

ICAL CCV Number: WG621573-02
CAL ID: HPMS15-13-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG621573-02	NA	NA	96722
Upper Limit	NA	NA	193444
Lower Limit	NA	NA	48361
L17070282-01	1.00	01	98990
L17070282-01	2.00	DL01	133354
WG621079-01	1.00	01	105105
WG621079-02	1.00	01	100098
WG621079-03	1.00	01	96128

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5385534
Report generated 07/17/2017 08:29

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L17070282
Instrument ID: HPMS15
Workgroup (AAB#): WG621590

CCV Number: WG621573-02
CAL ID: HPMS15-13-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG621573-02	NA	NA	7.11
Upper Limit	NA	NA	7.61
Lower Limit	NA	NA	6.61
L17070282-01	1.00	01	7.106
WG621079-01	1.00	01	7.102
WG621079-02	1.00	01	7.102
WG621079-03	1.00	01	7.102

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_RT - Modified 03/06/2008
PDF File ID: 5385089
Report generated 07/14/2017 12:15

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17070282
Instrument ID: HPMS15
Workgroup (AAB#): WG621590

ICAL CCV Number: WG621573-02
CAL ID: HPMS15-13-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG621573-02	NA	NA	7.11
Upper Limit	NA	NA	7.61
Lower Limit	NA	NA	6.61
L17070282-01	1.00	01	7.106
L17070282-01	2.00	DL01	7.106
WG621079-01	1.00	01	7.102
WG621079-02	1.00	01	7.102
WG621079-03	1.00	01	7.102

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5385535
Report generated: 07/17/2017 08:29

2.3 Metals Data

2.3.1 Metals I C P Data

2.3.1.1 Summary Data

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	3015A	**Prep Date:**	07/11/2017 09:09
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	07/12/2017 09:47
Workgroup #:	WG621311	**Analyst:**	JYH	**Run Date:**	07/12/2017 11:04
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	T4.071217.110416
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Selenium, Total	7782-49-2	0.0200	U	0.0200	0.0200	0.0100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

2.3.1.2 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:	**Example:**
Cs = Concentration computed by the data system in ug/mL (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial volume (mL)	50
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cs = Concentration computed by the data system (mg/L) (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial weight (g)	1
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cx = Concentration calculated as received (wet basis)	5
Px = Percent solids of sample (%wt)	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:	**Example:**
Cs = Concentration computed by the data system in ug/mL (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial volume (mL)	50
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cs = Concentration computed by the data system (mg/L) (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial weight (g)	1
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cx = Concentration calculated as received (wet basis)	5
Px = Percent solids of sample (%wt)	80
$Cdry$ = Concentration calculated as dry weight (mg/kg)	6.25

TCLP Non-Volatile

Analyst(s): CPD
Date: 7-10-17
Filter Lot #: 9480030
Microbac SOP: TCLP01 Rev #: 12

Balance ID: BAL020
pH Probe ID: TS
Temp probe ID: ☒1025 ☐1023

Analyst / Date		Analyst / Date	
CPD 7-10-17		BMB 7-11-17	
Time On	Temp On °C	Time Off	Temp Off °C
15:35	23.0	808	22.2

Agitator Speed 30 ± 2 rpm ☑

Jug #	Sample #	Tests	Method	Fluid #	Matrix *	% Solid	Pretest pH Initial	Pretest pH Final	Int. Wt. (g)	Fluid Vol. (mL)	Final extract pH
D	07-0182-02	ME	1311	F2-399	S	100	8.66	6.04	100.70	2014	6.09
D	-04	〃	〃	〃	〃	〃	8.75	6.35	100.98	2020	6.30
G-20	07-0308-01	Herb		F1-253			8.29	2.17	100.98	2020	5.14
G-32A	07-0306-01						7.13	1.87	100.65	2013	5.18
G-12	07-0314-01	SV, Pest					5.90	1.88	100.56	2011	5.12
G-1	07-0305-01	ME					5.48	1.85	100.66	2013	5.52
G-15	-02	〃					5.80	1.68	100.66	2013	4.97
G-17	-03	〃					4.63	—	100.95	2019	4.85
D	07-0309-01	ME					5.38	1.68	100.57	2011	4.96
NA	FBLK-1	ME, SV, Pest, Herb	1311	F1-253	NA	NA	NA	NA	100	100	4.91
NA	FBLK-2	ME	〃	F2-399	〃	〃	〃	〃	〃	〃	2.84
~~NA~~											

BMB 7-11-17

*Matrix Code: (S = solid, sand, soil or sludge) (P = paint) (O = organic) (W = water or aqueous waste)
D = Disposable plastic jug
TCLP Pretest weight will be 5.0 g (± 0.1) unless otherwise noted.
Temperature shall be maintained at 23° ± 2 for 18 ± 2 hours unless otherwise noted.

Comments: NA

Peer Review By:

Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup:	WG621173	SOP:	ME407 Revison 19
Analyst:	ERP	Spike Solution:	STD82522
Spike Analyst:	ERP	Spike Witness:	VC
Run Date:	07/11/2017 09:09	HNO3 Lot #:	COA19798
Method:	3015A	HCL Lot #:	COA19685
Balance:	BAL019	40 & 50 ML. DIGESTION TU	COA19764
Instrument:	MW-4	ICP FILTERS LOT#R6sa4256	RGT40011
Instrument Start:	07/11/2017 09:29		

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG621173-02	BLANK	1	40 mL	50 mL	205.671 g	205.671 g		
2	WG621057-01	FBLK1	17	5 mL	50 mL	208.572 g	208.535 g		
3	WG621057-02	FBLK2	17	5 mL	50 mL	207.267 g	207.2 g		
4	WG621173-03	LCS	1	40 mL	50 mL	212.473 g	212.453 g	5 mL	
5	WG621173-01	REF	17	5 mL	50 mL	206.223 g	206.206 g		
6	L17070183-02	SAMP	17	5 mL	50 mL	206.223 g	206.206 g		07/13/17
7	L17070183-04	SAMP	17	5 mL	50 mL	206.231 g	206.206 g		07/13/17
8	L17070282-01	SAMP	1	40 mL	50 mL	207.117 g	207.101 g		07/18/17
9	L17070300-01	SAMP	17	5 mL	50 mL	206.044 g	206.023 g		07/14/17
10	L17070300-02	SAMP	17	5 mL	50 mL	206.504 g	206.486 g		07/14/17
11	L17070300-03	SAMP	17	5 mL	50 mL	204.905 g	204.886 g		07/14/17
12	L17070309-01	SAMP	17	5 mL	50 mL	203.765 g	203.737 g		07/14/17
13	L17070348-01	SAMP	1	40 mL	50 mL	205.058 g	205.023 g		07/18/17
14	L17070364-01	SAMP	1	40 mL	50 mL	206.936 g	206.903 g		07/18/17
15	L17070364-02	SAMP	1	40 mL	50 mL	205.631 g	205.605 g		07/18/17
16	L17070364-03	SAMP	1	40 mL	50 mL	208.324 g	208.306 g		07/18/17
17	L17070364-04	SAMP	1	40 mL	50 mL	204.279 g	204.255 g		07/18/17
18	L17070396-03	SAMP	1	40 mL	50 mL	207.943 g	207.918 g		07/21/17
19	L17070396-04	SAMP	1	40 mL	50 mL	206.057 g	206.032 g		07/21/17
20	L17070396-05	SAMP	1	40 mL	50 mL	203.868 g	203.839 g		07/21/17
21	L17070396-06	SAMP	1	40 mL	50 mL	207.598 g	207.574 g		07/21/17
22	L17070396-07	SAMP	1	40 mL	50 mL	206.572 g	206.548 g		07/21/17
23	WG621173-04	MS	1	5 mL	50 mL	210.487 g	210.467 g	5 mL	
24	WG621173-05	MSD	1	5 mL	50 mL	211.923 g	211.899 g	5 mL	

Analyst: Erin Potter

Reviewer: Vicki Collins

MW_DIG - Modified 09/30/2009
PDF ID: 5377081
Report generated: 07/11/2017 10:15

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 071217T4.1
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82441 ICV Std: STD82498 Post Spike: STD82091
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT39282
CCV: STD82751 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 621311,621086,621461

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T4.071217.093237	WG621500-01	Calibration Point		1		07/12/17 09:32
2	T4.071217.093624	WG621500-02	Calibration Point		1		07/12/17 09:36
3	T4.071217.094012	WG621500-03	Calibration Point		1		07/12/17 09:40
4	T4.071217.094400	WG621500-04	Calibration Point		1		07/12/17 09:44
5	T4.071217.094728	WG621500-05	Calibration Point		1		07/12/17 09:47
6	T4.071217.095057	WG621500-06	Initial Calibration Verification		1		07/12/17 09:50
7	T4.071217.095426	WG621500-07	Initial Calib Blank		1		07/12/17 09:54
8	T4.071217.095813	WG621500-08	Low Level Initial Calibration V		1		07/12/17 09:58
9	T4.071217.100157	WG621500-09	Low Level Initial Calibration V		1		07/12/17 10:01
10	T4.071217.100538	WG621500-10	Interference Check		1		07/12/17 10:05
11	T4.071217.100928	WG621500-11	Interference Check		1		07/12/17 10:09
12	T4.071217.101309	WG621500-12	CCV		1		07/12/17 10:13
13	T4.071217.101637	WG621500-13	CCB		1		07/12/17 10:16
14	T4.071217.102026	WG621173-02	Method/Prep Blank	40/50	1		07/12/17 10:20
15	T4.071217.102412	WG621173-03	Laboratory Control S	40/50	1		07/12/17 10:24
16	T4.071217.102744	WG621057-01	Fluid Blank 1		1		07/12/17 10:27
17	T4.071217.103131	WG621057-02	Fluid Blank 2		1		07/12/17 10:31
18	T4.071217.103517	WG621173-01	Reference Sample		1	L17070183-02	07/12/17 10:35
19	T4.071217.103900	WG621173-04	Matrix Spike	5/50	1	L17070183-02	07/12/17 10:39
20	T4.071217.104230	WG621173-05	Matrix Spike Duplica	5/50	1	L17070183-02	07/12/17 10:42
21	T4.071217.104600	L17070183-04	T7G0356-02	5/50	1		07/12/17 10:46
22	T4.071217.104944	WG621311-01	Post Digestion Spike		1	L17070183-04	07/12/17 10:49
23	T4.071217.105313	WG621311-02	Serial Dilution		5	L17070183-04	07/12/17 10:53
24	T4.071217.105659	WG621500-14	CCV		1		07/12/17 10:56
25	T4.071217.110027	WG621500-15	CCB		1		07/12/17 11:00
26	T4.071217.110416	L17070282-01	LH18/24-SP650-6454-GRAB	40/50	1		07/12/17 11:04
27	T4.071217.110758	L17070300-01	7070331-01	5/50	1		07/12/17 11:07
28	T4.071217.111142	L17070300-02	7070331-02	5/50	1		07/12/17 11:11
29	T4.071217.111528	L17070300-03	7070331-03	5/50	1		07/12/17 11:15
30	T4.071217.111913	L17070309-01	SAMPLE 1	5/50	1		07/12/17 11:19
31	T4.071217.112258	L17070348-01	WEHR LATERAL - FILL SAM	40/50	1		07/12/17 11:22
32	T4.071217.112643	WG621500-16	CCV		1		07/12/17 11:26
33	T4.071217.113011	WG621500-17	CCB		1		07/12/17 11:30
34	T4.071217.113401	WG621500-18	Low Level Continuing Calibra		1		07/12/17 11:34

Page: 1 Approved: July 13, 2017

Kristi K Buck

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 071217T4.1
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82441 ICV Std: STD82498 Post Spike: STD82091
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT39282
CCV: STD82751 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 621311,621086,621461

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T4.071217.113745	WG621500-19	Low Level Continuing Calibra		1		07/12/17 11:37
36	T4.071217.114126	L17070364-01	39121-01-50086.000-SP1	40/50	1		07/12/17 11:41
37	T4.071217.114508	L17070364-02	39121-01-50086.000-SP1	40/50	1		07/12/17 11:45
38	T4.071217.114851	L17070364-03	39121-01-50086.000-PD1	40/50	1		07/12/17 11:48
39	T4.071217.115235	L17070364-04	39121-01-50086.000-PD1	40/50	1		07/12/17 11:52
40	T4.071217.115618	L17070396-03	TW-65S	40/50	1		07/12/17 11:56
41	T4.071217.120003	L17070396-04	TW-65S	40/50	1		07/12/17 12:00
42	T4.071217.120346	L17070396-05	SL-24	40/50	1		07/12/17 12:03
43	T4.071217.120729	L17070396-06	SL-24	40/50	1		07/12/17 12:07
44	T4.071217.121113	L17070396-07	EQ RINSE	40/50	1		07/12/17 12:11
45	T4.071217.121501	WG621500-20	CCV		1		07/12/17 12:15
46	T4.071217.121830	WG621500-21	CCB		1		07/12/17 12:18
47	T4.071217.122217	WG620984-02	Method/Prep Blank	40/50	1		07/12/17 12:22
48	T4.071217.122605	WG620984-03	Laboratory Control S	40/50	1		07/12/17 12:26
49	T4.071217.122935	WG620984-01	Reference Sample		1	L17070334-02	07/12/17 12:29
50	T4.071217.123320	WG620984-04	Matrix Spike	40/50	1	L17070334-02	07/12/17 12:33
51	T4.071217.123649	WG620984-05	Matrix Spike Duplica	40/50	1	L17070334-02	07/12/17 12:36
52	T4.071217.124019	L17070255-01	T1360	40/50	1		07/12/17 12:40
53	T4.071217.124401	L17070255-02	T1362	40/50	1		07/12/17 12:44
54	T4.071217.124744	L17070255-03	T1363	40/50	1		07/12/17 12:47
55	T4.071217.125135	WG621086-01	Post Digestion Spike		1	L17070255-03	07/12/17 12:51
56	T4.071217.125514	WG621086-02	Serial Dilution		5	L17070255-03	07/12/17 12:55
57	T4.071217.125903	WG621500-22	CCV		1		07/12/17 12:59
58	T4.071217.130231	WG621500-23	CCB		1		07/12/17 13:02
59	T4.071217.130618	WG621086-02	Serial Dilution		25	L17070255-03	07/12/17 13:06
60	T4.071217.131005	L17070255-04	T1365	40/50	1		07/12/17 13:10
61	T4.071217.131357	L17070273-01	39121-01-21022.000-SP1	40/50	1		07/12/17 13:13
62	T4.071217.131741	L17070273-02	39121-01-21022.000-SP1	40/50	1		07/12/17 13:17
63	T4.071217.132123	L17070280-01	LH18/24-SP140-7454-GRAB	40/50	1		07/12/17 13:21
64	T4.071217.132503	L17070329-01	39121-01-21042-000-SP2	40/50	1		07/12/17 13:25
65	T4.071217.132847	L17070329-02	39121-01-21042-000-SP2	40/50	1		07/12/17 13:28
66	T4.071217.133230	L17070330-01	39121-01-50058.000-SP1	40/50	1		07/12/17 13:32
67	T4.071217.133614	L17070330-02	39121-01-50058.000-SP1	40/50	1		07/12/17 13:36
68	T4.071217.133957	L17070331-01	39121-01-21022.000-SP2	40/50	1		07/12/17 13:39

Page: 2 Approved: July 13, 2017

Kristi K Buck

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 071217T4.1
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82441 ICV Std: STD82498 Post Spike: STD82091
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT39282
CCV: STD82751 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 621311,621086,621461

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	T4.071217.134341	WG621500-24	CCV		1		07/12/17 13:43
70	T4.071217.134709	WG621500-25	CCB		1		07/12/17 13:47
71	T4.071217.135057	L17070331-02	39121-01-21022.000-SP2	40/50	1		07/12/17 13:50
72	T4.071217.135440	L17070332-01	39121-01-21042.000-SP1	40/50	1		07/12/17 13:54
73	T4.071217.135823	L17070332-02	39121-01-21042.000-SP1	40/50	1		07/12/17 13:58
74	T4.071217.140206	L17070333-01	1805-107-B S1	40/50	1		07/12/17 14:02
75	T4.071217.140549	L17070333-02	1805-107-B S3	40/50	1		07/12/17 14:05
76	T4.071217.140933	L17070333-03	1805-107-B P1	40/50	1		07/12/17 14:09
77	T4.071217.141318	L17070334-01	1805-129-C W1	40/50	1		07/12/17 14:13
78	T4.071217.141703	WG621500-26	CCV		1		07/12/17 14:17
79	T4.071217.142030	WG621500-27	CCB		1		07/12/17 14:20
80	T4.071217.142418	WG621500-28	Low Level Continuing Calibra		1		07/12/17 14:24
81	T4.071217.142803	WG621500-29	Low Level Continuing Calibra		1		07/12/17 14:28
82	T4.071217.143143	WG621421-02	Method/Prep Blank	40/50	1		07/12/17 14:31
83	T4.071217.143529	WG621421-03	Laboratory Control S	40/50	1		07/12/17 14:35
84	T4.071217.143859	WG621208-01	Fluid Blank 1		1		07/12/17 14:38
85	T4.071217.144246	WG621208-02	Fluid Blank 2		1		07/12/17 14:42
86	T4.071217.144632	L17070405-01	500786-DS-001		1	WG621421-01	07/12/17 14:46
87	T4.071217.145018	WG621421-04	Matrix Spike	5/50	1	L17070405-01	07/12/17 14:50
88	T4.071217.145347	WG621421-05	Matrix Spike Duplica	5/50	1	L17070405-01	07/12/17 14:53
89	T4.071217.145716	L17070373-01	J7G0486-03	5/50	1		07/12/17 14:57
90	T4.071217.150059	WG621461-01	Post Digestion Spike		1	L17070373-01	07/12/17 15:00
91	T4.071217.150428	WG621461-02	Serial Dilution		5	L17070373-01	07/12/17 15:04
92	T4.071217.150816	WG621500-30	CCV		1		07/12/17 15:08
93	T4.071217.151144	WG621500-31	CCB		1		07/12/17 15:11
94	T4.071217.151531	L17070376-01	J7G0484-03	5/50	1		07/12/17 15:15
95	T4.071217.151915	L17070380-01	J7G0485-03	5/50	1		07/12/17 15:19
96	T4.071217.152259	L17070400-01	2212-118 S2	40/50	1		07/12/17 15:22
97	T4.071217.152643	L17070400-02	2212-118 S1	40/50	1		07/12/17 15:26
98	T4.071217.153027	L17070400-03	2212-118 S4	40/50	1		07/12/17 15:30
99	T4.071217.153412	L17070400-04	2212-118 S5	40/50	1		07/12/17 15:34
100	T4.071217.153755	L17070400-05	2212-118 W2	40/50	1		07/12/17 15:37
101	T4.071217.154139	L17070400-06	2212-118 W1	40/50	1		07/12/17 15:41
102	T4.071217.154522	L17070404-01	ALAN 10 BAGS	5/50	1		07/12/17 15:45

Page: 3 Approved: July 13, 2017

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 071217T4.1
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82441 ICV Std: STD82498 Post Spike: STD82091
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT39282
CCV: STD82751 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 621311,621086,621461

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
103	T4.071217.154906	L17070405-02	500786-DS-002	5/50	1		07/12/17 15:49
104	T4.071217.155252	WG621500-32	CCV		1		07/12/17 15:52
105	T4.071217.155620	WG621500-33	CCB		1		07/12/17 15:56
106	T4.071217.160008	L17070405-03	500786-DS-003	5/50	1		07/12/17 16:00
107	T4.071217.160353	L17070427-01	40123-B01-WQ-W0002	40/50	1		07/12/17 16:03
108	T4.071217.160740	L17070427-02	41834-B01-WQ-W0002	40/50	1		07/12/17 16:07
109	T4.071217.161127	L17070427-03	52107-B02-WQ-W0006	40/50	1		07/12/17 16:11
110	T4.071217.161513	L17070427-04	52107-R01-WQ-W0032	40/50	1		07/12/17 16:15
111	T4.071217.161901	L17070427-05	53603-D04-WQ-W0052	40/50	1		07/12/17 16:19
112	T4.071217.162248	WG621500-34	CCV		1		07/12/17 16:22
113	T4.071217.162617	WG621500-35	CCB		1		07/12/17 16:26
114	T4.071217.163004	WG621500-36	Low Level Continuing Calibra		1		07/12/17 16:30
115	T4.071217.163348	WG621500-37	Low Level Continuing Calibra		1		07/12/17 16:33

 Approved: July 13, 2017

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 12-JUL-2017
Analyst: JYH
Analyst: NA
Method: 6010B/6010C/200.7
Instrument: ICP-THERMO4
Curve Workgroup: 621500
Runlog ID: 83315
Analytical Workgroups: 621311,621086,621461

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	282,396,280,373,380,405,427
Client Forms	X
Level X	
Level 3	
Level 4	282,396,280,427
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	KKB
Comments	

Primary Reviewer:
13-JUL-2017

Secondary Reviewer:
13-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-13-2017 11:36:46

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C AAB#: WG621311

Login Number: L17070282

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
LH18/24-SP650-6454-GRAB	01	07/06/17					07/11/2017	4.8	180		07/12/17	5.8	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5380656
Report generated 07/12/2017 14:24

METHOD BLANK SUMMARY

Login Number:	L17070282	**Work Group:**	WG621311
Blank File ID:	T4.071217.102026	**Blank Sample ID:**	WG621173-02
Prep Date:	07/11/17 09:09	**Instrument ID:**	ICP-THERMO4
Analyzed Date:	07/12/17 10:20	**Method:**	6010C
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621173-03	T4.071217.102412	07/12/17 10:24	01
LH18/24-SP650-6454-GRAB	L17070282-01	T4.071217.110416	07/12/17 11:04	01

Report Name: BLANK_SUMMARY
PDF File ID: 5380657
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070282 Prep Date: 07/11/17 09:09 Sample ID: WG621173-02
Instrument ID: ICP-THERMO4 Run Date: 07/12/17 10:20 Prep Method: 3015A
File ID: T4.071217.102026 Analyst: JYH Method: 6010C
Workgroup (AAB#): WG621311 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-TH-12-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Selenium, Total	0.0100	0.0200	0.0100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5380658
12-JUL-2017 14:24

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070282 Run Date: 07/12/2017 Sample ID: WG621173-03
Instrument ID: ICP-THERMO4 Run Time: 10:24 Prep Method: 3015A
File ID: T4.071217.102412 Analyst: JYH Method: 6010C
Workgroup (AAB#): WG621311 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD82522 Cal ID: ICP-TH-12-JUL-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Selenium, Total	0.250	0.239	95.5	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5380659
Report generated: 07/12/2017 14:24

Loginnum:L17070282 Cal ID:ICP-THERMO4- Worknum:WG621311
Instrument ID:ICP-THERMO4 Contract #: Method:6010C
Parent ID:WG621173-01 File ID:T4.071217.103517 Dil:1 Matrix:WATER
Sample ID:WG621173-04 MS File ID:T4.071217.103900 Dil:1 Units:mg/L
Sample ID:WG621173-05 MSD File ID:T4.071217.104230 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Selenium, TCLP	ND	2.00	1.87	93.5	2.00	1.90	94.8	1.32	80 - 120	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:5380660
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17070282 **Worknum:** WG621311
Instrument: ICP-THERMO4 **Method:** 6010C
Serial Dil: WG621311-02 **File ID:** T4.071217.105313 **Dil:** 5 **Units:** ug/L
Sample: L17070183-04 **File ID:** T4.071217.104600 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Selenium	ND	U	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 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: 5380654
07/12/2017 14:24

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17070282 **Worknum:** WG621311
Instrument ID: ICP-THERMO4 **Method:** 6010C
Post Spike ID: WG621311-01 **File ID:** T4.071217.104944 **Dil:** 1 **Units:** ug/L
Sample ID: L17070183-04 **File ID:** T4.071217.104600 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
SELENIUM	196		0	U	200	98.1	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: 5380655
Report generated: 07/12/2017 14:24

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17070282**	Workgroup (AAB#):	**WG621311**
Analytical Method:	**6010C**	Instrument ID:	**ICP-THERMO4**
ICAL Worknum:	**WG621500**	Initial Calibration Date:	**12-JUL-2017 09:47**

	WG621500-01		WG621500-02		WG621500-03		WG621500-04		WG621500-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
SELENIUM	0	0.0000400	NA	NA	.008	0.0000900	.4	0.00646	.8	0.0130	.999204	

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: 5380663
Report generated: 12-JUL-2017 14:24

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17070282
Instrument ID: ICP-THERMO4
File ID: T4.071217.095426
Workgroup (AAB#): WG621311
Matrix: WATER

Run Date: 07/12/2017
Run Time: 09:54
Analyst: JYH
Cal ID: ICP-THERI - 12-JUL-17

Sample ID: WG621500-07
Method: 6010C
Units: mg/L

Analytes	MDL	RDL	Concentration	Qualifier
SELENIUM	.008	.016	.008	U

U = Result is less than 2 x MDL
F = Result is between MDL and 2 x MDL
* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 5380665
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070282	Run Date:	07/12/2017	Sample ID:	WG621500-13
Instrument ID:	ICP-THERMO4	Run Time:	10:16	Method:	6010C
File ID:	T4.071217.101637	Analyst:	JYH	Units:	mg/L
Workgroup (AAB#):	WG621311	Cal ID:	ICP-TH - 12-JUL-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	0.00800	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: 5380668
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070282	Run Date:	07/12/2017	Sample ID:	WG621500-15
Instrument ID:	ICP-THERMO4	Run Time:	11:00	Method:	6010C
File ID:	T4.071217.110027	Analyst:	JYH	Units:	mg/L
Workgroup (AAB#):	WG621311	Cal ID:	ICP-TH - 12-JUL-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	0.00800	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: 5380668
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070282	Run Date:	07/12/2017	Sample ID:	WG621500-17
Instrument ID:	ICP-THERMO4	Run Time:	11:30	Method:	6010C
File ID:	T4.071217.113011	Analyst:	JYH	Units:	mg/L
Workgroup (AAB#):	WG621311	Cal ID:	ICP-TH - 12-JUL-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	0.00800	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: 5380668
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17070282 Run Date: 07/12/2017 Sample ID: WG621500-06
Instrument ID: ICP-THERMO4 Run Time: 09:50 Method: 6010C
File ID: T4.071217.095057 Analyst: JYH Units: mg/L
Workgroup (AAB#): WG621311 Cal ID: ICP-TH - 12-JUL-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Selenium		.4	0.413	103	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5380664
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070282 Run Date: 07/12/2017 Sample ID: WG621500-12
Instrument ID: ICP-THERMO4 Run Time: 10:13 Method: 6010C
File ID: T4.071217.101309 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621311 Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.404	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5380667
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070282 Run Date: 07/12/2017 Sample ID: WG621500-14
Instrument ID: ICP-THERMO4 Run Time: 10:56 Method: 6010C
File ID: T4.071217.105659 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621311 Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.397	mg/L	99.4	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5380667
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070282 Run Date: 07/12/2017 Sample ID: WG621500-16
Instrument ID: ICP-THERMO4 Run Time: 11:26 Method: 6010C
File ID: T4.071217.112643 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621311 Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.404	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5380667
Report generated 07/12/2017 14:24

Login Number: L17070282 Run Date: 07/12/2017 Sample ID: WG621500-08
Instrument ID: ICP-THERMO4 Run Time: 09:58 Method: 6010C
File ID: T4.071217.095813 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621311 Cal ID: ICP-TH - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0145	mg/L	90.3	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5380669
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.

LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17070282 Run Date: 07/12/2017 Sample ID: WG621500-18

Instrument ID: ICP-THERMO4 Run Time: 11:34 Method: 6010C

File ID: T4.071217.113401 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621311 Cal ID: ICP-TH - 12-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0138	mg/L	86.3	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010

PDF File ID: 5380669

Report generated 07/12/2017 14:24

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17070282 **Workgroup (AAB#):** WG621311
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG621500-10 **File ID:** T4.071217.100538 **Units:** mg/L
Sol. AB : WG621500-11 **File ID:** T4.071217.100928 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Selenium	NS	-0.00602	NS	0.250	0.242	96.8	

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: 5380666
Report generated 07/12/2017 14:24

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070282 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5380662
Report generated: 07/12/2017 14:24

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070282 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5380662
Report generated: 07/12/2017 14:24

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070282 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5380662
Report generated: 07/12/2017 14:24

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070282 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5380662
Report generated: 07/12/2017 14:24

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070282 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5380662
Report generated: 07/12/2017 14:24

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070282 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5380662
Report generated: 07/12/2017 14:24

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17070282 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5380662
Report generated: 07/12/2017 14:24

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17070282 **Date:** 04/05/2017
Insturment ID: ICP-THERMO4 **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	4.5
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: 5380661
Report generated: 07/12/2017 14:24

2.3 Metals Data

2.3.2 Metals ICP-MS Data

2.3.2.1 Summary Data

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	3015A	**Prep Date:**	07/10/2017 09:12
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	07/10/2017 11:08
Workgroup #:	WG621040	**Analyst:**	JYH	**Run Date:**	07/10/2017 13:07
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	NI.071017.130748
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Barium, Total	7440-39-3	0.166		0.00600	0.00300	0.00150
Lead, Total	7439-92-1	0.00100	U	0.00200	0.00100	0.000500
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.3.2.2 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:	**Example:**
Cs = Concentration computed by the data system (ug/L)	0.1
Vf = Final volume	100
Vi = Initial volume	40
D = Dilution factor as a multiplier (10X = 10)	1
Cx = Concentration of element in (ug/L)	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:	**Example:**
Cs = Concentration computed by the data system (ug/L)	0.1
Vf = Final volume	200
Vi = Initial volume	0.5
D = Dilution factor as a multiplier (10X = 10)	1
Cx = Concentration of element in (ug/kg)	40

4.0 Adjusting the concentration to dry weight:

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

Where:	**Example:**
Cx = Concentration calculated as received (wet basis)	40
Px = Percent solids of sample (%wt)	80
$Cdry$ = Concentration calculated as dry weight (ug/kg)	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: WG620989
Analyst: VC
Spike Analyst: VC
Run Date: 07/10/2017 09:12
Method: 3015A
Balance: BAL016
Instrument: MW-3
Instrument Start: 07/10/2017 09:27

SOP: ME407 Revison 19
Spike Solution: STD80296
Spike Witness: ERP
40 & 50 ML. DIGESTION TU: COA19764
HNO3 Lot #: COA19798
ICP FILTERS LOT#R6sa4256: RGT40011
ICP-MS Water MDL SOLUT: STD82808

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG620989-02	BLANK	1	20 mL	50 mL	183.197 g	183.182 g		
2	WG620989-03	LCS	1	20 mL	50 mL	185.155 g	185.143 g	.25 mL	
3	L17070001-01	ML01	1	20 mL	50 mL	183.98 g	183.971 g	5 mL	07/17/17
4	L17070003-01	ML01	1	20 mL	50 mL	184.74 g	184.745 g	10 mL	07/17/17
5	L17070280-01	SAMP	1	20 mL	50 mL	186.123 g	186.108 g		07/18/17
6	L17070282-01	SAMP	1	20 mL	50 mL	184.906 g	184.893 g		07/18/17
7	L17070311-01	SAMP	1	20 mL	50 mL	185.185 g	185.174 g		07/18/17
8	L17070311-02	SAMP	1	20 mL	50 mL	185.161 g	185.147 g		07/18/17
9	L17070311-03	SAMP	1	20 mL	50 mL	181.832 g	181.814 g		07/18/17
10	L17070311-04	SAMP	1	20 mL	50 mL	184.925 g	184.901 g		07/18/17
11	L17070311-05	SAMP	1	20 mL	50 mL	185.548 g	185.552 g		07/18/17
12	L17070311-06	SAMP	1	20 mL	50 mL	182.838 g	182.839 g		07/18/17
13	WG620989-01	REF	1	20 mL	50 mL	186.281 g	186.286 g		
14	L17070311-07	SAMP	1	20 mL	50 mL	186.281 g	186.286 g		07/18/17
15	WG620989-04	MS	1	20 mL	50 mL	185.178 g	185.168 g	.25 mL	
16	WG620989-05	MSD	1	20 mL	50 mL	184.486 g	184.471 g	.25 mL	

L17070311-01	FILTERED DIGESTATE

Analyst: Vicki Collins

Reviewer: Erin Potter

MW_DIG - Modified 09/30/2009
PDF ID: 5374794
Report generated: 07/10/2017 10:15

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 071017A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

Calibration Std: STD82411 ICV Std: STD82815 Post Spike: STD79415
ICSA: STD82813 ICSAB: STD82814 Int. Std: RGT39300
CCV: STD82410 LLCCV: STD82816 Tuning Sol : STD82818
Stannous : Hydroxylamine :

Workgroups: 621026,621040

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.071017.105559	Blank	Blank		1		07/10/17 10:55
2	NI.071017.105904	WG621080-01	Calibration Point		1		07/10/17 10:59
3	NI.071017.110209	WG621080-02	Calibration Point		1		07/10/17 11:02
4	NI.071017.110515	WG621080-03	Calibration Point		1		07/10/17 11:05
5	NI.071017.110821	WG621080-04	Calibration Point		1		07/10/17 11:08
6	NI.071017.111128	WG621080-05	QC Std 1		1		07/10/17 11:11
7	NI.071017.111628	WG621080-06	Initial Calibration Verification		1		07/10/17 11:16
8	NI.071017.111936	WG621080-07	Initial Calib Blank		1		07/10/17 11:19
9	NI.071017.112242	WG621080-08	Low Level Initial Calibration V		1		07/10/17 11:22
10	NI.071017.112549	WG621080-09	Interference Check		1		07/10/17 11:25
11	NI.071017.112854	WG621080-10	Interference Check		1		07/10/17 11:28
12	NI.071017.113201	WG621080-11	CCV		1		07/10/17 11:32
13	NI.071017.113507	WG621080-12	CCB		1		07/10/17 11:35
14	NI.071017.113824	WG620732-02	Method/Prep Blank	20/50	1		07/10/17 11:38
15	NI.071017.114130	WG620732-03	Laboratory Control S	20/50	1		07/10/17 11:41
16	NI.071017.114435	WG620732-04	Filter Blank		1		07/10/17 11:44
17	NI.071017.114741	WG620732-01	Reference Sample		1	L17070056-05	07/10/17 11:47
18	NI.071017.115046	WG620732-05	Matrix Spike	20/50	1	L17070056-05	07/10/17 11:50
19	NI.071017.115352	WG620732-06	Matrix Spike Duplica	20/50	1	L17070056-05	07/10/17 11:53
20	NI.071017.115657	L17070056-01	SS007MWOB06-010	20/50	1		07/10/17 11:56
21	NI.071017.120003	WG621026-01	Post Digestion Spike		1	L17070056-01	07/10/17 12:00
22	NI.071017.120308	WG621026-02	Serial Dilution		5	L17070056-01	07/10/17 12:03
23	NI.071017.120614	WG621026-02	Serial Dilution		25	L17070056-01	07/10/17 12:06
24	NI.071017.120921	WG621080-13	CCV		1		07/10/17 12:09
25	NI.071017.121227	WG621080-14	CCB		1		07/10/17 12:12
26	NI.071017.121533	L17070056-02	SS007MWOB19-010	20/50	1		07/10/17 12:15
27	NI.071017.121839	L17070056-03	SS007MWOB19-010 DUP	20/50	1		07/10/17 12:18
28	NI.071017.122145	L17070056-04	SS007MWN748-010	20/50	1		07/10/17 12:21
29	NI.071017.122452	WG621080-15	CCV		1		07/10/17 12:24
30	NI.071017.122758	WG621080-16	CCB		1		07/10/17 12:27
31	NI.071017.123427	WG620989-02	Method/Prep Blank	20/50	1		07/10/17 12:34
32	NI.071017.123732	WG620989-03	Laboratory Control S	20/50	1		07/10/17 12:37
33	NI.071017.124038	L17070001-01	MDL-1	20/50	1		07/10/17 12:40
34	NI.071017.124342	L17070003-01	LOQ-1	20/50	1		07/10/17 12:43

Page: 1 Approved: July 11, 2017

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 071017A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

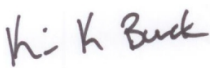
Calibration Std: STD82411 ICV Std: STD82815 Post Spike: STD79415
ICSA: STD82813 ICSAB: STD82814 Int. Std: RGT39300
CCV: STD82410 LLCCV: STD82816 Tuning Sol : STD82818
Stannous : Hydroxylamine :

Workgroups: 621026,621040

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	NI.071017.124912	WG620989-01	Reference Sample		1	L17070311-07	07/10/17 12:49
36	NI.071017.125219	WG621080-17	CCV		1		07/10/17 12:52
37	NI.071017.125525	WG621080-18	CCB		1		07/10/17 12:55
38	NI.071017.125831	WG620989-04	Matrix Spike	20/50	1	L17070311-07	07/10/17 12:58
39	NI.071017.130137	WG620989-05	Matrix Spike Duplica	20/50	1	L17070311-07	07/10/17 13:01
40	NI.071017.130443	L17070280-01	LH18/24-SP140-7454-GRAB	20/50	1		07/10/17 13:04
41	NI.071017.130748	L17070282-01	LH18/24-SP650-6454-GRAB	20/50	1		07/10/17 13:07
42	NI.071017.131053	L17070311-01	TW-11D	20/50	1		07/10/17 13:10
43	NI.071017.131359	L17070311-02	TW-11D	20/50	1		07/10/17 13:13
44	NI.071017.131704	WG621040-01	Post Digestion Spike		1	L17070311-02	07/10/17 13:17
45	NI.071017.132010	WG621040-02	Serial Dilution		5	L17070311-02	07/10/17 13:20
46	NI.071017.132315	WG621040-02	Serial Dilution		25	L17070311-02	07/10/17 13:23
47	NI.071017.132622	WG621080-19	CCV		1		07/10/17 13:26
48	NI.071017.132927	WG621080-20	CCB		1		07/10/17 13:29
49	NI.071017.133233	L17070311-03	TW-11S	20/50	1		07/10/17 13:32
50	NI.071017.133538	L17070311-04	TW-16D	20/50	1		07/10/17 13:35
51	NI.071017.133844	L17070311-05	TW-16S	20/50	1		07/10/17 13:38
52	NI.071017.134149	L17070311-06	TW-63D	20/50	1		07/10/17 13:41
53	NI.071017.134456	WG621080-21	CCV		1		07/10/17 13:44
54	NI.071017.134802	WG621080-22	CCB		1		07/10/17 13:48
55	NI.071017.135109	WG621080-23	Low Level Continuing Calibra		1		07/10/17 13:51
56	NI.071017.141035	WG621080-24	CCV		1		07/10/17 14:10
57	NI.071017.141344	WG621080-25	CCB		1		07/10/17 14:13
58	NI.071017.141651	WG620989-02	Method/Prep Blank	20/50	1		07/10/17 14:16
59	NI.071017.141957	WG620989-03	Laboratory Control S	20/50	1		07/10/17 14:19
60	NI.071017.142302	L17070001-01	MDL-1	20/50	1		07/10/17 14:23
61	NI.071017.142607	L17070003-01	LOQ-1	20/50	1		07/10/17 14:26
62	NI.071017.142915	WG621080-26	CCV		1		07/10/17 14:29
63	NI.071017.143220	WG621080-27	CCB		1		07/10/17 14:32

Page: 2 Approved: July 11, 2017



Microbac Laboratories Inc.

Data Checklist

Date: 10-JUL-2017
Analyst: JYH
Analyst: NA
Method: 6020/6020A/200.8
Instrument: ICP-MS
Curve Workgroup: 621080
Runlog ID: 83254
Analytical Workgroups: 621026,621040

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	056,001,003,280,282,311
Client Forms	X
Level X	
Level 3	
Level 4	056,001,003,280,282,311
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	KKB
Comments	

Primary Reviewer:
10-JUL-2017

Secondary Reviewer:
11-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-11-2017 14:42:47

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6020A AAB#: WG621040

Login Number: L17070282

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
LH18/24-SP650-6454-GRAB	01	07/06/17					07/10/2017	3.8	180		07/10/17	3.9	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5375864
Report generated 07/10/2017 14:01

METHOD BLANK SUMMARY

Login Number:	L17070282	**Work Group:**	WG621040
Blank File ID:	NI.071017.123427	**Blank Sample ID:**	WG620989-02
Prep Date:	07/10/17 09:12	**Instrument ID:**	ICP-MS2
Analyzed Date:	07/10/17 12:34	**Method:**	6020A
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG620989-03	NI.071017.123732	07/10/17 12:37	01
LH18/24-SP650-6454-GRAB	L17070282-01	NI.071017.130748	07/10/17 13:07	01
LCS	WG620989-03	NI.071017.141957	07/10/17 14:19	02

Report Name: BLANK_SUMMARY
PDF File ID: 5375865
Report generated 07/10/2017 15:03

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070282 Prep Date: 07/10/17 09:12 Sample ID: WG620989-02
Instrument ID: ICP-MS2 Run Date: 07/10/17 12:34 Prep Method: 3015A
File ID: NI.071017.123427 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG621040 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-MS-10-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Barium, Total	0.00150	0.00600	0.00150	1	U
Lead, Total	0.000500	0.00200	0.000500	1	U
Silver, Total	0.000500	0.00200	0.000500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5375866
10-JUL-2017 14:01

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG620989-03
Instrument ID: ICP-MS2 Run Time: 12:37 Prep Method: 3015A
File ID: NI.071017.123732 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG621040 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD80296 Cal ID: ICP-MS-10-JUL-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Barium, Total	0.125	0.128	102	80 - 120	
Lead, Total	0.125	0.122	97.4	80 - 120	
Silver, Total	0.125	0.113	90.2	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5375867
Report generated: 07/10/2017 14:02

Microbac Laboratories Inc.
MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum:L17070282 Cal ID:ICP-MS2- Worknum:WG621040
Instrument ID:ICP-MS2 Contract #: Method:6020A
Parent ID:WG620989-01 File ID:NI.071017.124912 Dil:1 Matrix:WATER
Sample ID:WG620989-04 MS File ID:NI.071017.125831 Dil:1 Units:mg/L
Sample ID:WG620989-05 MSD File ID:NI.071017.130137 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Barium	0.0421	0.125	0.169	102	0.125	0.164	97.7	3.05	80 - 120	20	
Lead	0.000520	0.125	0.120	95.4	0.125	0.120	95.2	0.218	80 - 120	20	
Silver	ND	0.125	0.107	85.3	0.125	0.105	84.0	1.51	80 - 120	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: 5375868
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17070282 **Worknum:** WG621040
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG621040-02 **File ID:** NI.071017.132010 **Dil:** 5 **Units:** ug/L
Sample: L17070311-02 **File ID:** NI.071017.131359 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Barium	7.54	X	8.04	F	6.59	
Lead	13.5	X	13.5	X	0.57	
Silver	ND	U	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
PDF File ID: 5375862
07/10/2017 14:01

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17070282 **Worknum:** WG621040
Instrument ID: ICP-MS2 **Method:** 6020A
Post Spike ID: WG621040-01 **File ID:** NI.071017.131704 **Dil:** 1 **Units:** ug/L
Sample ID: L17070311-02 **File ID:** NI.071017.131359 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
BARIUM	59.0		7.54		50	103.0	75 - 125	
LEAD	63.0		13.5		50	98.9	75 - 125	
SILVER	41.7		0	U	50	83.4	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: 5375863
Report generated: 07/10/2017 14:01

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17070282**	Workgroup (AAB#):	**WG621040**
Analytical Method:	**6020A**	Instrument ID:	**ICP-MS2**
ICAL Worknum:	**WG621080**	Initial Calibration Date:	**10-JUL-2017 11:08**

	WG621080-01		WG621080-02		WG621080-03		WG621080-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
BARIUM	0	18.3	.4	162	50	123000	100	249000	.999982	
LEAD	0	580	.4	1390	50	743000	100	1490000	.999945	
SILVER	0	169	.4	590	50	399000	100	795000	1	

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: 5375872
Report generated: 10-JUL-2017 14:02

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-07
Instrument ID: ICP-MS2 Run Time: 11:19 Method: 6020A
File ID: NI.071017.111936 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG621040 Cal ID: ICP-MS2 - 10-JUL-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SILVER	.2	.8	.2	U
BARIUM	.6	2.4	.6	U
LEAD	.2	.8	.2	U

U = Result is less than 2 x MDL

F = Result is between MDL and 2 x MDL

* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 5375874
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070282 | Run Date: 07/10/2017 | Sample ID: WG621080-12
Instrument ID: ICP-MS2 | Run Time: 11:35 | Method: 6020A
File ID: NI.071017.113507 | Analyst: JYH | Units: ug/L
Workgroup (AAB#): WG621040 | Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Barium	0.600	2.40	0.600	U
Lead	0.200	0.800	0.200	U
Silver	0.200	0.800	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: 5375877
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070282 | Run Date: 07/10/2017 | Sample ID: WG621080-16
Instrument ID: ICP-MS2 | Run Time: 12:27 | Method: 6020A
File ID: NI.071017.122758 | Analyst: JYH | Units: ug/L
Workgroup (AAB#): WG621040 | Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Barium	0.600	2.40	0.600	U
Lead	0.200	0.800	0.200	U
Silver	0.200	0.800	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: 5375877
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070282 | Run Date: 07/10/2017 | Sample ID: WG621080-18
Instrument ID: ICP-MS2 | Run Time: 12:55 | Method: 6020A
File ID: NI.071017.125525 | Analyst: JYH | Units: ug/L
Workgroup (AAB#): WG621040 | Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Barium	0.600	2.40	0.600	U
Lead	0.200	0.800	0.200	U
Silver	0.200	0.800	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: 5375877
Report generated 07/10/2017 14:02

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-20
Instrument ID: ICP-MS2 Run Time: 13:29 Method: 6020A
File ID: NI.071017.132927 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Barium	0.600	2.40	0.600	U
Lead	0.200	0.800	0.200	U
Silver	0.200	0.800	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: 5375877
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-06
Instrument ID: ICP-MS2 Run Time: 11:16 Method: 6020A
File ID: NI.071017.111628 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Barium		50	50.2	100	90 - 110	
Lead		50	48.8	97.5	90 - 110	
Silver		50	50.9	102	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5375873
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-11
Instrument ID: ICP-MS2 Run Time: 11:32 Method: 6020A
File ID: NI.071017.113201 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0501	mg/L	100	90 - 110		
Lead		0.0500	0.0493	mg/L	98.5	90 - 110		
Silver		0.0500	0.0485	mg/L	97.1	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5375876
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-15
Instrument ID: ICP-MS2 Run Time: 12:24 Method: 6020A
File ID: NI.071017.122452 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0507	mg/L	101	90 - 110		
Lead		0.0500	0.0488	mg/L	97.7	90 - 110		
Silver		0.0500	0.0458	mg/L	91.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5375876
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-17

Instrument ID: ICP-MS2 Run Time: 12:52 Method: 6020A

File ID: NI.071017.125219 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0510	mg/L	102	90 - 110		
Lead		0.0500	0.0491	mg/L	98.3	90 - 110		
Silver		0.0500	0.0493	mg/L	98.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5375876

Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-19
Instrument ID: ICP-MS2 Run Time: 13:26 Method: 6020A
File ID: NI.071017.132622 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0511	mg/L	102	90 - 110		
Lead		0.0500	0.0480	mg/L	96.0	90 - 110		
Silver		0.0500	0.0482	mg/L	96.5	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5375876
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-08
Instrument ID: ICP-MS2 Run Time: 11:22 Method: 6020A
File ID: NI.071017.112242 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.750	0.707	ug/L	94.3	70 - 130		
Lead		0.200	0.187	ug/L	93.3	70 - 130		
Silver		0.400	0.370	ug/L	92.4	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5375878
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17070282 Run Date: 07/10/2017 Sample ID: WG621080-23
Instrument ID: ICP-MS2 Run Time: 13:51 Method: 6020A
File ID: NI.071017.135109 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG621040 Cal ID: ICP-MS - 10-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.750	0.714	ug/L	95.3	70 - 130		
Lead		0.200	0.185	ug/L	92.7	70 - 130		
Silver		0.400	0.344	ug/L	85.9	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5375878
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17070282 **Workgroup (AAB#):** WG621040
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG621080-09 **File ID:** NI.071017.112549 **Units:** ug/L
Sol. AB : WG621080-10 **File ID:** NI.071017.112854 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Barium	NS	0.00400	NS	100	102	102	
Lead	NS	0.0945	NS	100	101	101	
Silver	NS	-0.00120	NS	100	88.6	88.6	

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: 5375875
Report generated 07/10/2017 14:02

Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L17070282 **Analytical Method:** 6020
Analytical Workgroup: WG621040 **Matrix:** 1
Instrument: ICP-MS2 **Analyst:** JYH
ICAL Date: 10-JUL-2017 10:59

			BISMUTH	GERMANIUM	INDIUM
Sample	Type	Run Date	% Rec	% Rec	% Rec
L17070282-01	SAMP	10-JUL-2017 13:07	93.902	101.559	109.446
L17070311-02	SAMP	10-JUL-2017 13:13	93.35	98.989	113.669
WG620989-02	BLANK	10-JUL-2017 12:34	101.799	100.899	107.688
WG620989-02	BLANK	10-JUL-2017 14:16	102.371	101.025	107.687
WG620989-03	LCS	10-JUL-2017 12:37	102.076	101.173	108.545
WG620989-03	LCS	10-JUL-2017 14:19	99.294	99.31	105.474
WG621040-01	PSPK	10-JUL-2017 13:17	92.85	99.509	114.817
WG621040-02	SERIAL	10-JUL-2017 13:20	92.533	92.627	106.339
WG621080-06	ICV	10-JUL-2017 11:16	98.214	100.646	101.181
WG621080-07	ICB	10-JUL-2017 11:19	100.425	100.068	102.623
WG621080-08	LLICV	10-JUL-2017 11:22	99.576	100.156	101.517
WG621080-09	ICS	10-JUL-2017 11:25	87.585	88.256	93.001
WG621080-10	ICS	10-JUL-2017 11:28	88.811	90.093	95.523
WG621080-11	CCV	10-JUL-2017 11:32	97.715	100.08	104.513
WG621080-12	CCB	10-JUL-2017 11:35	85.225	84.676	92.032
WG621080-15	CCV	10-JUL-2017 12:24	99.593	100.558	111.553
WG621080-16	CCB	10-JUL-2017 12:27	101.634	100.274	110.069
WG621080-17	CCV	10-JUL-2017 12:52	99.076	100.132	108.862
WG621080-18	CCB	10-JUL-2017 12:55	88.945	85.091	94.265
WG621080-19	CCV	10-JUL-2017 13:26	100.802	101.299	112.81
WG621080-20	CCB	10-JUL-2017 13:29	102.432	101.357	112.2
WG621080-23	LLCCV	10-JUL-2017 13:51	100.401	100.292	110.51
WG621080-24	CCV	10-JUL-2017 14:10	101.827	101.818	104.887
WG621080-25	CCB	10-JUL-2017 14:13	81.959	83.295	88.483
WG621080-26	CCV	10-JUL-2017 14:29	98.266	100.295	106.666
WG621080-27	CCB	10-JUL-2017 14:32	100.958	101.028	108.09

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: 5375871
Report generated: 07/10/2017 15:03

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17070282 **Date:** 04/12/2017
Insturment 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: 5375869
Report generated: 07/10/2017 14:02

2.4 General Chemistry Data

2.4.1 Hexavalent Chromium Data

2.4.1.1 Summary Data

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070282-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6454-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	06/05/2017 10:10
Workgroup #:	WG620845	**Analyst:**	SDC	**Run Date:**	07/07/2017 12:20
Collect Date:	07/06/2017 15:00	**Dilution:**	1	**File ID:**	00.1707071220-07
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Hexavalent	18540-29-9	0.0100	U	0.0200	0.0100	0.00500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070282
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.4.1.2 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: 07-JUL-2017
Analyst: SDC
Analyst: NA
Method: CR-6
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG620845

Calibration/Linearity	06/05/17
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	SDC
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
11-JUL-2017

Secondary Reviewer:
12-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-12-2017 11:09:56

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 7196A AAB#: WG620845

Login Number: L17070282

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
LH18/24-SP650-6454-GRAB	01	07/06/17					07/07/2017	.9	1		07/07/17	.9	1	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5379650
Report generated 07/12/2017 09:26

METHOD BLANK SUMMARY

Login Number: L17070282
Work Group: WG620845
Blank File ID: 00.1707071220-03
Blank Sample ID: WG620845-01
Prep Date: 07/07/17 12:20
Instrument ID: UV-2600
Analyzed Date: 07/07/17 12:20
Method: 7196A
Analyst: SDC

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG620845-02	00.1707071220-04	07/07/17 12:20	
LCS2	WG620845-03	00.1707071220-05	07/07/17 12:20	
LH18/24-SP650-6454-GRAB	L17070282-01	00.1707071220-07	07/07/17 12:20	
DUP	WG620845-06	00.1707071220-08	07/07/17 12:20	

Report Name: BLANK_SUMMARY
PDF File ID: 5379651
Report generated 07/12/2017 09:26

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070282 Prep Date: 07/07/17 12:20 Sample ID: WG620845-01
Instrument ID: UV-2600 Run Date: 07/07/17 12:20 Prep Method: 7196A
File ID: 00.1707071220-03 Analyst: SDC Method: 7196A
Workgroup (AAB#): WG620845 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Chromium, Hexavalent	0.00500	0.0200	0.00500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5379652
12-JUL-2017 09:26

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070282 Analyst: SDC Prep Method: 7196A
Instrument ID: UV-2600 Matrix: Water Method: 7196A
Workgroup (AAB#): WG620845 Units: mg/L
QC Key: DOD4 Lot #: STD81994

Sample ID: WG620845-02 LCS File ID: 00.1707071220-04 Run Date: 07/07/2017 12:20
Sample ID: WG620845-03 LCS2 File ID: 00.1707071220-05 Run Date: 07/07/2017 12:20

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chromium, Hexavalent	0.100	0.0972	97.2	0.100	0.0972	97.2	0.00	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5379653
Report generated: 07/12/2017 09:26

2.4.1.3 Raw Data

Curves

Parameter: Cr-6 Low

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: 80872, 82188

Concentration: 50mg/L, 5mg/L

Recipe for preparation of curve standards found in:
SOP: 2184 Revision: 22 Page: 12

Second Source Stock: 81994 (concentration: 2mg/L)

Daily Preparation: 10(2)/200

concentration = =0.1

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
0.2	100	5	540	0.822
0.1	100	5	540	0.432
0.05	100	5	540	0.209
0.02	100	5	540	0.083
0.01	100	5	540	0.041
0.00	100	5	540	0.004
		5	5	
2nd source 0.1	100	5	540	0.423

Analyst: Paul Greene Date/Time: 6/5/17 @ 1010

DCN#126170

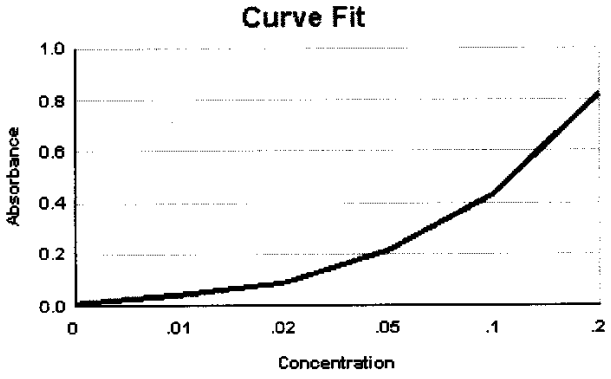
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG616556
Analytical Method:3500CR
Instrument ID:UV-2600

Analyst:ADG
Initial Calibration Date:06/05/2017

Analyte: CHROMIUM, HEXAVALENT
Number of Points: 6
Slope: 4.12523
Y-Intercept: 0.00390207
Coef. Of Correlation (R^2): 0.999348
Coef. Of Correlation (R): 0.999674

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00400	0.00	0.00	0.00390207
0.0100	0.0410	0.000100	0.000410	0.0451544
0.0200	0.0830	0.000400	0.00166	0.0864067
0.0500	0.209	0.00250	0.0105	0.210164
0.100	0.432	0.0100	0.0432	0.416425
0.200	0.822	0.0400	0.164	0.828948



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 06/05/2017 13:03

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG616556
File ID: 00.1706051010-07
CCV ID: WG616556-07
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 06/05/2017
Run Time: 10:10
Analyst: ADG
Cal ID: UV-260 - 05-JUN-17 10:10:06

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.1	0.102	4.23	2.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 06/05/2017 13:03

[redacted]*

WORKGROUP: WG620845

CHROMIUM (6)

(cr6)

Standard Methods 3500 Cr-D (18th, 19th), 3500Cr-B(20th) SPEC: UV-2600

SOP K2186 Rev. # 22 SW846 7196A Curve ID: 6-5-17

SOP OVAP K3500-Cr Rev. # _____ CCV: 82188 LCS: 81994 Spike: 80872 RGT 40510

Matrix: (Liquid) (mg/L) Daily dilution: 1(2)/100 SDC 7-7-17 Daily dilution: 10(2)/200 Daily dilution: 0.2(50)/100 RGT 39581

Soil (mg/Kg) Daily dilution: =0.05 Daily dilution: =0.1 Daily dilution: =0.1 CCA 18997

Sample	Volume (mL)	pH adj. to 2 ± 0.5	Dilution	Cell size (cm)	Absorbance @ 540 nm
CCV: mg/L(1 cm)	100				
CCV: mg/L(5 cm)	100	✓		5cm	0.199
Blank/CCB:	100	✓		5cm	0.002
LCS: ppm	100	✓		5cm	0.405
LCSDUP: ppm	100	✓		5cm	0.405
07-280-01	100	✓		5cm	0.011
07-282-01	100	✓		5cm	0.012
	100				
	100				
	100				
	100				
	100				
	100				
	100				
CCV: (1 cm)	100				
CCV: (5 cm)	100				
CCB:	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
DUP: 280-01	100	✓		5cm	0.010
MS: ( ) 282-01	100	✓		5cm	0.420
MSD: ( )	100				
CCV: (1 cm)	100				
CCV: (5 cm)	100	✓		5cm	0.205
CCB:	100	✓		5cm	0.005

Analyst: Evelyn Conley Date / Time: 7-7-17 1220 SDC 7-7-17

SW846 7196 (Dup and/or MS every 10 samples) **SM3500 Cr (Dup and MS/MSD every 20 samples)**

DCN#126895

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG620845
Analyte: CHROMIUM, HEXAVALENT

Analyst: SDC
Date: 07/07/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG620845-01	100	100	0.00200	4.125	0.003902	-0.00046108	-0.00046108	1	mg/L
WG620845-02	100	100	0.405	4.125	0.003902	0.097230	0.097230	1	mg/L
WG620845-03	100	100	0.405	4.125	0.003902	0.097230	0.097230	1	mg/L
L17070280-01	100	100	0.0110	4.125	0.003902	0.0017206	ND	1	mg/L
WG620845-04	100	100	0.0110	4.125	0.003902	0.0017206	0.0017206	1	mg/L
WG620845-05	100	100	0.00600	4.125	0.003902	0.00050856	0.00050856	1	mg/L
L17070282-01	100	100	0.00600	4.125	0.003902	0.00050856	ND	1	mg/L
WG620845-06	100	100	0.0100	4.125	0.003902	0.0014782	0.0014782	1	mg/L
WG620845-07	100	100	0.420	4.125	0.003902	0.10087	0.10087	1	mg/L

[redacted]

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 07/11/2017 16:36

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG621377
File ID: 00.1707071220-10
CCV ID: WG621377-03
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 07/07/2017
Run Time: 12:20
Analyst: SDC
Cal ID: UV-260 - 29-JUN-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0487	4.10	2.6	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/11/2017 16:35

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG621377
File ID: 00.1707071220-01
CCV ID: WG621377-01
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 07/07/2017
Run Time: 12:20
Analyst: SDC
Cal ID: UV-260 - 29-JUN-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0473	3.98	5.4	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/11/2017 16:35

[redacted]

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
July 18, 2017

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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	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

Microbac Laboratories Inc.
List of Valid Qualifiers
July 18, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
July 18, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

CHAIN OF CUSTODY

Name Of Lab Shipping To: MICROBAC (740) 373-4071 ATTN: STEPHANIE MOSSBURG

Project: AECOM
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No.
60256135.GWTPT
HRUMAR16

Job:
GROUNDWATER TREATMENT PLANT MONTHLY EFFLUENT SAMPLES

Prepared By:
Scott Beesinger

P.O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: VOLATILES	SILVER, SELENIUM, LEAD, BARIUM	HEXAVALENT CHROMIUM	1, 4 - DIOXANE	PERCHLORATE						Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650-6454-Grab	Water	07/06/17 / 15:00		3	X										HCL	
LH18/24-SP650-6454-Grab	Water	07/06/17 / 15:00		4			X	X	X						NONE	
LH18/24-SP650-6454-Grab	Water	07/06/17 / 15:00		1		X									HNO3	
Trip Blank	Water	07/06/17		2	X										HCL	

Additional Remarks: **STANDARD TURN AROUND TIME**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/06/17	15:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

Microbac OVD
Received: 07/07/2017 09:47
By: BRENDA GREGORY 221000102998

Brenda Gregory

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC®

Cooler ID 298

COOLER TEMP >6° C LOG

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

7/7/17 CMD

pH Exceptions

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

7/7/17 CMD

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

CMD 7/7/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17070282
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 18-JUL-2017

Samplenum	Container ID	Products
L17070282-01	932786	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	07-JUL-2017 11:01	BRG		
2	ANALYZ	V1	ORG4	07-JUL-2017 16:40	HRF	CLS	

Comments:Products cancelled.

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	07-JUL-2017 11:01	BRG		
2	ANALYZ	V1	ORG4	07-JUL-2017 16:40	HRF	CLS	

Comments:Products cancelled.

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	07-JUL-2017 11:01	BRG		
2	ANALYZ	V1	ORG4	07-JUL-2017 16:40	HRF	CLS	

Comments:Products cancelled.

Samplenum	Container ID	Products
L17070282-01	932787	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	07-JUL-2017 11:01	BRG		
2	PREP	W1	EXT	11-JUL-2017 14:32	CPD	CLS	

Comments:Products cancelled.

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		07-JUL-2017 11:01	BRG		

Samplenum	Container ID	Products
L17070282-01	932788	PCT-S 6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	07-JUL-2017 11:01	BRG		
2	ANALYZ	W1	SEM	14-JUL-2017 08:12	JWR	CLS	
3	STORE	SEM	A1	17-JUL-2017 15:35	BRG	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17070282
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 18-JUL-2017

Samplenum	Container ID	Products
L17070282-01	932789	PCT-S AG-MS BA-MS PB-MS SE-AX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	07-JUL-2017 11:01	BRG		
2	PREP	W1	DIG	07-JUL-2017 11:26	AC	CLS	
3	ANALYZ*	DIG	METALS	10-JUL-2017 11:17	JYH	AC	
4	STORE	DIG	A1	11-JUL-2017 12:27	CLS	ERP	

Sample extract/digestate/leachate

Samplenum	Container ID	Products
L17070282-01	932790	PCT-S 826-SPE 827-DIOXANE CR-6

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	07-JUL-2017 11:01	BRG		
2	ANALYZ	L1	WET	07-JUL-2017 11:06	SDC	CLS	
3	ANALYZ	W1	A1	11-JUL-2017 08:03	AZH	SDC	

Samplenum	Container ID	Products
L17070282-02	932791	PCT-S 826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	07-JUL-2017 11:01	BRG		
2	ANALYZ	V1	ORG4	07-JUL-2017 16:40	HRF	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	07-JUL-2017 11:01	BRG		
2	ANALYZ	V1	ORG4	07-JUL-2017 16:40	HRF	CLS	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L17070552

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on July 17 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17070552
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114637	I	5.0		J4616881980	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)	
11	Were pH ranges acceptable? (voa's excluded)	
12	Were VOA samples free of headspace (less than 6mm)?	

Microbac

Lab Report #: L17070552
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP650-6457	L17070552-01	07/12/2017 15:00	07/13/2017 10:15

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

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-17 17:36:23

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG621721	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG621629	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-17 17:37:23

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG621629	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG621629	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG621629	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG621629	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG621629	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG621574	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-17 17:36:55

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG621574	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG621574	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG621574	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG621574	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070552
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG621574	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-17 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Lab Report #: L17070552
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070552-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6457	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	07/14/2017 07:40
Workgroup #:	WG621721	**Analyst:**	DCM	**Run Date:**	07/14/2017 08:10
Collect Date:	07/12/2017 15:00	**Dilution:**	5	**File ID:**	S2170714001.031
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	9.02		1.00	0.500	0.250

Certificate of Analysis

Sample #:	L17070552-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP650-6457	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	06/07/2017 15:45
Workgroup #:	WG621629	**Analyst:**	DLP	**Run Date:**	07/13/2017 14:05
Collect Date:	07/12/2017 15:00	**Dilution:**	2	**File ID:**	00.1707131405-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	1.44		0.200	0.100	0.0500

Certificate of Analysis

Sample #:	L17070552-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6457	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG621574	**Analyst:**	DCM	**Run Date:**	07/13/2017 14:08
Collect Date:	07/12/2017 15:00	**Dilution:**	5	**File ID:**	TC07132017.019
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	69.0		10.0	5.00	2.50

2.1 General Chemistry Data

2.1.1 Ammonia Data

2.1.1.1 Summary Data

Microbac

Lab Report #: L17070552
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070552-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6457	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	07/14/2017 07:40
Workgroup #:	WG621721	**Analyst:**	DCM	**Run Date:**	07/14/2017 08:10
Collect Date:	07/12/2017 15:00	**Dilution:**	5	**File ID:**	S2170714001.031
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	9.02		1.00	0.500	0.250

2.1.1.2 QC Summary Data

Example Ammonia Calculations

(absorbance - intercept)/(slope * dilution) = 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: 14-JUL-2017
Analyst: DCM
Analyst: NA
Method: NH3
Instrument: SC2
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG621721

Calibration/Linearity	07-14-2017
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	DCM
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
14-JUL-2017

Secondary Reviewer:
14-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-14-2017 13:57:23

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1 AAB#: WG621721

Login Number: L17070552

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
LH18/24-SP650-6457	01	07/12/17					07/14/2017	1.7	28		07/14/17	1.7	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5384560
Report generated 07/14/2017 10:10

METHOD BLANK SUMMARY

Login Number:	L17070552	**Work Group:**	WG621721
Blank File ID:	S2170714001.011	**Blank Sample ID:**	WG621721-01
Prep Date:	07/14/17 07:44	**Instrument ID:**	SMARTCHEM2
Analyzed Date:	07/14/17 07:44	**Method:**	350.1
Analyst:	DCM		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621721-02	S2170714001.012	07/14/17 07:46	01
LCS2	WG621721-03	S2170714001.013	07/14/17 07:46	01
LH18/24-SP650-6457	L17070552-01	S2170714001.031	07/14/17 08:10	DL01
DUP	WG621721-05	S2170714001.034	07/14/17 08:13	01

Report Name: BLANK_SUMMARY
PDF File ID: 5384561
Report generated 07/14/2017 10:10

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070552 Prep Date: 07/14/17 07:44 Sample ID: WG621721-01
Instrument ID: SMARTCHEM2 Run Date: 07/14/17 07:44 Prep Method: 350.1
File ID: S2170714001.011 Analyst: DCM Method: 350.1
Workgroup (AAB#): WG621721 Matrix: Water Units: mg/L
Contract #: Cal ID: SMARTC-14-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.200	0.0500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5384562
14-JUL-2017 10:10

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070552 Analyst: DCM Prep Method: 350.1
Instrument ID: SMARTCHEM2 Matrix: Water Method: 350.1
Workgroup (AAB#): WG621721 Units: mg/L
QC Key: DOD4 Lot #: STD80299

Sample ID: WG621721-02 LCS File ID: S2170714001.012 Run Date: 07/14/2017 07:46
Sample ID: WG621721-03 LCS2 File ID: S2170714001.013 Run Date: 07/14/2017 07:46

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.92	96.0	2.00	1.98	98.9	2.96	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5384563
Report generated: 07/14/2017 10:10

2.1 General Chemistry Data

2.1.2 Orthophosphate Data

2.1.2.1 Summary Data

Microbac

Lab Report #: L17070552
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070552-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP650-6457	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	06/07/2017 15:45
Workgroup #:	WG621629	**Analyst:**	DLP	**Run Date:**	07/13/2017 14:05
Collect Date:	07/12/2017 15:00	**Dilution:**	2	**File ID:**	00.1707131405-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	1.44		0.200	0.100	0.0500

2.1.2.2 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: 13-JUL-2017
Analyst: DLP
Analyst: NA
Method: PO4
Instrument: V-1200
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG621629

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	SAV
Comments	

Primary Reviewer:
13-JUL-2017

Secondary Reviewer:
14-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-14-2017 14:25:23

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.2 AAB#: WG621629

Login Number: L17070552

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
LH18/24-SP650-6457	01	07/12/17					07/13/2017	1	2		07/13/17	1	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5385483
Report generated 07/14/2017 14:06

METHOD BLANK SUMMARY

Login Number:	L17070552	**Work Group:**	WG621629
Blank File ID:	00.1707131405-03	**Blank Sample ID:**	WG621629-01
Prep Date:	07/13/17 14:05	**Instrument ID:**	V-1200
Analyzed Date:	07/13/17 14:05	**Method:**	365.2
Analyst:	DLP		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621629-02	00.1707131405-04	07/13/17 14:05	
LCS2	WG621629-03	00.1707131405-05	07/13/17 14:05	
LH18/24-SP650-6457	L17070552-01	00.1707131405-06	07/13/17 14:05	
DUP	WG621629-05	00.1707131405-11	07/13/17 14:05	

Report Name: BLANK_SUMMARY
PDF File ID: 5385484
Report generated 07/14/2017 14:06

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070552 Prep Date: 07/13/17 14:05 Sample ID: WG621629-01
Instrument ID: V-1200 Run Date: 07/13/17 14:05 Prep Method: 365.2
File ID: 00.1707131405-03 Analyst: DLP Method: 365.2
Workgroup (AAB#): WG621629 Matrix: Water Units: mg/L
Contract #: Cal ID: V-1200-11-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Orthophosphate	0.0250	0.100	0.0250	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5385485
14-JUL-2017 14:06

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070552 Analyst: DLP Prep Method: 365.2
Instrument ID: V-1200 Matrix: Water Method: 365.2
Workgroup (AAB#): WG621629 Units: mg/L
QC Key: DOD4 Lot #: STD82902

Sample ID: WG621629-02 LCS File ID: 00.1707131405-04 Run Date: 07/13/2017 14:05
Sample ID: WG621629-03 LCS2 File ID: 00.1707131405-05 Run Date: 07/13/2017 14:05

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Orthophosphate	1.00	1.04	104	1.00	1.05	105	0.153	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5385486
Report generated: 07/14/2017 14:06

2.1.2.3 Raw Data

WG616997

Curves

Parameter: PO4

Spectrophotometer: V-1200

Calibration (Curve) standard stock: Std 79440

Concentration: 1000mg/L

Recipe for preparation of curve standards found in:
SOP: 3653 Revision: 17 Page: 9

Second Source Stock: 82182 (concentration: 10)

Daily Preparation: 10(10)/100 =

concentration = 1.0

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
1.0	50	1cm	890	~~0.608~~ 0.621
0.7				0.445
0.5				0.312
0.2				0.127
0.1				0.063
0.05				0.031
0				0.001
2nd Source (1.0)	↓	↓	↓	~~0.650~~ 0.637

Analyst: Tammy Morris

Date/Time: 6/7/17 @ 1545

DCN#126310

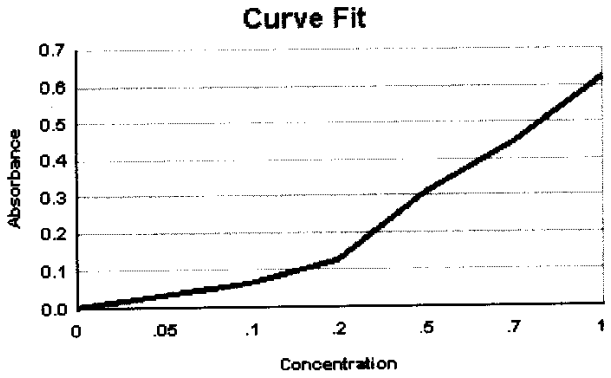
Microbac Laboratories Inc.
INITIAL CALIBRATION

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

[redacted]

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 Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 06/07/2017 16:28

[redacted]

WORKGROUP: WG621629

Orthophosphate

(orthophosphate1)

EPA 365.2 / SM4500-P E
SOP K3653 Rev M
Color Reagent Chemicals
RGT 40280
RGT 40466
RGT 39475
COA 18278

CCV: STD 82901
Daily Dilution: 5(5)/50 = 2
Daily Dilution: 0.5

LCS: STD 82902
Daily Dilution: 10(10)/100 = 1
Daily Dilution: 0.10
Spectrophotometer: V-1200
Curve ID: 616997
6-07-17

Spike: STD 82902
Daily Dilution: 2(10)/50 = 2
Daily Dilution: 0.40

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: 0.5 mg/L	50	✓		0.326
BLK/CCB:	50	✓		0.000
LCS: 0.10 ppm	50	✓		0.653
LCSD: 0.10 ppm	50	✓		0.654
07-552-01	50	✓	½ 1/5	0.449 / 0.236
07-555-01	50	✓		0.245
-02	50	✓		0.023
-03	50	✓		0.058
04	50	✓		0.025
	50			
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP: 07-553-01	50	✓		0.246
MS: (553-02	50	✓		0.254
MSD: ( )	50			
CCV: ( ) 0.5	50			0.330
CCB: 0	50			0.000

Analyst: Ashley Payne
Date / Time: 07-13-17 / 1405

DCN#127001

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG621629
Analyte: ORTHOPHOSPHATE

Analyst: DLP
Date: 07/13/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG621629-01	50	50	0	0.6240	0.001247	-0.0019981	-0.0019981	1	mg/L
WG621629-02	50	50	0.653	0.6240	0.001247	1.0444	1.0444	1	mg/L
WG621629-03	50	50	0.654	0.6240	0.001247	1.0460	1.0460	1	mg/L
L17070552-01	50	50	0.449	0.6240	0.001247	0.71752	1.4350	2	mg/L
L17070555-01	50	50	0.245	0.6240	0.001247	0.39061	0.39061	1	mg/L
WG621629-04	50	50	0.245	0.6240	0.001247	0.39061	0.39061	1	mg/L
WG621629-06	50	50	0.0230	0.6240	0.001247	0.034859	0.034859	1	mg/L
L17070555-02	50	50	0.0230	0.6240	0.001247	0.034859	0.034859 F	1	mg/L
L17070555-03	50	50	0.0580	0.6240	0.001247	0.090946	0.090946	1	mg/L
L17070555-04	50	50	0.0250	0.6240	0.001247	0.038064	0.038064 F	1	mg/L
WG621629-05	50	50	0.245	0.6240	0.001247	0.39061	0.39061	1	mg/L
WG621629-07	50	50	0.254	0.6240	0.001247	0.40503	0.40503	1	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 07/13/2017 15:54

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG621695
File ID: 00.1707131405-01
CCV ID: WG621695-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 07/13/2017
Run Time: 14:05
Analyst: DLP
Cal ID: V-1200 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.520	0.652	4.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/13/2017 15:52

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG621695
File ID: 00.1707131405-13
CCV ID: WG621695-03
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 07/13/2017
Run Time: 14:05
Analyst: DLP
Cal ID: V-1200 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.527	0.660	5.4	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/13/2017 15:52

[redacted]

2.1 General Chemistry Data

2.1.3 Total Organic Carbon Data

2.1.3.1 Summary Data

Microbac

Lab Report #: L17070552
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070552-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6457	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG621574	**Analyst:**	DCM	**Run Date:**	07/13/2017 14:08
Collect Date:	07/12/2017 15:00	**Dilution:**	5	**File ID:**	TC07132017.019
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	69.0		10.0	5.00	2.50

2.1.3.2 QC Summary Data

Total Organic Carbon Example Calculations
(Direct Readout Parameter)

(Readout)/(dilution) = 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: 13-JUL-2017
Analyst: DCM
Analyst: NA
Method: TOC
Instrument: TOC-VWP
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG621574

Calibration/Linearity	02-10-2017
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	DCM
Secondary Reviewer	SAV
Comments	

Primary Reviewer:
13-JUL-2017

Secondary Reviewer:
14-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-14-2017 14:25:05

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 415.1 **AAB#:** WG621574

Login Number: L17070552

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
LH18/24-SP650-6457	01	07/12/17					07/13/2017	1	28		07/13/17	1	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5385467
Report generated 07/14/2017 14:03

METHOD BLANK SUMMARY

Login Number:	L17070552	**Work Group:**	WG621574
Blank File ID:	TC07132017.004	**Blank Sample ID:**	WG621574-01
Prep Date:	07/13/17 09:18	**Instrument ID:**	TOC-VWP
Analyzed Date:	07/13/17 09:18	**Method:**	415.1
Analyst:	DCM		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621574-02	TC07132017.005	07/13/17 09:37	01
LCS2	WG621574-03	TC07132017.006	07/13/17 09:58	01
DUP	WG621574-05	TC07132017.013	07/13/17 12:23	01
LH18/24-SP650-6457	L17070552-01	TC07132017.019	07/13/17 14:08	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5385468
Report generated 07/14/2017 14:03

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070552 Prep Date: 07/13/17 09:18 Sample ID: WG621574-01
Instrument ID: TOC-VWP Run Date: 07/13/17 09:18 Prep Method: 415.1
File ID: TC07132017.004 Analyst: DCM Method: 415.1
Workgroup (AAB#): WG621574 Matrix: Water Units: mg/L
Contract #: Cal ID: TOC-VW-10-FEB-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Total Organic Carbon	0.500	2.00	0.500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5385469
14-JUL-2017 14:03

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070552 Analyst: DCM Prep Method: 415.1
Instrument ID: TOC-VWP Matrix: Water Method: 415.1
Workgroup (AAB#): WG621574 Units: mg/L
QC Key: DOD4 Lot #: STD80787

Sample ID: WG621574-02 LCS File ID: TC07132017.005 Run Date: 07/13/2017 09:37
Sample ID: WG621574-03 LCS2 File ID: TC07132017.006 Run Date: 07/13/2017 09:58

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	27.5	110	25.0	27.5	110	0.0364	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5385470
Report generated: 07/14/2017 14:03

2.1.3.3 Raw Data

Curve

~~WG602411~~ ~~WG602476~~ dm 1/13/17 WG602481

Total Organic Carbon

MAKE DAILY

CCV (TOC): _____ (5/200)(1000) = 25mg/L

LCS (TOC): _____ (5/200)(1000) = 25mg/L

CCV (TIC): _____ (5/200)(1000) = 25mg/L

MS (TOC): _____

Calibration Curve Date: _____

Reagent: RGT 38944, RGT 37673

☑ SM5310-C : Matrix 2 WG_____

☐ EPA 415.1/9060A(mod): Matrix 1 WG_____ WG_____

SOP: K 4151 Rev. ~~17~~ 18 dm 1/13/17

Instrument: Shimadza TOC-VWP/ASI

DAILY CHECK

☑ drain reservoir filled
☑ ASI water bottle full
☐ dilution water bottle full

☑ 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	all points analyzed in duplicate	
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		
45		
46		
47		
48		
49		
50		

Position	Sample ID	Dilution
51		
52	See SOP	
53	for point	
54	Preparation	
55		
56		
57		
58		
59		
60	5/200 (100) = 25	
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		

Analyst: David Merkle Date/Time: 2/10/17

DCN#123915

C:\TOC3201\Data\CURVES-02-10-2017.t32

	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

Instr.Information

System	TOCVW ASI
Detector	Wet Chemical

Cal. Curve

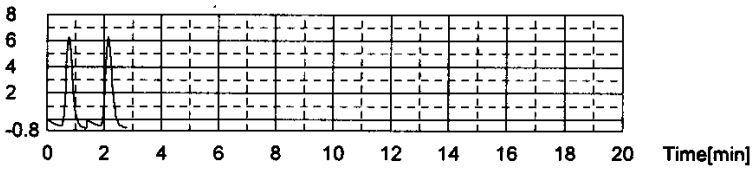
Sample Name:	TCCURVE
Sample ID:	Untitled
Cal. Curve:	TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status	Completed

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

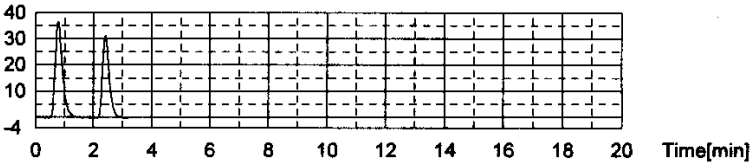
Acid Add. 0.000%
Mean Area 10.82



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

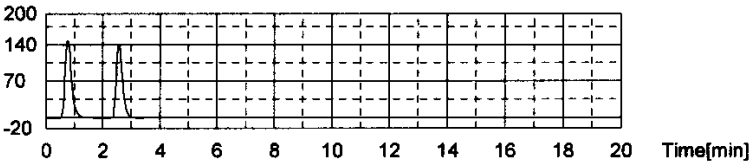
Acid Add. 0.000%
Mean Area 57.92



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

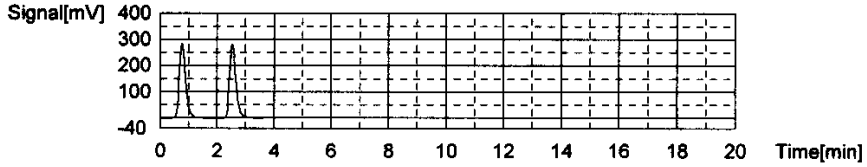
Acid Add. 0.000%
Mean Area 227.4



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

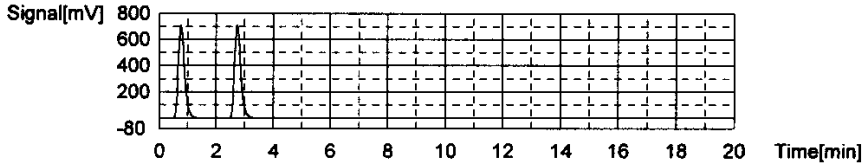
Acid Add. 0.000%
Mean Area 440.2



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

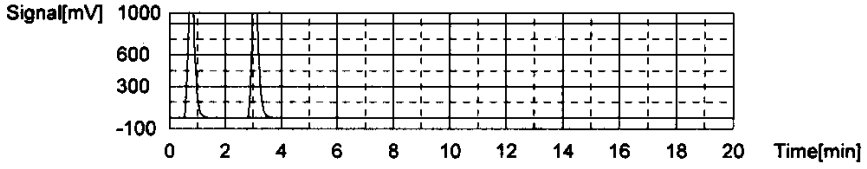
Acid Add. 0.000%
Mean Area 1092



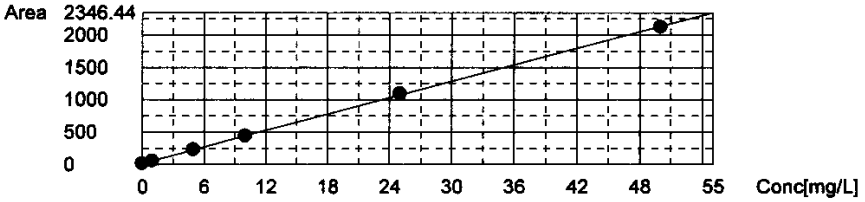
Conc: 50.00mg/L

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

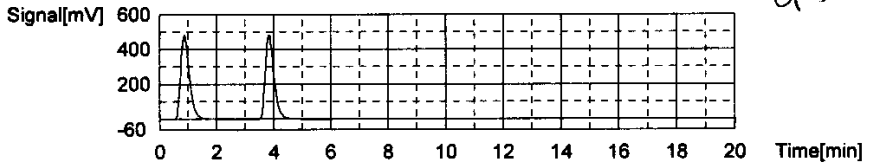
1. Det

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

95.6%

Mean Area 1029
Mean Conc. 23.90mg/L



Cal. Curve

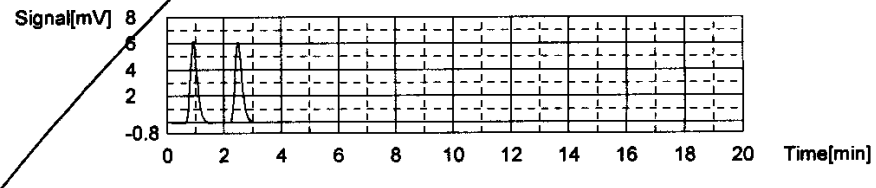
Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed

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

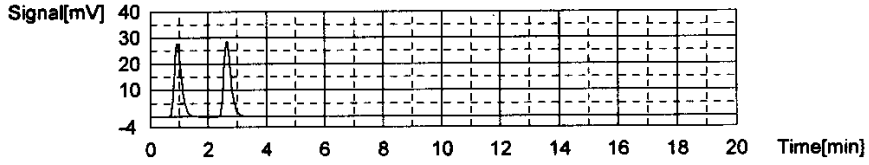
Acid Add. 3.000%
Mean Area 10.51



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

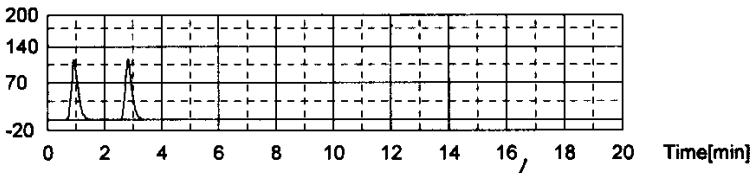


Conc: 5.000mg/L

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

dcm
3/23/17

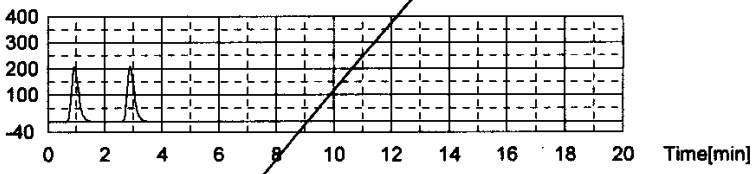
Acid Add. 3.000%
Mean Area 189.6



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

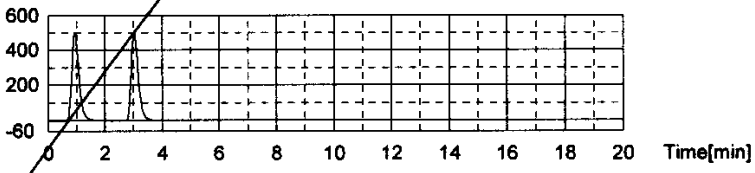
Acid Add. 3.000%
Mean Area 361.4



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

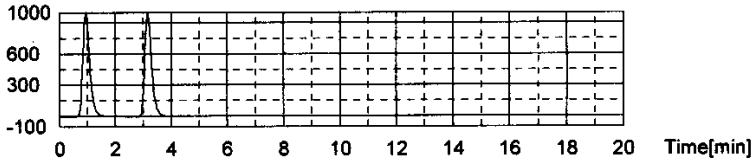
Acid Add. 3.000%
Mean Area 858.1



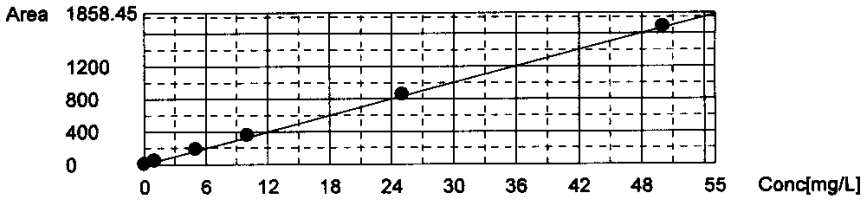
Conc: 50.00mg/L

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

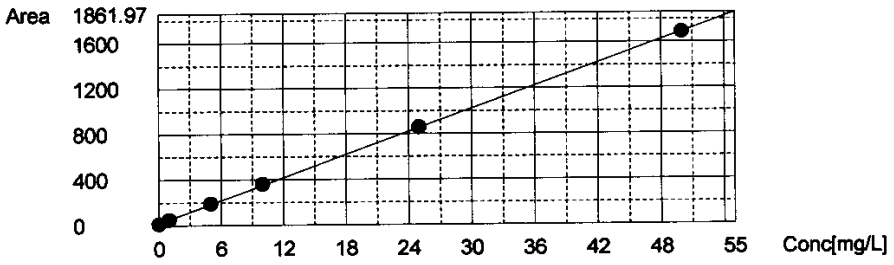
Acid Add.	3.000%
Mean Area	858.1
SD Area	1.697
CV Area	0.20%
Vial	4

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
r^2	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

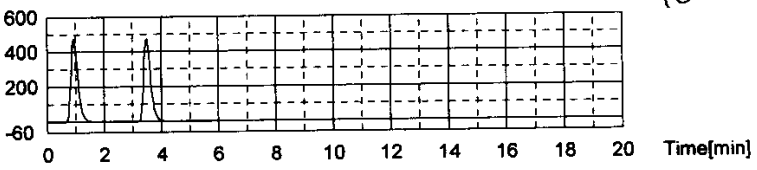
1. Det

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_1	2/10/2017 4:06:15 PM
2	814.6	24.33mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	2/10/2017 4:12:07 PM

96.9%

Mean Area 812.5
Mean Conc. 24.27mg/L



Sample

Sample Name:
Sample ID: Untitled
Origin: TCCURVE-02-10-2017.2017_02_10_14_14_25.cal
Status Completed
Chk. Result

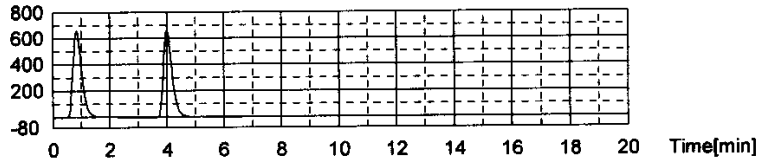
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

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	2/10/2017 4:25:42 PM
2	1411	0.000mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_14_14_2	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

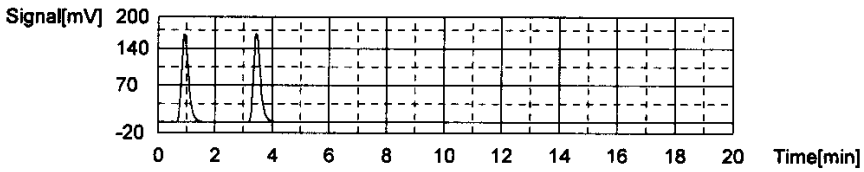
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

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_1	2/10/2017 4:37:09 PM
2	287.2	8.577mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	2/10/2017 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

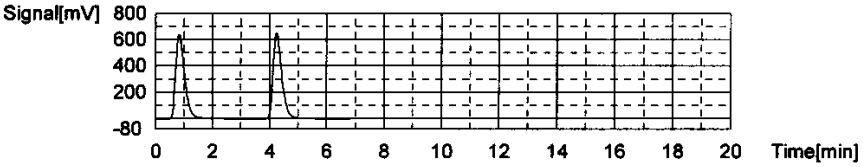
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

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_59	2/10/2017 4:55:07 PM
2	1373	32.04mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_59	2/10/2017 5:01:02 PM

Mean Area 1376
Mean Conc. 32.10mg/L



WORKGROUP: WG621574

Total Organic Carbon

MAKE DAILY

CCV (TOC): Std 79381 / (5/200)(1000) = 25mg/L

CCV (TIC): Std 80416 / (5/200)(1000) = 25mg/L

Calibration Curve Date: 2/10/17

LCS (TOC): Std 80787 / (5/200)(1000) = 25mg/L

MS (TOC): Std 80787 / 0.41(1000)/40=KJ

Reagent: RGT 40592

RGT 39266

☑ SM5310-C : Matrix 2 WG 621574

☐ EPA 415.1/9060A(mod): Matrix 1 WG_____

☐ SW846 9060A (4 rep) WG_____

SOP: K 4/15/ Rev. 18

Instrument: Shimadza TOC-VWP/ASI

DAILY CHECK

☑ drain reservoir filled
☑ ASI water bottle full
☑ dilution water bottle full

☑ 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	LCSDUP	
7	C7-475-01	
8	C3	
9	C4	
10	C7-452-01	
11	C7-456-01	
12	C7-457-01	
13	DUP C7-456-01	
14	CCV	
15	CCB	
16	MS C7-456-01	
17	CCV	
18	CCB	
19	552-01	1/5
20	559 01	
21	CCV	
22	CCB	
23		
24		
25		

Position	Sample ID	Dilution
26		
27		
28		
29		
30		
31		
32		
33		
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50		

Position	Sample ID	Dilution
51		
52		
53		
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75		

Analyst: David Merkle

Date/Time: 7/13/17

DCN#126991

C:\TOC3201\Data\07-13-2017-TOC-DCM.t32

	Analysi	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:1.703mg/L TC:28.02mg/L IC:26.32mg/L	Completed	7/13/2017 8:43:26 AM	1
2	TOC	TOC/TIC	TOC:28.57mg/L TC:38.42mg/L IC:9.849mg/L	Completed	7/13/2017 8:56:21 AM	2
3	TOC	CCV	!!Error!! TOC:26.14mg/L TC:25.85mg/L IC:-0.2850mg/L	Completed	7/13/2017 9:08:38 AM	3
4	TOC	WG621574-01 BLK	!!Error!! TOC:0.06885mg/L TC:-0.1415mg/L IC:-0.2104mg/	Completed	7/13/2017 9:29:52 AM	0
5	TOC	WG621574-02 LCS	!!Error!! TOC:27.51mg/L TC:27.20mg/L IC:-0.3099mg/L	Completed	7/13/2017 9:50:55 AM	5
6	TOC	WG621574-03 LCSDU	!!Error!! TOC:27.50mg/L TC:27.19mg/L IC:-0.3100mg/L	Completed	7/13/2017 10:12:06 AM	6
7	TOC	L17070475-01	TOC:2.950mg/L TC:23.13mg/L IC:20.18mg/L	Completed	7/13/2017 10:34:00 AM	7
8	TOC	L17070475-03	TOC:2.234mg/L TC:20.49mg/L IC:18.25mg/L	Completed	7/13/2017 10:56:01 AM	8
9	TOC	L17070475-04	TOC:2.395mg/L TC:22.64mg/L IC:20.25mg/L	Completed	7/13/2017 11:18:22 AM	9
10	TOC	L17070452-01	!!Error!! TOC:0.2570mg/L TC:0.05316mg/L IC:-0.2038mg/L	Completed	7/13/2017 11:37:48 AM	10
11	TOC	L17070456-01	!!Error!! TOC:0.1994mg/L TC:-0.07762mg/L IC:-0.2770mg/	Completed	7/13/2017 11:57:04 AM	11
12	TOC	L17070457-01	!!Error!! TOC:0.2232mg/L TC:-0.05671mg/L IC:-0.2799mg/	Completed	7/13/2017 12:16:18 PM	12
13	TOC	WG621574-05 DUP	!!Error!! TOC:0.2032mg/L TC:-0.07596mg/L IC:-0.2792mg/	Completed	7/13/2017 12:35:30 PM	13
14	TOC	CCV	!!Error!! TOC:27.17mg/L TC:26.91mg/L IC:-0.2588mg/L	Completed	7/13/2017 12:47:48 PM	14
15	TOC	CCB	!!Error!! TOC:0.07783mg/L TC:-0.1490mg/L IC:-0.2268mg/	Completed	7/13/2017 12:56:48 PM	0
16	TOC	WG621574-06 MS	!!Error!! TOC:11.06mg/L TC:10.85mg/L IC:-0.2105mg/L	Completed	7/13/2017 1:17:48 PM	16
17	TOC	CCV	!!Error!! TOC:26.46mg/L TC:26.21mg/L IC:-0.2513mg/L	Completed	7/13/2017 1:29:46 PM	17
18	TOC	CCB	!!Error!! TOC:0.07105mg/L TC:-0.1459mg/L IC:-0.2169mg/	Completed	7/13/2017 1:38:46 PM	0
19	TOC	L17070552-01 (5)	TOC:13.79mg/L TC:28.45mg/L IC:14.66mg/L	Completed	7/13/2017 2:23:15 PM	19
20	TOC	L17070559-01	TOC:9.946mg/L TC:19.93mg/L IC:9.983mg/L	Completed	7/13/2017 2:48:04 PM	20
21	TOC	CCV	!!Error!! TOC:27.30mg/L TC:27.10mg/L IC:-0.1984mg/L	Completed	7/13/2017 3:00:26 PM	21
22	TOC	CCB	!!Error!! TOC:0.07771mg/L TC:-0.1383mg/L IC:-0.2160mg/	Completed	7/13/2017 3:09:24 PM	0

7/13/2017 3:34:45 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

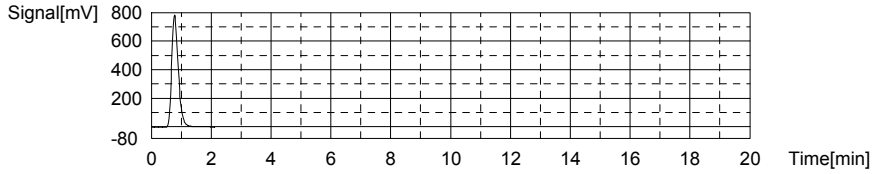
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.703mg/L TC:28.02mg/L IC:26.32mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1203	28.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 8:38:19 AM

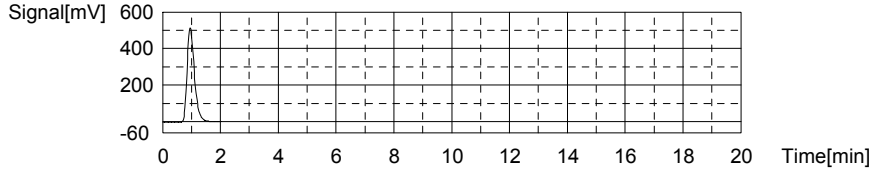
Mean Area 1203
Mean Conc. 28.02mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	899.8	26.32mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 8:43:26 AM

Mean Area 899.8
Mean Conc. 26.32mg/L



Sample

Sample Name: TOC/TIC
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

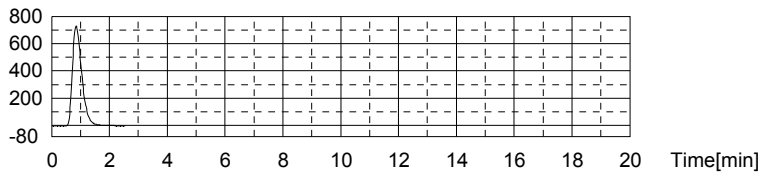
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:28.57mg/L TC:38.42mg/L IC:9.849mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1643	38.42mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 8:51:25 AM

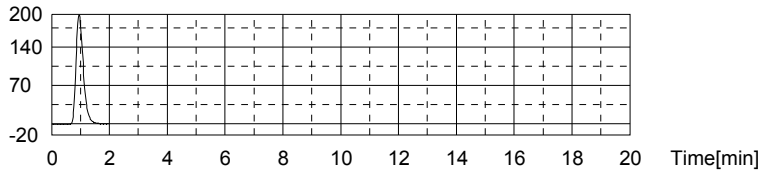
Mean Area 1643
Mean Conc. 38.42mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	348.2	9.849mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 8:56:21 AM

Mean Area 348.2
Mean Conc. 9.849mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

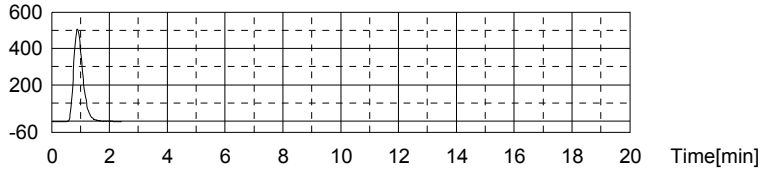
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.14mg/L TC:25.85mg/L IC:-0.2850mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1111	25.85mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 9:04:13 AM

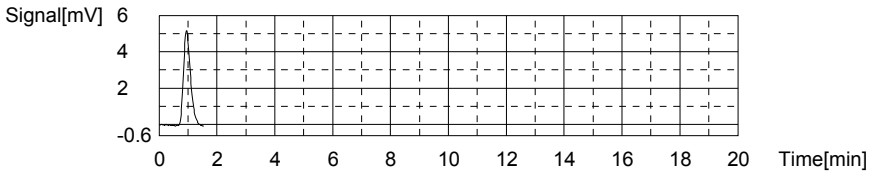
Mean Area 1111
Mean Conc. 25.85mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.870	-0.2850mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 9:08:38 AM

Mean Area 8.870
Mean Conc. -0.2850mg/L



Sample

Sample Name: WG621574-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

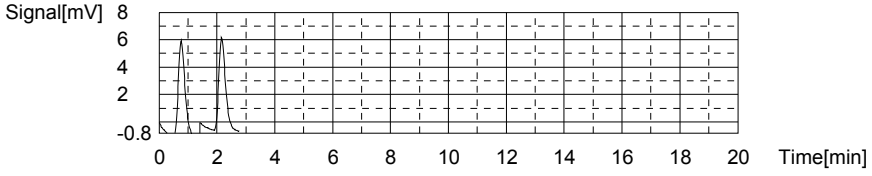
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.06885mg/L TC:-0.1415mg/L IC:-0.2104mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.07	-0.1369mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 9:18:18 AM
2	10.68	-0.1461mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 9:21:49 AM

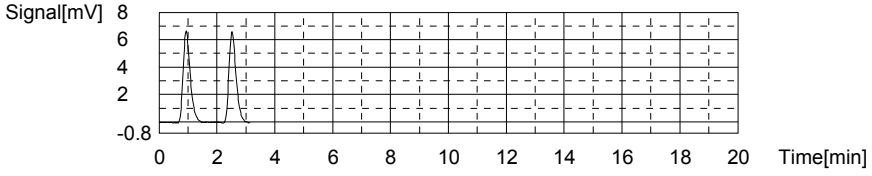
Mean Area 10.88
Mean Conc. -0.1415mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.44	-0.2083mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 9:25:50 AM
2	11.30	-0.2125mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 9:29:52 AM

Mean Area 11.37
Mean Conc. -0.2104mg/L



Sample

Sample Name: WG621574-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

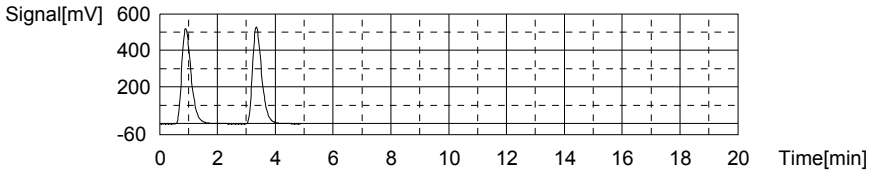
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.51mg/L TC:27.20mg/L IC:-0.3099mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1171	27.27mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 9:37:35 AM
2	1165	27.13mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 9:42:16 AM

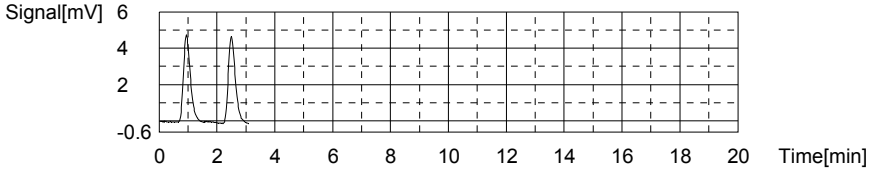
Mean Area 1168
Mean Conc. 27.20mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.993	-0.3112mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/13/2017 9:46:41 AM
2	8.081	-0.3086mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/13/2017 9:50:55 AM

Mean Area 8.037
Mean Conc. -0.3099mg/L



Sample

Sample Name: WG621574-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

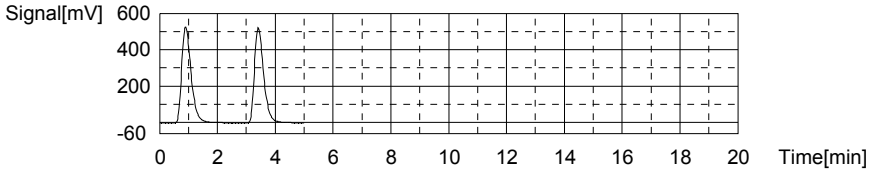
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.50mg/L TC:27.19mg/L IC:-0.3100mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1185	27.60mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 9:58:52 AM
2	1150	26.77mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 10:03:37 AM

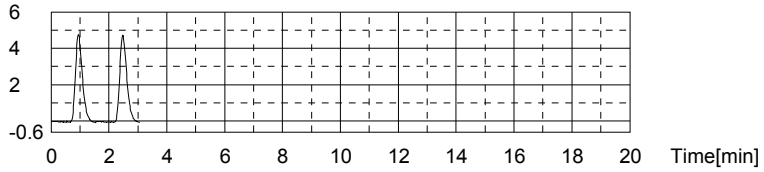
Mean Area 1168
Mean Conc. 27.19mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.035	-0.3100mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 10:07:58 AM
2	8.033	-0.3100mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 10:12:06 AM

Mean Area 8.034
Mean Conc. -0.3100mg/L



Sample

Sample Name: L17070475-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

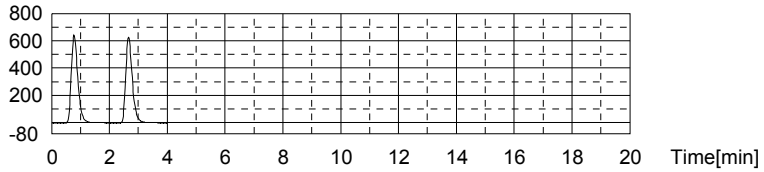
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.950mg/L TC:23.13mg/L IC:20.18mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1000	23.23mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 10:19:26 AM
2	991.8	23.03mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 10:24:01 AM

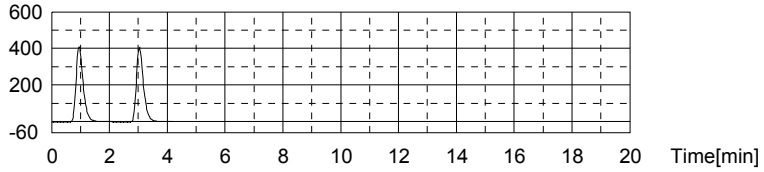
Mean Area 995.9
Mean Conc. 23.13mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	697.3	20.27mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 10:29:06 AM
2	691.1	20.09mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 10:34:00 AM

Mean Area 694.2
Mean Conc. 20.18mg/L



Sample

Sample Name: L17070475-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

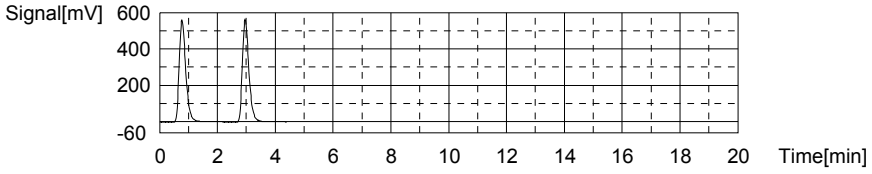
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.234mg/L TC:20.49mg/L IC:18.25mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	882.8	20.46mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 10:41:38 AM
2	885.2	20.52mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 10:46:06 AM

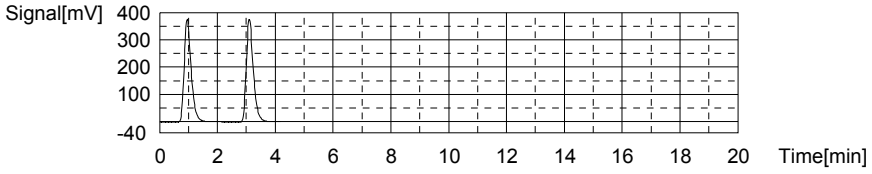
Mean Area 884.0
Mean Conc. 20.49mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	629.4	18.25mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/13/2017 10:51:14 AM
2	629.9	18.26mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/13/2017 10:56:01 AM

Mean Area 629.6
Mean Conc. 18.25mg/L



Sample

Sample Name: L17070475-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

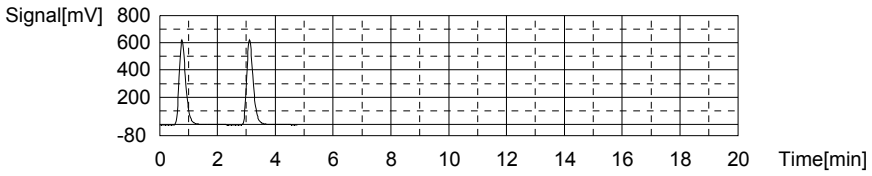
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.395mg/L TC:22.64mg/L IC:20.25mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	973.1	22.59mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 11:03:48 AM
2	977.5	22.70mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 11:08:30 AM

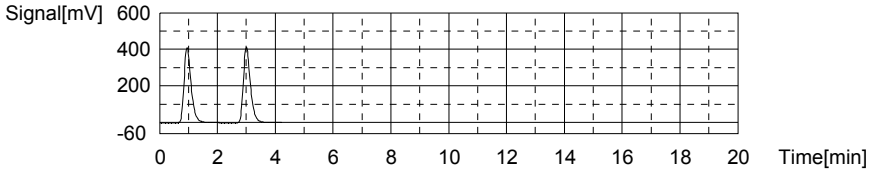
Mean Area 975.3
Mean Conc. 22.64mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	692.6	20.13mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 11:13:32 AM
2	700.4	20.37mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 11:18:22 AM

Mean Area 696.5
Mean Conc. 20.25mg/L



Sample

Sample Name: L17070452-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

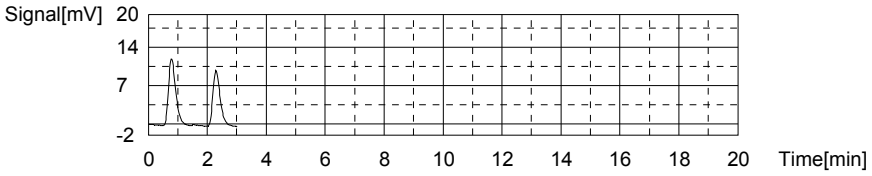
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.2570mg/L TC:0.05316mg/L IC:-0.2038mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	20.78	0.09249mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 11:25:19 AM
2	17.45	0.01382mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 11:29:05 AM

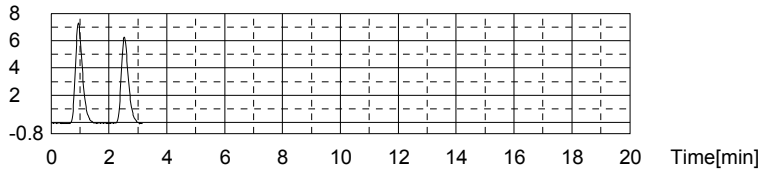
Mean Area 19.12
Mean Conc. 0.05316mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.50	-0.1766mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 11:33:36 AM
2	10.68	-0.2310mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 11:37:48 AM

Mean Area 11.59
Mean Conc. -0.2038mg/L



Sample

Sample Name: L17070456-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

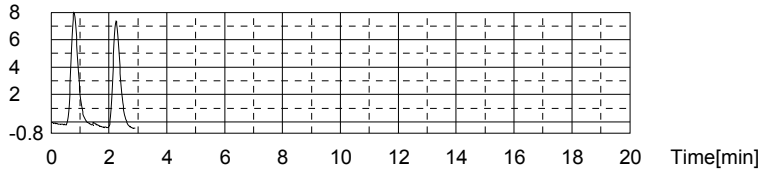
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1994mg/L TC:-0.07762mg/L IC:-0.2770mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	13.88	-0.07053mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 11:44:42 AM
2	13.28	-0.08470mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 11:48:25 AM

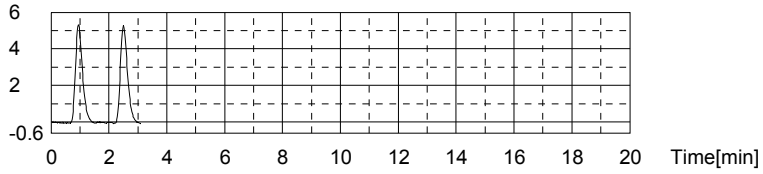
Mean Area 13.58
Mean Conc. -0.07762mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.129	-0.2773mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 11:52:49 AM
2	9.151	-0.2766mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 11:57:04 AM

Mean Area 9.140
Mean Conc. -0.2770mg/L



Sample

Sample Name: L17070457-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

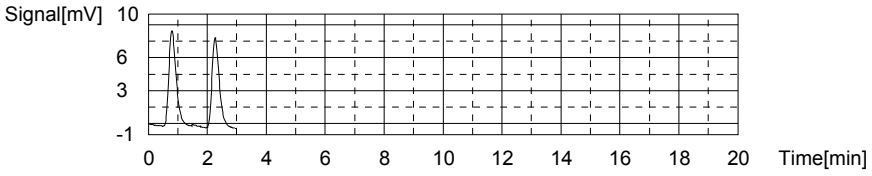
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.2232mg/L TC:-0.05671mg/L IC:-0.2799mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	14.91	-0.04619mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 12:03:59 PM
2	14.02	-0.06722mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 12:07:43 PM

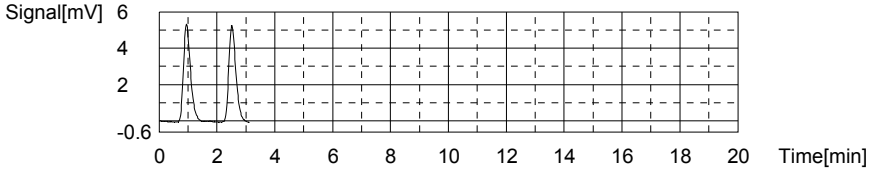
Mean Area 14.47
Mean Conc. -0.05671mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.127	-0.2774mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/13/2017 12:12:06 PM
2	8.954	-0.2825mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/13/2017 12:16:18 PM

Mean Area 9.041
Mean Conc. -0.2799mg/L



Sample

Sample Name: WG621574-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

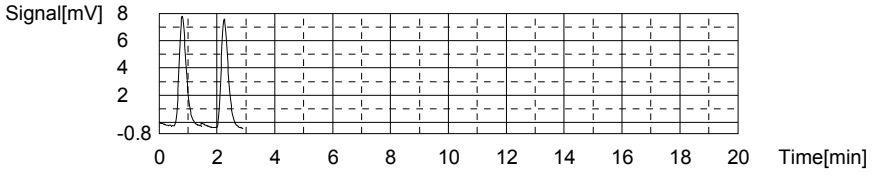
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.2032mg/L TC:-0.07596mg/L IC:-0.2792mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	13.77	-0.07313mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 12:23:12 PM
2	13.53	-0.07880mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 12:26:55 PM

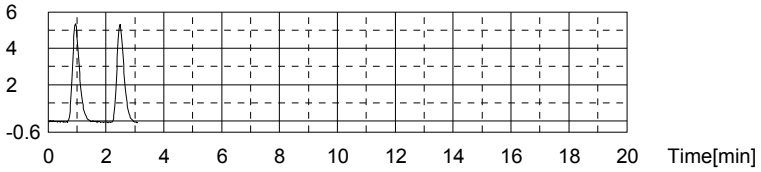
Mean Area 13.65
Mean Conc. -0.07596mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.997	-0.2812mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 12:31:18 PM
2	9.135	-0.2771mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 12:35:30 PM

Mean Area 9.066
Mean Conc. -0.2792mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

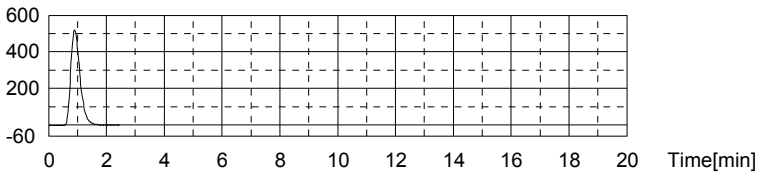
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.17mg/L TC:26.91mg/L IC:-0.2588mg/L

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_5	7/13/2017 12:43:24 PM

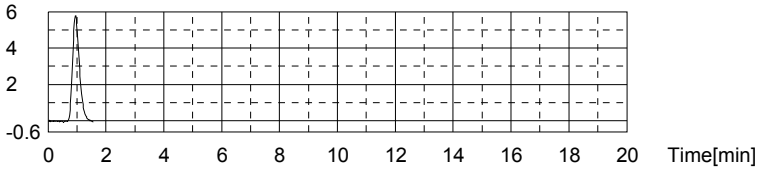
Mean Area 1156
Mean Conc. 26.91mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.750	-0.2588mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 12:47:48 PM

Mean Area 9.750
Mean Conc. -0.2588mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

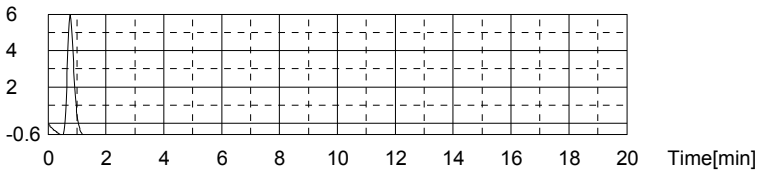
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.07783mg/L TC:-0.1490mg/L IC:-0.2268mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.56	-0.1490mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 12:52:48 PM

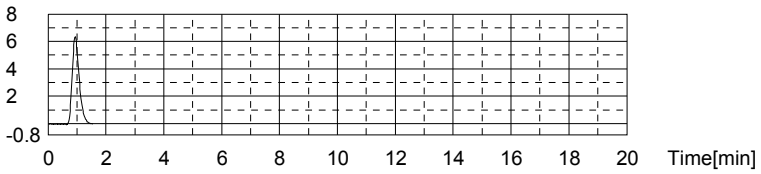
Mean Area 10.56
Mean Conc. -0.1490mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.82	-0.2268mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 12:56:48 PM

Mean Area 10.82
Mean Conc. -0.2268mg/L



Sample

Sample Name: WG621574-06 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

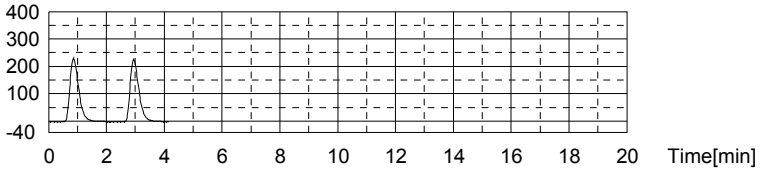
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:11.06mg/L TC:10.85mg/L IC:-0.2105mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	480.8	10.96mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 1:04:20 PM
2	471.0	10.73mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 1:08:53 PM

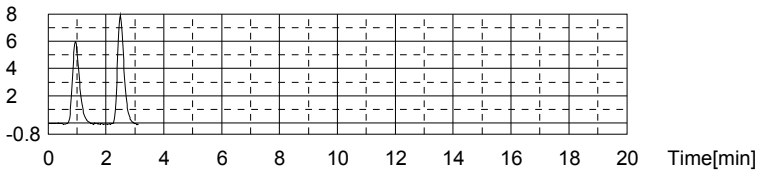
Mean Area 475.9
Mean Conc. 10.85mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.27	-0.2432mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 1:13:43 PM
2	12.46	-0.1778mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 1:17:48 PM

Mean Area 11.37
Mean Conc. -0.2105mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

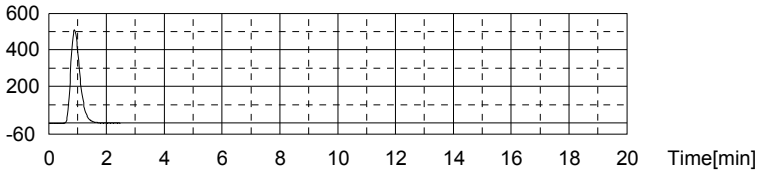
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.46mg/L TC:26.21mg/L IC:-0.2513mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1126	26.21mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 1:25:22 PM

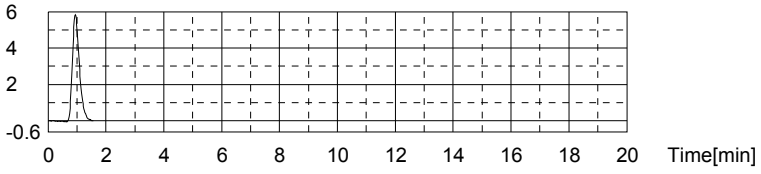
Mean Area 1126
Mean Conc. 26.21mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.00	-0.2513mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 1:29:46 PM

Mean Area 10.00
Mean Conc. -0.2513mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

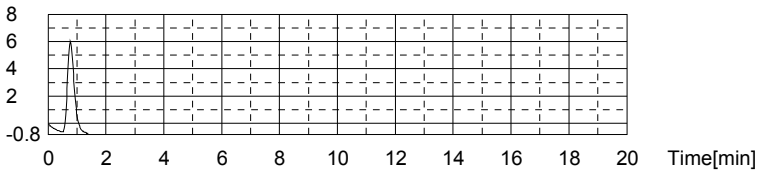
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.07105mg/L TC:-0.1459mg/L IC:-0.2169mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.69	-0.1459mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 1:34:46 PM

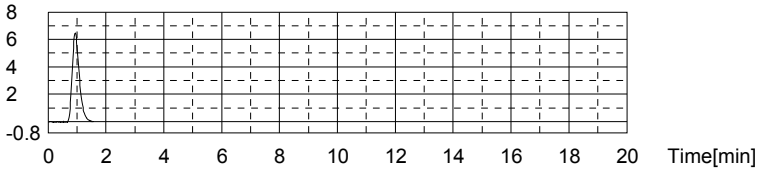
Mean Area 10.69
Mean Conc. -0.1459mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.15	-0.2169mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 1:38:46 PM

Mean Area 11.15
Mean Conc. -0.2169mg/L



Sample

Sample Name: L17070552-01 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

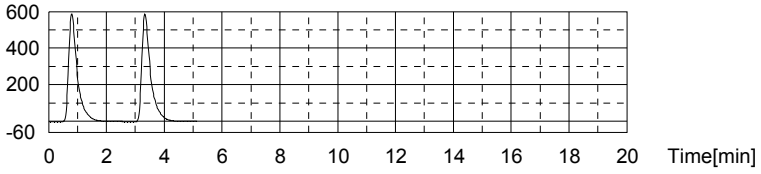
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:13.79mg/L TC:28.45mg/L IC:14.66mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1212	28.24mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 2:08:28 PM
2	1230	28.66mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 2:13:26 PM

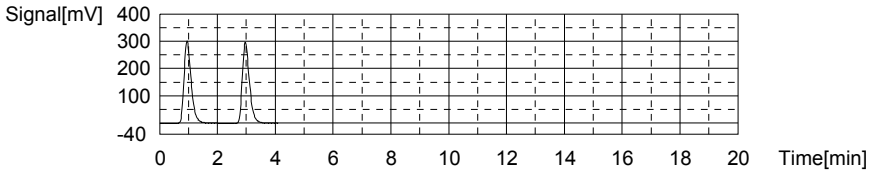
Mean Area 1221
Mean Conc. 28.45mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	512.6	14.76mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 2:18:24 PM
2	506.1	14.56mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 2:23:15 PM

Mean Area 509.4
Mean Conc. 14.66mg/L



Sample

Sample Name: L17070559-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

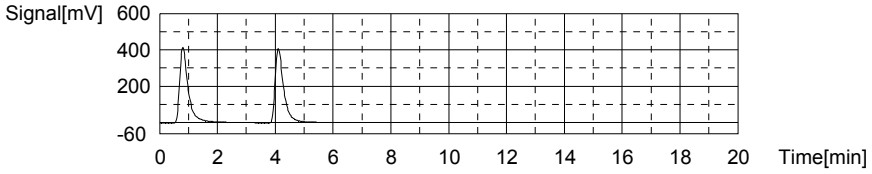
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:9.946mg/L TC:19.93mg/L IC:9.983mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	865.4	20.05mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 2:31:59 PM
2	855.3	19.81mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/13/2017 2:38:25 PM

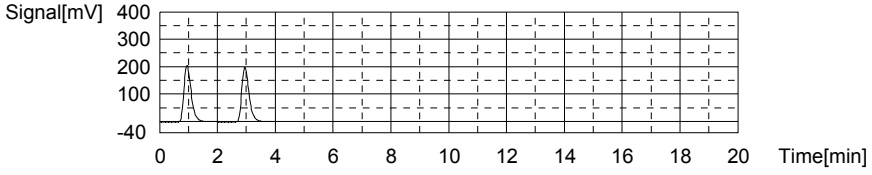
Mean Area 860.4
Mean Conc. 19.93mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	357.3	10.12mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 2:43:20 PM
2	348.1	9.846mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 2:48:04 PM

Mean Area 352.7
Mean Conc. 9.983mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

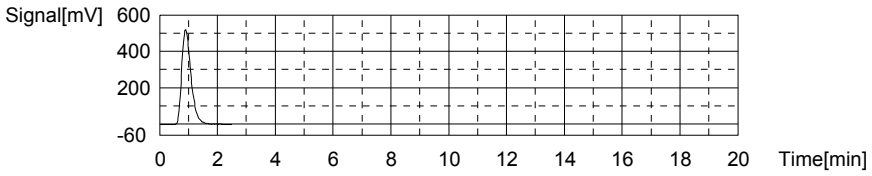
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.30mg/L TC:27.10mg/L IC:-0.1984mg/L

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_57	7/13/2017 2:55:59 PM

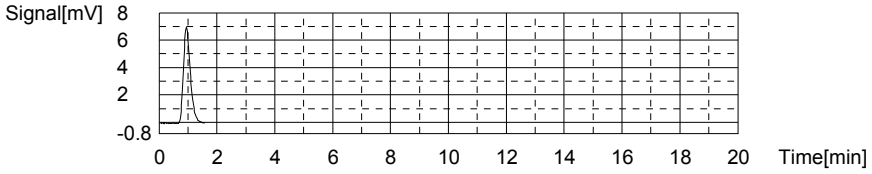
Mean Area 1164
Mean Conc. 27.10mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.77	-0.1984mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 3:00:26 PM

Mean Area 11.77
Mean Conc. -0.1984mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

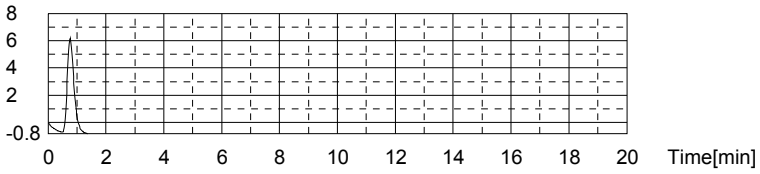
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.07771mg/L TC:-0.1383mg/L IC:-0.2160mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.01	-0.1383mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/13/2017 3:05:26 PM

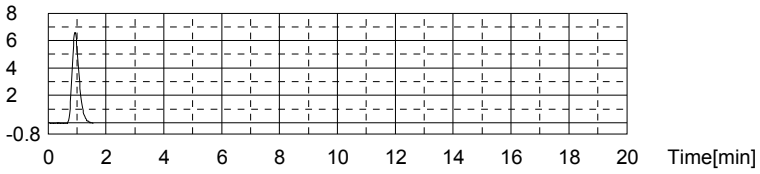
Mean Area 11.01
Mean Conc. -0.1383mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.18	-0.2160mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/13/2017 3:09:24 PM

Mean Area 11.18
Mean Conc. -0.2160mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
July 17, 2017

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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	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

Microbac Laboratories Inc.
List of Valid Qualifiers
July 17, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
July 17, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

AECOM

Chain of Custody Record

COC Number:

Laboratory:	Microbac POC: Stephanie Mossburg	Project Manager: [redacted] ELSPETH SHARP	Mail to: Linda Raabe
Address:	158 Starlite Drive	Phone/Fax Number: 210-296-2000	112 East Pecan STE. 400
	Marietta, OH 45750	Sampler (print): Scott Beesinger	San Antonio, TX 78205
Phone:	1-800-373-4071		210-296-2000
Client:	AECOM	Signature: Scott Beesinger	Fed Ex Airbill No:
Address:	112 East Pecan Ste. 400		
	San Antonio, TX 78205	pH:	Program:
Turn Around Time:	STANDARD		
Project Name/Location:	Longhorn		
Project Number:	60256135, GWTPTHRU MAR16		

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp*	Grab	Matrix	Number of Containers	TOC	Ammonia-N	Orthophosphate						ERPIMS SA CODE	ERPIMS Cooler ID	LOT CONTROL NUMBERS ABLOT	LOT CONTROL NUMBERS EBLOT	LOT CONTROL NUMBERS TBLOT
GWTP Weekly	LH8/24-SP650-6457			7/12/17	1500		X	W	3	X	X	X										

Comments: STANDARD TAT

Relinquished by: (Signature)	Scott Beesinger	Date: 7/12/17	Time: 1545	Received:
Relinquished by: (Signature)		Date:	Time:	Received (Signature):

Microbac OVD
Received: 07/13/2017 10:15
By: CARA STRICKLER
221000103258

Time	Relinquished by: (Signature)
Time	Remarks:

*Homogenize all composite samples prior to analysis

*Distribution: White to Laboratory, Canary to Project Manager, Pink QA/QC Manager

MICROBAC®

COOLER TEMP >6° C LOG

Cooler ID 3258

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

CMD 7/13/17

pH Exceptions

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

CMD 7/13/17

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

CMD 7/13/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17070552
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 24-JUL-2017

Samplenum	Container ID	Products
L17070552-01	934835	8260 PO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	13-JUL-2017 10:30	CLS		
2	ANALYZ	W1	WET	13-JUL-2017 10:35	AZH	CLS	
3	STORE	W1	A1	14-JUL-2017 08:06	CLS	DLP	

Samplenum	Container ID	Products
L17070552-01	934836	GRO TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	13-JUL-2017 10:30	CLS		<2
2	ANALYZ	W1	DIG	13-JUL-2017 13:54	ADG	CLS	

Samplenum	Container ID	Products
L17070552-01	934837	COR-PH NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	13-JUL-2017 10:30	CLS		<2
2	ANALYZ	W1	WET	13-JUL-2017 12:52	EPT	CLS	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L17070560

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on July 18 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114637	I	5.0		J4616881980	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)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	Yes

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP650-6456	L17070560-01	07/12/2017 15:00	07/13/2017 10:15
TRIP BLANK	L17070560-02	07/12/2017 00:01	07/13/2017 10:15

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

Microbac Laboratories
Case Narrative

Login Number: L17070560
Department: Volatiles
Analyst: Tiffany Bailey

METHOD

Preparation SW-846 5030B/5030C/5035A

Analysis SW-846 8260B

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: 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 MS/MSD results were not associated with this sample delivery group (SDG), due to insufficient volume of sample. The laboratory included an LCS and LCS duplicate in the preparation batch in lieu of the NELAC prescribed MS/MSD. Microbac Laboratories recommends site specific MS/MSD samples to avoid possible data qualifications.

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: 127527
Approved By: Sarah Vandenberg
Sarah Vandenberg

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-07-17 19:08:17

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG621748	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-17 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG622089	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-18 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-07-18 18:02:26

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG622089	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-18 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG622089	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-18 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG622089	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-18 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG622089	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-18 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070560
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG622089	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-18 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	LH18/24-SP650-6456	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/12/2017 16:47
Workgroup #:	WG621677	**Analyst:**	TMB	**Run Date:**	07/13/2017 20:57
Collect Date:	07/12/2017 15:00	**Dilution:**	1	**File ID:**	8M420653
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	10.1		10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	1.22		1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.685	J	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	97.3	70	120	
4-Bromofluorobenzene	102	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	101	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6456	**Prep Method:**	6850	**Prep Date:**	07/14/2017 09:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG621748	**Analyst:**	JWR	**Run Date:**	07/14/2017 18:53
Collect Date:	07/12/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40198
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.657		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L17070560-01	**PrePrep Method:**	N/A	**Instrument:**	IC3
Client ID:	LH18/24-SP650-6456	**Prep Method:**	9056	**Prep Date:**	07/17/2017 17:44
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	06/26/2017 19:12
Workgroup #:	WG622089	**Analyst:**	CAS	**Run Date:**	07/18/2017 03:15
Collect Date:	07/12/2017 15:00	**Dilution:**	5	**File ID:**	I3_071717-31
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	18.2		10.0	5.00	2.50

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-01	**PrePrep Method:**	N/A	**Instrument:**	IC3
Client ID:	LH18/24-SP650-6456	**Prep Method:**	9056	**Prep Date:**	07/17/2017 17:44
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	06/26/2017 19:12
Workgroup #:	WG622089	**Analyst:**	CAS	**Run Date:**	07/18/2017 03:35
Collect Date:	07/12/2017 15:00	**Dilution:**	50	**File ID:**	I3_071717-32
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	480		20.0	10.0	5.00

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	TRIP BLANK	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/12/2017 16:47
Workgroup #:	WG621677	**Analyst:**	TMB	**Run Date:**	07/13/2017 20:28
Collect Date:	07/12/2017 00:01	**Dilution:**	1	**File ID:**	8M420652
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	2.83	J	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.500	U	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	96.7	70	120	
4-Bromofluorobenzene	99.8	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	100	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.1 Volatiles Data

2.1.1 Volatiles GCMS Data (8260)

2.1.1.1 Summary Data

Microbac Laboratories
Case Narrative

Login Number: L17070560
Department: Volatiles
Analyst: Tiffany Bailey

METHOD

Preparation SW-846 5030B/5030C/5035A

Analysis SW-846 8260B

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: 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 MS/MSD results were not associated with this sample delivery group (SDG), due to insufficient volume of sample. The laboratory included an LCS and LCS duplicate in the preparation batch in lieu of the NELAC prescribed MS/MSD. Microbac Laboratories recommends site specific MS/MSD samples to avoid possible data qualifications.

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: 127527
Approved By: Sarah Vandenberg
Sarah Vandenberg

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	LH18/24-SP650-6456	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/12/2017 16:47
Workgroup #:	WG621677	**Analyst:**	TMB	**Run Date:**	07/13/2017 20:57
Collect Date:	07/12/2017 15:00	**Dilution:**	1	**File ID:**	8M420653
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	10.1		10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	1.22		1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.685	J	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	97.3	70	120	
4-Bromofluorobenzene	102	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	101	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	TRIP BLANK	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/12/2017 16:47
Workgroup #:	WG621677	**Analyst:**	TMB	**Run Date:**	07/13/2017 20:28
Collect Date:	07/12/2017 00:01	**Dilution:**	1	**File ID:**	8M420652
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	2.83	J	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.500	U	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	96.7	70	120	
4-Bromofluorobenzene	99.8	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	100	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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

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

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(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 quantiation 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: HPMS8 Dataset: 041217
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 24/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54128

Internal Standard: STD81235 Surrogate Standard: STD81235
CCV: STD81397 LCS: STD81404 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG609829

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
8M418914	WG609829-01 50ng BFB STD 8260	NA	1	1	STD80989	04/12/17 10:17
8M418915	RINSE	NA	1	1	STD80989	04/12/17 10:42
8M418916	WG609829-02 5ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 11:11
8M418917	WG609829-03 20ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 11:40
8M418918	WG609829-04 50ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 12:10
8M418919	WG609829-05 100ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 12:41
8M418920	WG609829-06 200ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 13:10
8M418921	WG609829-07 300ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 13:40
8M418922	WG609829-08 400ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 14:10
8M418923	WG609829-09 500ug/L STD A9/FOO	NA	1	1	STD81397	04/12/17 14:39
8M418924	RINSE	NA	1	1		04/12/17 15:09
8M418925	RINSE	NA	1	1		04/12/17 15:39
8M418926	WG609829-10 100ug/L ALT SRC STD A9/F	NA	1	1	STD81404	04/12/17 16:10
8M418927	WG609948-01 50ug/L CCV STD 8260	NA	1	1	STD81377	04/12/17 16:39
8M418928	RINSE	NA	1	1		04/12/17 17:09

Approved: April 18, 2017

Page: 1

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS8 Dataset: 071217
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54251

Internal Standard: STD82585 Surrogate Standard: STD82585
CCV: STD82870 LCS: STD82805 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG621442

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
8M420608	BFB CHECK	NA	1	1	STD82467	07/12/17 08:37
8M420609	BFB CHECK	NA	1	1	STD82467	07/12/17 09:10
8M420610	BFB CHECK	NA	1	1	STD82467	07/12/17 09:25
8M420611	WG621442-01 50ng BFB STD 8260	NA	1	1	STD82467	07/12/17 09:40
8M420612	RINSE	NA	1	1		07/12/17 10:11
8M420613	RINSE	NA	1	1		07/12/17 10:40
8M420614	WG621442-01 50ng BFB STD 8260	NA	1	1	STD82467	07/12/17 11:20
8M420615	RINSE	NA	1	1		07/12/17 11:45
8M420616	WG621442-02 0.3ug/L STD 8260	NA	1	1	STD82870	07/12/17 12:15
8M420617	WG621442-03 0.4ug/L STD 8260	NA	1	1	STD82870	07/12/17 12:45
8M420618	WG621442-04 1ug/L STD 8260	NA	1	1	STD82870	07/12/17 13:17
8M420619	WG621442-05 2ug/L STD 8260	NA	1	1	STD82870	07/12/17 13:46
8M420620	WG621442-06 5ug/L STD 8260	NA	1	1	STD82870	07/12/17 14:16
8M420621	WG621442-07 20ug/L STD 8260	NA	1	1	STD82870	07/12/17 14:46
8M420622	WG621442-08 50ug/L STD 8260	NA	1	1	STD82870	07/12/17 15:16
8M420623	WG621442-09 100ug/L STD 8260	NA	1	1	STD82870	07/12/17 15:47
8M420624	WG621442-10 200ug/L STD 8260	NA	1	1	STD82870	07/12/17 16:17
8M420625	WG621442-11 300ug/L STD 8260	NA	1	1	STD82870	07/12/17 16:47
8M420626	RINSE	NA	1	1		07/12/17 17:17
8M420627	RINSE	NA	1	1		07/12/17 17:47
8M420628	WG621442-12 20ug/L ALT SRC STD 8260	NA	1	1	STD82805	07/12/17 18:16
8M420629	CCV CHECK	NA	1	1	STD82870	07/12/17 18:45
8M420630	RINSE	NA	1	1		07/12/17 19:14
8M420631	RINSE	NA	1	1		07/12/17 19:44
8M420632	RINSE	NA	1	1		07/12/17 20:15
8M420633	RINSE	NA	1	1		07/12/17 20:44
8M420634	RINSE	NA	1	1		07/12/17 21:14
8M420635	RINSE	NA	1	1		07/12/17 21:43
8M420636	RINSE	NA	1	1		07/12/17 22:13
8M420637	RINSE	NA	1	1		07/12/17 22:42
8M420638	RINSE	NA	1	1		07/12/17 23:11

Comments

Approved: July 13, 2017

Page: 1

Microbac Laboratories Inc.

Instrument Run Log

Instrument:	HPMS8	Dataset:	071217		
Analyst1:	TMB	Analyst2:	NA		
Method:	8260B	SOP:	MSV01/OVAP MSV01	Rev:	25/0
Method:	624	SOP:	MSV10	Rev:	15
Method:	5030B/5030C/5035A	SOP:	PAT01/OVAP PAT01	Rev:	18/1
Maintenance Log ID:	54251				

Internal Standard: STD82585 Surrogate Standard: STD82585

CCV: STD82870 LCS: STD82805 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG621442

Comments:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
21	X			
File ID: 8M420628				
Bromomethane was low in the alt. source. DNR.				

Approved: July 13, 2017

Page: 2

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS8 Dataset: 071317
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID:

Internal Standard: STD82585 Surrogate Standard: STD82585
CCV: STD82870 LCS: STD82908 MS/MSD: STD82908

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG621677

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
8M420639	WG621676-01 50ng BFB STD 8260	NA	1	1	STD82467	07/13/17 14:10
8M420640	WG621676-02 50ug/L CCV STD 8260	NA	1	1	STD827870	07/13/17 14:37
8M420641	WG621442-12 20ug/L ALT SRC STD 8260	NA	1	1	STD827908	07/13/17 15:06
8M420642	WG000000-01 100ug/L A9 CCV STD 8260	NA	1	1	STD827519	07/13/17 15:36
8M420643	WG621677-01 0713 BLANK STD 8260	NA	1	1		07/13/17 16:05
8M420644	WG621677-02 20ug/L STD 8260	NA	1	1	STD82908	07/13/17 16:34
8M420645	L17070558-04 A MS 826-SPE1	<2	1	1	STD82908	07/13/17 17:03
8M420646	L17070558-05 A MSD 826-SPE1	<2	1	1	STD82908	07/13/17 17:33
8M420647	L17070547-03 A TB 826-BETX	<2	1	1		07/13/17 18:02
8M420648	L17070548-03 A TB 826-BETX	<2	1	1		07/13/17 18:32
8M420649	L17070558-08 A TB 826-SPE1	<2	1	1		07/13/17 19:00
8M420650	L17070558-09 A AB 826-SPE1	<2	1	1		07/13/17 19:30
8M420651	L17070558-10 A 826-SPE1	<2	1	1		07/13/17 19:58
8M420652	L17070560-02 A TB 826-SPE	<2	1	1		07/13/17 20:28
8M420653	L17070560-01 A 826-SPE	<2	1	1		07/13/17 20:57
8M420654	L17070282-01 B 826-SPE	<2	1	1		07/13/17 21:27
8M420655	L17070558-03 A RS 826-SPE1	<2	1	1		07/13/17 21:56
8M420656	L17070547-01 A 826-BETX	<2	1	1		07/13/17 22:25
8M420657	L17070548-01 A 826-BETX	<2	1	1		07/13/17 22:55
8M420658	L17070558-01 A 826-SPE1	<2	1	1		07/13/17 23:23
8M420659	L17070558-02 A 826-SPE1	<2	1	1		07/13/17 23:53
8M420660	L17070558-06 A 826-SPE1	<2	1	1		07/14/17 00:22
8M420661	L17070558-07 A 826-SPE1	<2	1	1		07/14/17 00:52
8M420662	RINSE	NA	1	1		07/14/17 01:21
8M420663	WG621677-08 0713 BLANK STD 624	NA	2	1		07/14/17 01:50
8M420664	L17070516-02 B TB 624-SPE	5	2	1		07/14/17 02:19
8M420665	L17070516-01 B 624-SPE	6	2	1		07/14/17 02:48
8M420666	L17070514-02 E 624-SPE1	6	2	1		07/14/17 03:18
8M420667	CCV	NA	1	1		07/14/17 03:48
8M420668	RINSE	NA	1	1		07/14/17 04:17

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Approved: July 14, 2017

Page: 1

Microbac Laboratories Inc.

Instrument Run Log

Instrument:	HPMS8	Dataset:	071317		
Analyst1:	TMB	Analyst2:	NA		
Method:	8260B	SOP:	MSV01/OVAP MSV01	Rev:	25/0
Method:	624	SOP:	MSV10	Rev:	15
Method:	5030B/5030C/5035A	SOP:	PAT01/OVAP PAT01	Rev:	18/1
Maintenance Log ID:					

Internal Standard:	STD82585	Surrogate Standard:	STD82585		
CCV:	STD82870	LCS:	STD82908	MS/MSD:	STD82908

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG621677

Comments:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
4				
File ID: 8M420642				
	Not needed, DNR.			

Approved: July 14, 2017

Page: 2

Microbac Laboratories Inc.

Data Checklist

Date: 12-APR-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 81580
Analytical Workgroups: WG609829

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	X
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
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	TMB
Secondary Reviewer	FJB
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:
17-APR-2017
Tiffany Bailey

Secondary Reviewer:
18-APR-2017

CHECKLIST1 - Modified 03/05/2008
Generated: APR-18-2017 13:13:22

Microbac Laboratories Inc.

Data Checklist

Date: 12-JUL-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 83334
Analytical Workgroups: WG621442

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	X
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	TMB
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:
13-JUL-2017
Tiffany Bailey

Secondary Reviewer:
13-JUL-2017
Ashley Cater

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-13-2017 14:34:01

Microbac Laboratories Inc.

Data Checklist

Date: 13-JUL-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 83361
Analytical Workgroups: WG621677

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	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
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	TMB
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:
14-JUL-2017

Secondary Reviewer:
14-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-14-2017 13:18:24

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B **AAB#:** WG621677

Login Number: L17070560

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
LH18/24-SP650-6456	01	07/12/17					07/13/2017	1.2	14		07/13/17	1.2	14	
TRIP BLANK	02	07/12/17					07/13/2017	1.9	14		07/13/17	1.9	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5384741
Report generated 07/14/2017 12:32

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17070560
Instrument Id: HPMS8
Workgroup (AAB#): WG621677

Method: 8260
CAL ID: HPMS8-12-JUL-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17070560-01	1.00	01	97.3	101	102	101
L17070560-02	1.00	01	96.7	101	99.8	100
WG621677-01	1.00	01	94.8	101	98.4	101
WG621677-02	1.00	01	95.3	101	97.3	100
WG621677-08	1.00	01	95.7	99.1	101	100

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	70	-	120
2 - Dibromofluoromethane	85	-	115
3 - 4-Bromofluorobenzene	75	-	120
4 - Toluene-d8	85	-	120

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 5384747
Report generated: 07/14/2017 12:32

METHOD BLANK SUMMARY

Login Number:	L17070560	**Work Group:**	WG621677
Blank File ID:	8M420643	**Blank Sample ID:**	WG621677-01
Prep Date:	07/13/17 16:05	**Instrument ID:**	HPMS8
Analyzed Date:	07/13/17 16:05	**Method:**	8260B
Analyst:	TMB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG621677-02	8M420644	07/13/17 16:34	01
TRIP BLANK	L17070560-02	8M420652	07/13/17 20:28	01
LH18/24-SP650-6456	L17070560-01	8M420653	07/13/17 20:57	01

Report Name: BLANK_SUMMARY
PDF File ID: 5385174
Report generated 07/14/2017 12:32

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070560 Prep Date: 07/13/17 16:05 Sample ID: WG621677-01
Instrument ID: HPMS8 Run Date: 07/13/17 16:05 Prep Method: 5030B/5030C/503
File ID: 8M420643 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG621677 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS8-12-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	0.500	0.125	1	U
1,1-Dichloroethene	0.500	2.00	0.500	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	0.500	0.125	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chloroform	0.125	0.500	0.125	1	U
Ethylbenzene	0.250	1.00	0.250	1	U
Methylene chloride	0.250	1.00	0.250	1	U
m,p-Xylene	0.500	2.00	0.500	1	U
o-Xylene	0.250	1.00	0.250	1	U
Styrene	0.125	0.500	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Toluene	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	94.8	70 - 120	PASS
4-Bromofluorobenzene	98.4	75 - 120	PASS
Dibromofluoromethane	101	85 - 115	PASS
Toluene-d8	101	85 - 120	PASS

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5384742
14-JUL-2017 12:32

Login Number: L17070560 Run Date: 07/13/2017 Sample ID: WG621677-02
Instrument ID: HPMS8 Run Time: 16:34 Prep Method: 5030B/5030C/503
File ID: 8M420644 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG621677 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD82908 Cal ID: HPMS8-12-JUL-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
1,1,1-Trichloroethane	20.0	21.2	106	65 - 130	
1,1,2-Trichloroethane	20.0	19.3	96.5	75 - 125	
1,1-Dichloroethane	20.0	19.8	98.9	70 - 135	
1,1-Dichloroethene	20.0	20.3	101	70 - 130	
1,2-Dichloroethane	20.0	20.3	102	70 - 130	
Acetone	20.0	17.5	87.4	40 - 140	
Benzene	20.0	20.5	102	80 - 120	
Carbon tetrachloride	20.0	21.3	106	65 - 140	
Chloroform	20.0	19.9	99.6	65 - 135	
Ethylbenzene	20.0	19.5	97.4	75 - 125	
Methylene chloride	20.0	20.2	101	55 - 140	
m,p-Xylene	40.0	39.4	98.6	75 - 130	
o-Xylene	20.0	19.8	99.1	80 - 120	
Styrene	20.0	20.1	100	65 - 135	
Tetrachloroethene	20.0	19.8	98.8	45 - 150	
Trichloroethene	20.0	20.9	105	70 - 125	
Toluene	20.0	19.6	98.1	75 - 120	
Vinyl chloride	20.0	20.6	103	50 - 145	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	95.3	70 - 120	PASS
4-Bromofluorobenzene	97.3	75 - 120	PASS
Dibromofluoromethane	101	85 - 115	PASS
Toluene-d8	100	85 - 120	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 5384743
Report generated: 07/14/2017 12:32

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070560
Instrument: HPMS8
Analyst: TMB
Workgroup: WG609829

Tune ID: WG609829-01
Run Date: 04/12/2017
Run Time: 10:17
File ID: 8M418914
Cal ID: HPMS8-12-APR-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	15.0	6807	PASS
75.0	95.0	30.0	60.0	45.8	20724	PASS
95.0	95.0	100	100	100	45280	PASS
96.0	95.0	5.00	9.00	6.80	3077	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	94.7	42898	PASS
175	174	5.00	9.00	8.05	3453	PASS
176	174	95.0	101	100	42994	PASS
177	176	5.00	9.00	6.69	2876	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG609829-02	STD	01	04/12/2017 11:11	
WG609829-03	STD	01	04/12/2017 11:40	
WG609829-04	STD	01	04/12/2017 12:10	
WG609829-05	STD-CCV	01	04/12/2017 12:41	
WG609829-06	STD	01	04/12/2017 13:10	
WG609829-07	STD	01	04/12/2017 13:40	
WG609829-08	STD	01	04/12/2017 14:10	
WG609829-09	STD	01	04/12/2017 14:39	
WG609829-10	SSCV	01	04/12/2017 16:10	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5384745
Report generated 07/14/2017 12:32

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070560
Instrument: HPMS8
Analyst: TMB
Workgroup: WG621442

Tune ID: WG621442-01
Run Date: 07/12/2017
Run Time: 11:20
File ID: 8M420614
Cal ID: HPMS8-12-JUL-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	19.5	6967	PASS
75.0	95.0	30.0	60.0	48.6	17397	PASS
95.0	95.0	100	100	100	35797	PASS
96.0	95.0	5.00	9.00	6.70	2398	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	73.2	26213	PASS
175	174	5.00	9.00	7.42	1945	PASS
176	174	95.0	101	96.2	25208	PASS
177	176	5.00	9.00	6.78	1710	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG621442-02	STD	01	07/12/2017 12:15	
WG621442-03	STD	01	07/12/2017 12:45	
WG621442-04	STD	01	07/12/2017 13:17	
WG621442-05	STD	01	07/12/2017 13:46	
WG621442-06	STD	01	07/12/2017 14:16	
WG621442-07	STD	01	07/12/2017 14:46	
WG621442-08	STD-CCV	01	07/12/2017 15:16	
WG621442-09	STD	01	07/12/2017 15:47	
WG621442-10	STD	01	07/12/2017 16:17	
WG621442-11	STD	01	07/12/2017 16:47	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5384745
Report generated 07/14/2017 12:32

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17070560
Instrument: HPMS8
Analyst: TMB
Workgroup: WG621676

Tune ID: WG621676-01
Run Date: 07/13/2017
Run Time: 14:10
File ID: 8M420639
Cal ID: HPMS8-12-JUL-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	19.5	6522	PASS
75.0	95.0	30.0	60.0	49.6	16627	PASS
95.0	95.0	100	100	100	33496	PASS
96.0	95.0	5.00	9.00	7.02	2353	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	75.1	25172	PASS
175	174	5.00	9.00	6.91	1739	PASS
176	174	95.0	101	95.2	23975	PASS
177	176	5.00	9.00	6.98	1674	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG621676-02	CCV	01	07/13/2017 14:37	
WG621442-12	SSCV	01	07/13/2017 15:06	
WG621677-01	BLANK	01	07/13/2017 16:05	
WG621677-02	LCS	01	07/13/2017 16:34	
L17070560-02	TRIP BLANK	01	07/13/2017 20:28	
L17070560-01	LH18/24-SP650-6456	01	07/13/2017 20:57	
WG621677-08	BLANK2	01	07/14/2017 01:50	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5384745
Report generated 07/14/2017 12:32

Calibration Table Report
Method: A9FOOWT.M
Title: A9-FOO Water SOP:MSV01 04-12-17 HPMS8
Last Calibration: Thu Apr 13 16:40:13 2017
Curve: WG609829
Calibration Files

	Compound	5 8M418916.D	20 8M418917.D	50 8M418918.D	100 8M418919.D	200 8M418920.D	300 8M418921.D	400 8M418922.D	500 8M418923.D	Avg	%RSD
I	Fluorobenzene	ISTD									
T	Acetonitrile		0.013	0.012	0.013	0.013	0.012	0.013	0.013	0.013	3.572
T	3-Chloro-1-propene	0.312	0.315	0.327	0.337	0.346	0.341	0.344	0.341	0.333	3.984
T	2-Chloro-1,3-butadiene	0.285	0.299	0.317	0.330	0.340	0.336	0.337	0.336	0.322	6.267
T	Ethyl Acetate	0.099	0.101	0.098	0.101	0.108	0.103	0.106	0.109	0.103	4.045
T	Methacrylonitrile	0.052	0.059	0.057	0.059	0.064	0.061	0.063	0.065	0.060	7.025
T	Isobutyl Alcohol			0.003	0.004	0.004	0.004	0.005	0.005	0.004	12.096
T	1-Butanol									0.000	0.000
T	Methyl methacrylate	0.096	0.101	0.103	0.107	0.116	0.112	0.116	0.121	0.109	7.922
T	2-Nitropropane		0.027	0.028	0.031	0.034	0.034	0.035	0.037	0.032	11.358
I	Chlorobenzene-d5	ISTD									
I	1,4-Dichlorobenzene-d4	ISTD									
T	Cyclohexanone		0.006	0.006	0.007	0.008	0.007	0.008	0.009	0.007	13.841

Mon Apr 17 15:45:45 2017

Calibration Table Report
Method: 8260WT.M
Title: Method 8260B/624 WTR-SOP:OVLMSV01 071217 HPMS8
Last Calibration: Thu Jul 13 12:10:35 2017
Curve: WG621442
Calibration Files

	Compound	0.3 8M420616.D	0.4 8M420617.D	1 8M420618.D	2 8M420619.D	5 8M420620.D	20 8M420621.D	50 8M420622.D	100 8M420623.D	200 8M420624.D	300 8M420625.D	Avg	%RSD	Linear	Quad
I	Fluorobenzene	ISTD													
T	Dichlorodifluoromethane			0.385	0.382	0.388	0.430	0.443	0.426	0.444		0.414	6.778		
P	Chloromethane			0.538	0.507	0.471	0.460	0.466	0.441	0.431		0.473	7.927		
C	Vinyl Chloride		0.371	0.385	0.375	0.358	0.357	0.354	0.332	0.327		0.357	5.613		
T	1,3-Butadiene				0.310	0.265	0.253	0.174	0.139	0.136	0.124	0.200	37.262		1.000
T	Bromomethane			0.209	0.211	0.207	0.204	0.213	0.217	0.242		0.215	5.950		
T	Chloroethane		0.161	0.190	0.186	0.187	0.189	0.195	0.194	0.204		0.188	6.558		
T	Trichlorofluoromethane		0.399	0.480	0.462	0.457	0.454	0.473	0.471	0.499		0.462	6.322		
T	Diethyl ether			0.202	0.195	0.199	0.199	0.202	0.209		0.213	0.203	3.044		
T	Isoprene					0.364	0.383	0.379	0.379	0.393	0.393	0.382	2.853		
T	Acrolein				0.026	0.028	0.028	0.030	0.030		0.031	0.029	6.351		
T	1,1,2-Trichloro-1,2,2-Trifluoroethane			0.232	0.234	0.235	0.232	0.244	0.243	0.256		0.240	3.692		
T	Acetone					0.060	0.054	0.053	0.048	0.052	0.050	0.053	7.922		
C	1,1-Dichloroethene		0.377	0.392	0.379	0.390	0.375	0.387	0.382	0.401		0.385	2.293		
T	Tert-Butyl Alcohol				0.015	0.016	0.016	0.016	0.017		0.018	0.016	6.802		
T	Dimethyl Sulfide					0.272	0.283	0.283	0.284	0.295	0.293	0.285	2.834		
T	Iodomethane			0.270	0.268	0.275	0.298	0.301	0.292	0.297	0.249	0.281	6.573		
T	Methyl acetate					0.142	0.146	0.143	0.146	0.148	0.146	0.145	1.584		
T	Methylene Chloride			0.267	0.274	0.264	0.264	0.272	0.270	0.277		0.270	1.872		
T	Carbon Disulfide			0.941	0.874	0.830	0.856	0.838	0.828	0.836	0.779	0.848	5.485		
T	Acrylonitrile			0.062	0.064	0.067	0.068	0.074	0.076		0.068	0.068	7.172		
T	Methyl Tert Butyl Ether			0.577	0.601	0.618	0.622	0.649	0.639	0.640		0.621	4.080		
T	trans-1,2-Dichloroethene		0.340	0.385	0.379	0.366	0.362	0.370	0.366	0.372		0.368	3.660		
T	n-Hexane					0.347	0.344	0.352	0.347	0.368	0.360	0.353	2.584		
T	Diisopropyl ether			0.935	0.917	0.903	0.888	0.898	0.888		0.846	0.896	3.121		
T	Vinyl Acetate					0.419	0.438	0.408	0.414	0.426	0.415	0.420	2.534		
P	1,1-Dichloroethane		0.458	0.482	0.470	0.465	0.466	0.479	0.471	0.477		0.471	1.723		
T	Ethyl-Tert-Butyl ether			0.831	0.816	0.820	0.816	0.829	0.828		0.796	0.819	1.465		
T	2-Butanone					0.079	0.083	0.082	0.082	0.083	0.083	0.082	2.114		
T	Propionitrile			0.022	0.023	0.023	0.024	0.025	0.025		0.026	0.024	6.135		
T	2,2-Dichloropropane		0.385	0.437	0.430	0.425	0.404	0.417	0.409	0.416		0.415	3.882		
T	cis-1,2-Dichloroethene		0.276	0.303	0.284	0.280	0.287	0.294	0.291	0.296		0.289	3.055		
C	Chloroform	0.548	0.511	0.510	0.480	0.479	0.478	0.486	0.476	0.475		0.494	5.035		
T	1-Bromopropane			0.036	0.044	0.053	0.051	0.052	0.052	0.053	0.053	0.049	12.042		
T	Bromochloromethane		0.139	0.169	0.162	0.169	0.169	0.173	0.172	0.173		0.166	6.800		
T	Tetrahydrofuran			0.047	0.049	0.051	0.051	0.053	0.054		0.053	0.051	4.851		
S	Dibromofluoromethane				0.255	0.264	0.266	0.266	0.266	0.269	0.268	0.265	1.768		
T	1,1,1-Trichloroethane		0.387	0.427	0.428	0.424	0.419	0.434	0.430	0.442		0.424	3.895		
T	Cyclohexane			0.436	0.431	0.430	0.429	0.430	0.426	0.451	0.434	0.433	1.756		
T	1,1-Dichloropropene			0.365	0.356	0.362	0.353	0.364	0.361	0.371		0.362	1.660		
T	Tert-Amyl-Methyl ether			0.683	0.698	0.704	0.702	0.713	0.715		0.689	0.701	1.642		
T	Carbon Tetrachloride		0.336	0.355	0.363	0.371	0.376	0.392	0.389	0.4		0.3729	5.70358		
S	1,2-Dichloroethane-d4				0.266	0.289	0.29	0.287	0.284	0.281	0.281	0.2827	2.90242		
T	Heptane											0	0		
T	1,2-Dichloroethane		0.321	0.337	0.349	0.348	0.346	0.357	0.35	0.351		0.3449	3.1896		
T	Benzene		1.061	1.098	1.043	1.045	1.021	1.048	1.01	0.974		1.0374	3.55109		
T	Trichloroethene		0.249	0.275	0.273	0.273	0.273	0.283	0.278	0.287		0.2738	4.13144		
T	Methylcyclohexane					0.409	0.416	0.414	0.413	0.433	0.428	0.4189	2.24967		
C	1,2-Dichloropropane		0.226	0.268	0.268	0.261	0.262	0.27	0.266	0.274		0.2618	5.75286		
T	Bromodichloromethane		0.326	0.344	0.346	0.351	0.368	0.382	0.378	0.385		0.36	5.92766		
T	1,4-Dioxane					0.002	0.002	0.002	0.002		0.002	0.0018	5.8085		
T	Dibromomethane		0.12	0.152	0.147	0.147	0.153	0.16	0.158	0.16		0.1498	8.62705		
T	2-Chloroethyl Vinyl Ether			0.143	0.128	0.136	0.152	0.149	0.149	0.156	0.155	0.1461	6.681		
T	4-Methyl-2-Pentanone					0.068	0.072	0.073	0.073	0.077	0.077	0.0732	4.81586		
T	cis-1,3-Dichloropropene		0.41	0.422	0.423	0.416	0.426	0.446	0.439	0.446		0.4285	3.20463		

T	Dimethyl Disulfide					0.212	0.247	0.255	0.258	0.27	0.268	0.2518	8.461	
I	Chlorobenzene-d5	ISTD												
S	Toluene-d8				1.209	1.229	1.218	1.223	1.212	1.199	1.203	1.2134	0.870637	
C	Toluene		1.576	1.564	1.512	1.501	1.454	1.475	1.416	1.317		1.4768	5.67274	
T	Ethyl Methacrylate			0.322	0.35	0.352	0.389	0.387	0.389	0.396	0.401	0.3733	7.61268	
T	Paraldehyde											0	0	
T	trans-1,3-Dichloropropene			0.46	0.487	0.48	0.494	0.521	0.516	0.519		0.4966	4.62266	
T	1,1,2-Trichloroethane		0.235	0.271	0.269	0.261	0.269	0.28	0.277	0.281		0.2678	5.51806	
T	2-Hexanone					0.079	0.089	0.091	0.091	0.094	0.096	0.09	6.57886	
T	1,3-Dichloropropane		0.425	0.457	0.466	0.471	0.477	0.489	0.478	0.482		0.4682	4.24144	
T	Tetrachloroethene		0.256	0.307	0.306	0.299	0.289	0.298	0.297	0.313		0.2957	5.98593	
T	Dibromochloromethane		0.286	0.291	0.312	0.315	0.338	0.36	0.366	0.376		0.3306	10.4902	
T	1,2-Dibromoethane		0.26	0.273	0.284	0.282	0.28	0.289	0.288	0.292		0.2811	3.69636	
T	1-Chlorohexane		0.498	0.528	0.502	0.5	0.503	0.501	0.495	0.51	0.511	0.5055	1.96961	
P	Chlorobenzene		0.994	1.032	0.999	0.981	0.98	1.006	1	0.99		0.9977	1.66654	
T	1,1,1,2-Tetrachloroethane		0.315	0.342	0.331	0.346	0.353	0.378	0.385			0.35	7.04542	
C	Ethylbenzene		0.497	0.559	0.545	0.532	0.538	0.56	0.57	0.603		0.5505	5.62169	
T	m-,p-Xylene		0.637	0.698	0.675	0.659	0.654	0.674	0.667	0.636		0.6625	3.10245	
T	o-Xylene			0.658	0.65	0.645	0.643	0.658	0.659	0.682		0.6563	1.99517	
T	Styrene		1.04	1.096	1.11	1.095	1.112	1.152	1.132	1.1		1.1046	2.93765	
P	Bromoform			0.156	0.178	0.182	0.211	0.232	0.236	0.248		0.2062	16.8025	0.998
T	Isopropylbenzene		1.595	1.718	1.656	1.678	1.626	1.654	1.592	1.472		1.6238	4.56954	
I	1,4-Dichlorobenzene-d4	ISTD												
P	1,1,2,2-Tetrachloroethane		0.503	0.605	0.615	0.596	0.615	0.637	0.628	0.637		0.6044	7.19732	
S	p-Bromofluorobenzene				1	1.006	0.993	1.003	1.004	0.99	1.016	1.0017	0.856243	
T	1,2,3-Trichloropropane			0.18	0.171	0.18	0.18	0.187	0.183	0.187		0.1812	3.02083	
T	trans-1,4-Dichloro-2-Butene			0.155	0.15	0.162	0.195	0.199	0.201	0.205	0.188	0.1818	12.3835	
T	n-Propylbenzene		3.751	4.164	3.974	3.916	3.865	3.827	3.586	3.056		3.7675	8.82548	
T	Bromobenzene	0.877	0.724	0.801	0.82	0.775	0.803	0.822	0.813	0.815		0.8056	5.10084	
T	1,3,5-Trimethylbenzene		2.7	2.875	2.787	2.736	2.699	2.72	2.626	2.428		2.6962	4.84181	
T	2-Chlorotoluene		2.519	2.616	2.532	2.423	2.545	2.501	2.296	2.175		2.4509	5.9892	
T	4-Chlorotoluene		2.298	2.484	2.445	2.457	2.258	2.367	2.383	2.111		2.3503	5.28147	
T	a-Methylstyrene					1.465	1.551	1.538	1.54	1.545	1.46	1.5167	2.77782	
T	tert-Butylbenzene			0.556	0.552	0.545	0.547	0.569	0.568	0.597		0.5621	3.23821	
T	1,2,4-Trimethylbenzene		2.651	2.908	2.895	2.778	2.787	2.824	2.731	2.499		2.759	4.85936	
T	sec-Butylbenzene			3.53	3.41	3.359	3.314	3.32	3.171	2.858		3.2804	6.57291	
T	p-Isopropyltoluene			2.921	2.813	2.777	2.73	2.787	2.71	2.503		2.7486	4.65415	
T	1,3-Dichlorobenzene		1.549	1.651	1.569	1.555	1.543	1.574	1.557	1.533		1.5665	2.33558	
T	1,4-Dichlorobenzene	1.689	1.472	1.575	1.58	1.534	1.55	1.568	1.543	1.52		1.559	3.78008	
T	n-Butylbenzene			2.866	2.764	2.744	2.656	2.671	2.57	2.338		2.6584	6.37542	
T	1,2-Dichlorobenzene	1.549	1.433	1.498	1.496	1.471	1.444	1.458	1.444	1.425		1.4687	2.70191	
T	1,2-Dibromo-3-Chloropropane				0.094	0.101	0.117	0.125	0.124	0.128		0.1147	12.2244	
T	1,2,4-Trichlorobenzene		1.068	1.141	1.146	1.088	1.108	1.136	1.126	1.112		1.1155	2.43717	
T	Hexachlorobutadiene		0.451	0.486	0.45	0.454	0.445	0.451	0.45	0.454		0.4552	2.79191	
T	Naphthalene		1.927	2.007	2.102	2.048	2.112	2.16	2.073	1.921		2.0438	4.24414	
T	1,2,3-Trichlorobenzene	1.146	0.956	1.017	1.032	1.006	0.993	1.032	1.021	1.011		1.0238	5.02675	

Thu Jul 13 12:28:55 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070560 Run Date: 07/13/2017 Sample ID: WG621442-12
Instrument ID: HPMS8 Run Time: 15:06 Method: 8260B
File ID: 8M420641 Analyst: TMB QC Key: DOD4
ICal Workgroup: WG621442 Cal ID: HPMS8 - 12-JUL-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	20.4	ug/L	0.392	1.80	20	
Chloroform	CCC	20.0	19.9	ug/L	0.492	0.400	20	
Ethylbenzene	CCC	20.0	19.5	ug/L	0.536	2.60	20	
Toluene	CCC	20.0	19.5	ug/L	1.44	2.40	20	
Vinyl Chloride	CCC	20.0	20.4	ug/L	0.364	1.80	20	
1,1,2,2-Tetrachloroethane	SPCC	20.0	18.5	ug/L	0.558	7.70	20	
Chloromethane	SPCC	20.0	20.5	ug/L	0.484	2.30	20	
Bromoform	SPCC	20.0	17.4	ug/L	0.204	12.9	20	
Chlorobenzene	SPCC	20.0	19.9	ug/L	0.991	0.700	20	
1,1-Dichloroethane	SPCC	20.0	19.6	ug/L	0.462	2.00	20	
1,1,1-Trichloroethane		20.0	21.4	ug/L	0.454	7.10	20	
1,1,2-Trichloroethane		20.0	19.6	ug/L	0.262	2.20	20	
1,2-Dichloroethane		20.0	20.4	ug/L	0.352	2.00	20	
Acetone		20.0	17.1	ug/L	0.0454	14.5	20	
Benzene		20.0	20.6	ug/L	1.07	3.10	20	
Carbon Tetrachloride		20.0	21.7	ug/L	0.404	8.30	20	
Methylene Chloride		20.0	20.1	ug/L	0.271	0.400	20	
m-,p-Xylene		40.0	39.4	ug/L	0.653	1.50	20	
o-Xylene		20.0	19.7	ug/L	0.646	1.60	20	
Styrene		20.0	19.9	ug/L	1.10	0.400	20	
Tetrachloroethene		20.0	20.0	ug/L	0.296	0.200	20	
Trichloroethene		20.0	21.1	ug/L	0.289	5.60	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5384744
Report generated 07/14/2017 12:32

Login Number: L17070560 Run Date: 07/13/2017 Sample ID: WG621676-02
Instrument ID: HPMS8 Run Time: 14:37 Method: 8260B
File ID: 8M420640 Analyst: TMB QC Key: DOD4
Workgroup (AAB#): WG621677 Cal ID: HPMS8 - 12-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	51.1	ug/L	0.268	2.20	20	
1,1-Dichloroethene	CCC	50.0	51.7	ug/L	0.399	3.46	20	
Chloroform	CCC	50.0	49.8	ug/L	0.492	0.386	20	
Ethylbenzene	CCC	50.0	50.3	ug/L	0.554	0.695	20	
Toluene	CCC	50.0	49.4	ug/L	1.46	1.14	20	
Vinyl Chloride	CCC	50.0	52.9	ug/L	0.379	5.89	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	42.1	ug/L	0.509	15.8	20	
Bromoform	SPCC	50.0	42.5	ug/L	0.203	15.0	20	
Chlorobenzene	SPCC	50.0	49.3	ug/L	0.984	1.37	20	
Chloromethane	SPCC	50.0	50.6	ug/L	0.479	1.24	20	
1,1-Dichloroethane	SPCC	50.0	51.5	ug/L	0.485	2.91	20	
Xylenes		150	149	ug/L	0.654	0.360	20	
1,1,1-Trichloroethane		50.0	53.6	ug/L	0.454	7.18	20	
1,1,2-Trichloroethane		50.0	45.6	ug/L	0.244	8.88	20	
1,2-Dichloroethane		50.0	49.0	ug/L	0.338	2.06	20	
Acetone		50.0	44.0	ug/L	0.0467	12.0	20	
Benzene		50.0	51.4	ug/L	1.07	2.88	20	
Carbon Tetrachloride		50.0	55.9	ug/L	0.417	11.7	20	
Methylene Chloride		50.0	50.1	ug/L	0.270	0.183	20	
m-,p-Xylene		100	101	ug/L	0.666	0.560	20	
o-Xylene		50.0	48.9	ug/L	0.642	2.20	20	
Styrene		50.0	50.2	ug/L	1.11	0.417	20	
Tetrachloroethene		50.0	50.7	ug/L	0.300	1.48	20	
Trichloroethene		50.0	53.0	ug/L	0.290	5.94	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5384746
Report generated 07/14/2017 12:32

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17070560
Instrument ID: HPMS8
Workgroup (AAB#): WG621677

ICAL CCV Number: WG621442-08
CAL ID: HPMS8-12-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG621442-08	NA	NA	281846	537042	703614
Upper Limit	NA	NA	563692	1074084	1407228
Lower Limit	NA	NA	140923	268521	351807
L17070560-01	1.00	01	230479	445172	555212
L17070560-02	1.00	01	234858	449003	562372
WG621677-01	1.00	01	265719	502425	633311
WG621677-02	1.00	01	275882	514336	642018

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

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5385176
Report generated 07/14/2017 12:32

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17070560
Instrument ID: HPMS8
Workgroup (AAB#): WG621677

ICAL CCV Number: WG621442-08
CAL ID: HPMS8-12-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG621442-08	NA	NA	17.79	14.77	10.91
Upper Limit	NA	NA	18.29	15.27	11.41
Lower Limit	NA	NA	17.29	14.27	10.41
L17070560-01	1.00	01	17.79	14.77	10.9
L17070560-02	1.00	01	17.79	14.77	10.9
WG621677-01	1.00	01	17.79	14.77	10.91
WG621677-02	1.00	01	17.79	14.77	10.89

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

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5385179
Report generated: 07/14/2017 12:33

2.2 General Chromatography Data

2.2.1 LC/MS Data (6850)

2.2.1.1 Summary Data

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6456	**Prep Method:**	6850	**Prep Date:**	07/14/2017 09:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG621748	**Analyst:**	JWR	**Run Date:**	07/14/2017 18:53
Collect Date:	07/12/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40198
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.657		0.400	0.200	0.100

2.2.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

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

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: NA

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40075	WG619865-01 CCB	1	1		06/29/17 13:13
2	1LM.LM40076	WG619865-02 STD (0.1 ug/L)	1	1	STD80232	06/29/17 13:32
3	1LM.LM40077	WG619865-03 STD (0.2 ug/L)	1	1	STD80232	06/29/17 13:51
4	1LM.LM40078	WG619865-04 STD (0.5 ug/L)	1	1	STD80232	06/29/17 14:10
5	1LM.LM40079	WG619865-05 STD (1.0 ug/L)	1	1	STD80232	06/29/17 14:29
6	1LM.LM40080	WG619865-06 STD (2.0 ug/L)	1	1	STD80232	06/29/17 14:48
7	1LM.LM40081	WG619865-07 STD (5.0 ug/L)	1	1	STD80232	06/29/17 15:07
8	1LM.LM40082	WG619865-08 STD (10 ug/L)	1	1	STD80232	06/29/17 15:26
9	1LM.LM40083	WG619865-09 SSCV (1.0 ug/L)	1	1	STD80234	06/29/17 15:45
10	1LM.LM40084	WG619609-01 CCB	1	1		06/29/17 16:04
11	1LM.LM40085	WG619609-02 CCV (1.0ug/L)	1	1	STD80232	06/29/17 16:23
12	1LM.LM40086	WG619615-05 MRL (0.2ug/L)	1	1	STD80232	06/29/17 16:42
13	1LM.LM40087	WG619615-01 MCT (0.2ug/L)	1	1	STD80234	06/29/17 17:01
14	1LM.LM40088	WG619615-02 BLANK	1	1		06/29/17 17:20
15	1LM.LM40089	WG619615-03 LCS (0.2ug/L)	1	1	STD80234	06/29/17 17:39
16	1LM.LM40090	WG619615-04 LCS2 (0.2ug/L)	1	1	STD80234	06/29/17 17:57
17	1LM.LM40091	L17061390-01 10,000X	1	10000	STD80234	06/29/17 18:16
18	1LM.LM40092	L17061390-02	1	1	STD80234	06/29/17 18:35
19	1LM.LM40093	L17061390-03 100X	1	100	STD80234	06/29/17 18:54
20	1LM.LM40094	L17061390-04	1	1	STD80234	06/29/17 19:13
21	1LM.LM40095	L17061390-05 10X	1	10		06/29/17 19:32
22	1LM.LM40096	L17061390-06	1	1		06/29/17 19:51
23	1LM.LM40097	WG619609-03 CCV (1.0ug/L)	1	1	STD80232	06/29/17 20:10
24	1LM.LM40098	WG619615-06 MRL (0.2ug/L)	1	1	STD80232	06/29/17 20:29
25	1LM.LM40099	WG619609-04 CCB	1	1		06/29/17 20:48
26	1LM.LM40100	L17061390-07	1	1		06/29/17 21:07
27	1LM.LM40101	L17061390-09 100,000X	1	100000		06/29/17 21:26
28	1LM.LM40102	L17061390-10	1	1		06/29/17 21:45
29	1LM.LM40103	L17061390-12	1	1		06/29/17 22:04
30	1LM.LM40104	L17061390-13	1	1		06/29/17 22:23
31	1LM.LM40105	L17061390-15	1	1		06/29/17 22:42
32	1LM.LM40106	L17061390-16 2X	1	2		06/29/17 23:01
33	1LM.LM40107	WG619609-05 CCV (1.0ug/L)	1	1	STD80232	06/29/17 23:20

Page: 1 Approved: 30-JUN-17

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 NA

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM40108	WG619615-07 MRL (0.2ug/L)	1	1	STD80232	06/29/17 23:39
35	1LM.LM40109	WG619609-06 CCB	1	1		06/29/17 23:57

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L17061390-01 Analyzed at a dilution based on historical data.			
19				
	L17061390-03 Analyzed at a dilution based on historical data.			
21				
	L17061390-05 Analyzed at a dilution based on historical data.			
27				
	L17061390-09 Analyzed at a dilution based on historical data.			
32				
	L17061390-16 Analyzed at a dilution based on historical data.			

Page: 2 Approved: 30-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 071417_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG621748 (waters)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (06/29/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments: Sample L17070280-01 was analyzed at a dilution based on its historical results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40188	WG621753-01 CCB	1	1		07/14/17 15:44
2	1LM.LM40189	WG621753-02 CCV (1.0ug/L)	1	1	STD80232	07/14/17 16:03
3	1LM.LM40190	WG621748-07 MRL (0.2ug/L)	1	1	STD80232	07/14/17 16:22
4	1LM.LM40191	WG621748-01 MCT (0.2ug/L)	1	1	STD80234	07/14/17 16:41
5	1LM.LM40192	WG621748-02 BLANK	1	1		07/14/17 17:00
6	1LM.LM40193	WG621748-03 LCS (0.2ug/L)	1	1	STD80234	07/14/17 17:19
7	1LM.LM40194	L17070003-01 LOQ (0.2ug/L)	1	1	STD80234	07/14/17 17:37
8	1LM.LM40195	L17070001-01 LOD (0.1ug/L)	1	1	STD80234	07/14/17 17:56
9	1LM.LM40196	L17070280-01 (10,000x)	1	10000		07/14/17 18:15
10	1LM.LM40197	L17070282-01	1	1		07/14/17 18:34
17	1LM.LM40198	L17070560-01 REF	1	1		07/14/17 18:53
12	1LM.LM40199	L17070560-01 MS	1	1	STD80234	07/14/17 19:12
13	1LM.LM40200	L17070560-01 MSD	1	1	STD80234	07/14/17 19:31
14	1LM.LM40201	WG621753-03 CCV (1.0ug/L)	1	1	STD80232	07/14/17 19:50
15	1LM.LM40202	WG621748-08 MRL (0.2ug/L)	1	1	STD80232	07/14/17 20:09
16	1LM.LM40203	WG621753-04 CCB	1	1		07/14/17 20:28

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 17-JUL-17

Microbac Laboratories Inc.

Data Checklist

Date: 29-JUN-2017
Analyst: WTD
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83086
Analytical Workgroups: L17061390

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	X
Check for completeness	X
Primary Reviewer	WTD
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:

Secondary Reviewer:
30-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-30-2017 12:54:25

Microbac Laboratories Inc.

Data Checklist

Date: 14-JUL-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83400
Analytical Workgroups: L17070001, L17070003, L17070280, L17070282, L17070560

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	TRRP
Check for completeness	X
Primary Reviewer	JWR
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:
17-JUL-2017

John Richards

Secondary Reviewer:
17-JUL-2017

Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-17-2017 15:11:34

Microbac

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG621748

Login Number: L17070560

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
LH18/24-SP650-6456	01	07/12/17					07/14/2017	1.8	28		07/14/17	.4	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5387576
Report generated 07/17/2017 15:30

METHOD BLANK SUMMARY

Login Number: L17070560
Work Group: WG621748
Blank File ID: 1LM.LM40192
Blank Sample ID: WG621748-02
Prep Date: 07/14/17 09:00
Instrument ID: LCMS1
Analyzed Date: 07/14/17 17:00
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG621748-07	1LM.LM40190	07/14/17 16:22	01
MCT	WG621748-01	1LM.LM40191	07/14/17 16:41	01
LCS	WG621748-03	1LM.LM40193	07/14/17 17:19	01
LH18/24-SP650-6456	L17070560-01	1LM.LM40198	07/14/17 18:53	01
QCMRL	WG621748-08	1LM.LM40202	07/14/17 20:09	01

Report Name: BLANK_SUMMARY
PDF File ID: 5387577
Report generated 07/17/2017 15:30

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070560 Prep Date: 07/14/17 09:00 Sample ID: WG621748-02
Instrument ID: LCMS1 Run Date: 07/14/17 17:00 Prep Method: 6850
File ID: 1LM.LM40192 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5387578
17-JUL-2017 15:30

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number:	L17070560	**Run Date:**	07/14/2017	**Sample ID:**	WG621748-03
Instrument ID:	LCMS1	**Run Time:**	17:19	**Prep Method:**	6850
File ID:	1LM.LM40193	**Analyst:**	JWR	**Method:**	6850
Workgroup (AAB#):	WG621748	**Matrix:**	Water	**Units:**	ug/L
QC Key:	DOD4	**Lot#:**	STD80234	**Cal ID:**	LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.195	97.5	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5387580
Report generated: 07/17/2017 15:30

Loginnum:L17070560 Cal ID:LCMS1- Worknum:WG621748
Instrument ID:LCMS1 Contract #: Method:6850
Parent ID:WG621748-04 File ID:1LM.LM40198 Dil:1 Matrix:WATER
Sample ID:WG621748-05 MS File ID:1LM.LM40199 Dil:1 Units:ug/L
Sample ID:WG621748-06 MSD File ID:1LM.LM40200 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	0.657	0.200	0.842	92.5	0.200	0.831	87.0	1.32	80 - 120	15	

* 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: 5387581
Report generated 07/17/2017 15:30

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17070560
Analytical Method: 6850
ICAL Workgroup: WG619865

Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.454	6.38	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5387903
Report generated 07/17/2017 15:30

Login Number: L17070560
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-02			WG619865-03			WG619865-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	20800.0000	1.476	0.200	44600.0000	1.521	0.500	102000.000	1.433

INT_CAL - Modified 03/06/2008
PDF File ID: 5387903
Report generated 07/17/2017 15:30

Login Number: L17070560
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-05			WG619865-06			WG619865-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	214000.000	1.464	2.00	408000.000	1.442	5.00	981000.000	1.437

INT_CAL - Modified 03/06/2008
PDF File ID: 5387903
Report generated 07/17/2017 15:30

Login Number: L17070560
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-08		
	CONC	RESP	RF
Perchlorate	10.0	1820000.00	1.407

INT_CAL - Modified 03/06/2008
PDF File ID: 5387903
Report generated 07/17/2017 15:30

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070560 Run Date: 06/29/2017 Sample ID: WG619865-09
Instrument ID: LCMS1 Run Time: 15:45 Method: 6850
File ID: 1LM.LM40083 Analyst: WTD QC Key: DOD4
ICal Workgroup: WG619865 Cal ID: LCMS1 - 29-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.980	ug/L	1.40	2.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5387908
Report generated 07/17/2017 15:30

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070560	Run Date:	07/14/2017	Sample ID:	WG621753-01
Instrument ID:	LCMS1	Run Time:	15:44	Method:	6850
File ID:	1LM.LM40188	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG621748	Cal ID:	LCMS1 - 29-JUN-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5387585
Report generated 07/17/2017 15:30

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070560 | Run Date: 07/14/2017 | Sample ID: WG621753-04
Instrument ID: LCMS1 | Run Time: 20:28 | Method: 6850
File ID: 1LM.LM40203 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG621748 | Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5387585
Report generated 07/17/2017 15:30

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070560 Run Date: 07/14/2017 Sample ID: WG621753-02

Instrument ID: LCMS1 Run Time: 16:03 Method: 6850

File ID: 1LM.LM40189 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG621748 Cal ID: LCMS1 - 29-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.967	ug/L	1.39	3.30	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5387584

Report generated 07/17/2017 15:30

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070560 Run Date: 07/14/2017 Sample ID: WG621753-03

Instrument ID: LCMS1 Run Time: 19:50 Method: 6850

File ID: 1LM.LM40201 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG621748 Cal ID: LCMS1 - 29-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.963	ug/L	1.38	3.70	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5387584

Report generated 07/17/2017 15:30

Login Number: L17070560 Run Date: 07/14/2017 Sample ID: WG621748-07
Instrument ID: LCMS1 Run Time: 16:22 Prep Method: 6850
File ID: 1LM.LM40190 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.198	99.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5387583
Report generated 07/17/2017 15:30

Login Number: L17070560 Run Date: 07/14/2017 Sample ID: WG621748-08
Instrument ID: LCMS1 Run Time: 20:09 Prep Method: 6850
File ID: 1LM.LM40202 Analyst: JWR Method: 6850
Workgroup (AAB#): WG621748 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.187	93.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5387583
Report generated 07/17/2017 15:30

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L17070560
Instrument ID: LCMS1
Workgroup (AAB#): WG621748

ICAL CCV Number: WG619865-05
CAL ID: LCMS1-29-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG619865	NA	NA	703000
Upper Limit	NA	NA	1054500
Lower Limit	NA	NA	351500
L17070560-01	1.00	01	540000
WG621748-02	1.00	01	635000
WG621748-03	1.00	01	667000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5387586
Report generated 07/17/2017 15:31

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**	6850	**Samplenum:**	L17070560-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40198
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 18:53	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	102000	33200	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG619865-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40076
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 13:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	20800	6780	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG619865-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40077
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 13:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44600	13700	3.26	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG619865-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40078
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	102000	31100	3.28	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG619865-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40079
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:29	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	65900	3.25	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG619865-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40080
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 14:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	408000	126000	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG619865-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40081
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	981000	306000	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG619865-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40082
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1820000	577000	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG619865-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40083
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	06/29/2017 15:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	200000	61800	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**	6850	**Samplenum:**	WG621748-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40191
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40200	12700	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**	6850	**Samplenum:**	WG621748-02
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40192
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 17:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**	6850	**Samplenum:**	WG621748-03
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40193
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 17:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38600	12200	3.16	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Microbac

Login #:	L17070560	**Prep Method:**	6850	**Samplenum:**	WG621748-05
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40199
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 19:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	130000	41300	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**	6850	**Samplenum:**	WG621748-06
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40200
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 19:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	127000	42300	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**	6850	**Samplenum:**	WG621748-07
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40190
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:22	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38000	12400	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**	6850	**Samplenum:**	WG621748-08
Instrument:	LCMS1	**Prep Date:**	07/14/2017 09:00	**File ID:**	1LM.LM40202
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 20:09	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	41500	13900	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG621753-01
Instrument:	LCMS1	**Prep Date:**	07/14/2017 15:44	**File ID:**	1LM.LM40188
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 15:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	2390	959	2.49	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG621753-02
Instrument:	LCMS1	**Prep Date:**	07/14/2017 16:03	**File ID:**	1LM.LM40189
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 16:03	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	175000	54500	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG621753-03
Instrument:	LCMS1	**Prep Date:**	07/14/2017 19:50	**File ID:**	1LM.LM40201
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 19:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	59400	3.32	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070560	**Prep Method:**		**Samplenum:**	WG621753-04
Instrument:	LCMS1	**Prep Date:**	07/14/2017 20:28	**File ID:**	1LM.LM40203
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG621748	**Analysis Date:**	07/14/2017 20:28	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	732	0.000	2.3	3.8	*

2.3 General Chemistry Data

2.3.1 Method 9056

2.3.1.1 Summary Data

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-01	**PrePrep Method:**	N/A	**Instrument:**	IC3
Client ID:	LH18/24-SP650-6456	**Prep Method:**	9056	**Prep Date:**	07/17/2017 17:44
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	06/26/2017 19:12
Workgroup #:	WG622089	**Analyst:**	CAS	**Run Date:**	07/18/2017 03:15
Collect Date:	07/12/2017 15:00	**Dilution:**	5	**File ID:**	I3_071717-31
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	18.2		10.0	5.00	2.50

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070560-01	**PrePrep Method:**	N/A	**Instrument:**	IC3
Client ID:	LH18/24-SP650-6456	**Prep Method:**	9056	**Prep Date:**	07/17/2017 17:44
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	06/26/2017 19:12
Workgroup #:	WG622089	**Analyst:**	CAS	**Run Date:**	07/18/2017 03:35
Collect Date:	07/12/2017 15:00	**Dilution:**	50	**File ID:**	I3_071717-32
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	480		20.0	10.0	5.00

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17070560
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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 unkown samples.
Amount(ppm) = [(slope)(area count of unknown) + y-intercept](dilution)
(The slope is the amt/area also identified as the CF or calibration factor)

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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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 STD81395(26-JUN-2017)

CCV STD: STD81395 LCS STD: STD81396 NS

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
32	I3_062617-32	WG618473-05 ANION CCV	1	1	STD81395	06/27/17 03:21
33	I3_062617-33	WG618473-06 ANION CCB	1	1		06/27/17 03:41
34	I3_062617-34	END	1	1		06/27/17 04:02

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 27-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC3 Dataset: 071717 IC3.SEQ
Analyst1: CAS Analyst2: NA
Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254
Eluent ID#: RGT40740

Workgroups: Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM
Analytical WGs: WG622085 (LOD/LOQ Waters), WG622086 (LOD/LOQ Soils), WG622089 (Waters)
Internal STD: NA Surrogate STD: NA Calibration STD STD81395(26-JUN-2017)
CCV STD: STD81395 LCS STD: STD81396 MS/MSD STD: STD81396

Comments: System Backpressure: 2104 psi

Samples L17070549 (-03,05) were analyzed at dilutions only due to their pre-run screen results for sulfate, which were greater than 200 ppm.

Samples L17070560-01 was analyzed at dilutions only due to its pre-run screen results for chloride, which was greater than 200 ppm.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I3_071717-01	ELUENT	1	1		07/17/17 17:04
2	I3_071717-02	DI WATER	1	1		07/17/17 17:24
3	I3_071717-03	WG622092-01 ANION CCV	1	1	STD81395	07/17/17 17:44
4	I3_071717-04	WG622092-02 ANION CCB	1	1		07/17/17 18:05
5	I3_071717-05	WG622085-01 ANION BLANK	1	1		07/17/17 18:25
6	I3_071717-06	WG622085-02 ANION LCS	1	1	STD81396	07/17/17 18:46
7	I3_071717-07	WG622085-03 ANION LCS2	1	1	STD81396	07/17/17 19:06
8	I3_071717-08	L17070001-01 (F,CL,BR,SO4) LOD	1	1	STD81396	07/17/17 19:26
9	I3_071717-09	L17070001-01 (NO2,NO3) LOD	1	1	STD81396	07/17/17 19:47
10	I3_071717-10	L17070003-01 (F,CL,BR,SO4) LOQ	1	1	STD81396	07/17/17 20:07
11	I3_071717-11	L17070003-01 (NO2,NO3) LOQ	1	1	STD81396	07/17/17 20:27
12	I3_071717-12	WG622092-03 ANION CCV	1	1	STD81395	07/17/17 20:48
13	I3_071717-13	WG622092-04 ANION CCB	1	1		07/17/17 21:08
14	I3_071717-14	WG622086-01 ANION BLANK	7	1		07/17/17 21:28
15	I3_071717-15	WG622086-02 ANION LCS	7	1	STD81396	07/17/17 21:49
16	I3_071717-16	WG622086-03 ANION LCS2	7	1	STD81396	07/17/17 22:09
17	I3_071717-17	L17070002-01 (F,CL,BR,SO4) LOD	7	1	STD81396	07/17/17 22:29
18	I3_071717-18	L17070002-01 (NO2,NO3) LOD	7	1	STD81396	07/17/17 22:50
19	I3_071717-19	L17070004-01 (F,CL,BR,SO4) LOQ	7	1	STD81396	07/17/17 23:10
20	I3_071717-20	L17070004-01 (NO2,NO3) LOQ	7	1	STD81396	07/17/17 23:31
21	I3_071717-21	WG622092-05 ANION CCV	1	1	STD81395	07/17/17 23:51
22	I3_071717-22	WG622092-06 ANION CCB	1	1		07/18/17 00:11
23	I3_071717-23	WG622089-01 ANION BLANK	1	1		07/18/17 00:32
24	I3_071717-24	WG622089-02 ANION LCS	1	1	STD81396	07/18/17 00:52
25	I3_071717-25	L17070547-01 (F,CL,BR,SO4)	1	1		07/18/17 01:12
26	I3_071717-26	L17070548-01 (F,CL,BR,SO4)	1	1		07/18/17 01:33
27	I3_071717-27	L17070549-01 (F,CL,BR,SO4)	1	1		07/18/17 01:53
28	I3_071717-28	L17070549-01 RR SO4 5x	1	5		07/18/17 02:13
29	I3_071717-29	L17070549-03 (F,CL,BR,SO4) 10x	1	10		07/18/17 02:34
30	I3_071717-30	L17070549-05 (F,CL,BR,SO4) 5x	1	5		07/18/17 02:54

Page: 1 Approved: 18-JUL-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC3 Dataset: 071717 IC3.SEQ

Analyst1: CAS Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254

Eluent ID#: RGT40740

Workgroups: Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM

Analytical WGs: WG622085 (LOD/LOQ Waters), WG622086 (LOD/LOQ Soils), WG622089 (Waters)

Internal STD: NA Surrogate STD: NA STD81395(26-JUN-2017)

CCV STD: STD81395 LCS STD: STD81396 STD81396

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
31	I3_071717-31	L17070560-01 (CL,SO4) 5x	1	5		07/18/17 03:15
32	I3_071717-32	L17070560-01 RR CL 50x	1	50		07/18/17 03:35
33	I3_071717-33	WG622092-07 ANION CCV	1	1	STD81395	07/18/17 03:55
34	I3_071717-34	WG622092-08 ANION CCB	1	1		07/18/17 04:16
35	I3_071717-35	L17070578-01 (F,CL,SO4)	2	1		07/18/17 04:36
36	I3_071717-36	L17070578-01 RR CL 10x	2	10		07/18/17 04:56
44	I3_071717-37	L17070654-01 (CL) REF	2	1		07/18/17 05:17
38	I3_071717-38	WG622089-04 DUP 0654-01	2	1		07/18/17 05:37
39	I3_071717-39	WG622089-05 MS 0654-01	2	1	STD81396	07/18/17 05:57
40	I3_071717-40	WG622089-06 MSD 0654-01	2	1	STD81396	07/18/17 06:18
41	I3_071717-41	WG622092-09 ANION CCV	1	1	STD81395	07/18/17 06:38
42	I3_071717-42	WG622092-10 ANION CCB	1	1		07/18/17 06:59
43	I3_071717-43	END	1	1		07/18/17 07:19

Comments

Seq.	Rerun	Dil.	Reason	Analytes
39				
	Sample WG622089-05 MS 0654-01 had an MS %Rec below the advisory limit for chloride. This was due to the parent sample's initial matrix, which contained an amount of chloride greater than 10% of that of the MS spiking solution.			
40				
	Sample WG622089-06 MSD 0654-01 had an MSD %Rec below the advisory limit for chloride. This was due to the parent sample's initial matrix, which contained an amount of chloride greater than 10% of that of the MSD spiking solution.			

Page: 2 Approved: 18-JUL-17

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

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-27-2017 11:56:01

Microbac Laboratories Inc.

Data Checklist

Date: 17-JUL-2017
Analyst: CAS
Analyst: NA
Method: 300/9056
Instrument: IC3
Curve Workgroup: NA
Runlog ID: 83420
Analytical Workgroups: L17070001,0002,0003,0004,0547,0548,0549,0560,0578,0654

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)	2104 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	<ADV. LIMIT (MATRIX INTERFERENCE)
%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	MES

Primary Reviewer:
18-JUL-2017

Secondary Reviewer:
18-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-18-2017 13:54:49

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 9056 **AAB#:** WG622089

Login Number: L17070560

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
LH18/24-SP650-6456	01	07/12/17					07/17/2017	5.1	2	*	07/18/17	5.5	2	*
LH18/24-SP650-6456	01	07/12/17					07/17/2017	5.1	2	*	07/18/17	5.5	2	*

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5389518
Report generated 07/18/2017 13:51

METHOD BLANK SUMMARY

Login Number:	L17070560	Work Group:	WG622089
Blank File ID:	I3_071717-23	Blank Sample ID:	WG622089-01
Prep Date:	07/17/17 17:44	Instrument ID:	IC3
Analyzed Date:	07/18/17 00:32	Method:	9056
Analyst:	CAS		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG622089-02	I3_071717-24	07/18/17 00:52	01
LH18/24-SP650-6456	L17070560-01	I3_071717-31	07/18/17 03:15	DL01
LH18/24-SP650-6456	L17070560-01	I3_071717-32	07/18/17 03:35	DL02
DUP	WG622089-04	I3_071717-38	07/18/17 05:37	01

Report Name: BLANK_SUMMARY
PDF File ID: 5389519
Report generated 07/18/2017 13:51

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070560 Prep Date: 07/17/17 17:44 Sample ID: WG622089-01
Instrument ID: IC3 Run Date: 07/18/17 00:32 Prep Method: 9056
File ID: I3_071717-23 Analyst: CAS Method: 9056
Workgroup (AAB#): WG622089 Matrix: Water Units: mg/L
Contract #: Cal ID: IC3-26-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Chloride	0.100	0.400	0.100	1	U
Sulfate	0.500	2.00	0.500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5389520
18-JUL-2017 13:51

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070560 Run Date: 07/18/2017 Sample ID: WG622089-02
Instrument ID: IC3 Run Time: 00:52 Prep Method: 9056
File ID: I3_071717-24 Analyst: CAS Method: 9056
Workgroup (AAB#): WG622089 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD81396 Cal ID: IC3-26-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Chloride	8.00	8.08	101	90 - 110	
Sulfate	40.0	40.9	102	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5389521
Report generated: 07/18/2017 13:51

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17070560
Analytical Method: 9056
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
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5390033
Report generated 07/18/2017 13:51

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17070560
Analytical Method: 9056
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	5.464	1.00	0.161800000	6.180	4.00	0.664500000	6.020
Sulfate	1.00	0.121400000	8.237	5.00	0.587100000	8.516	20.0	2.49160000	8.027

INT_CAL - Modified 03/06/2008
PDF File ID: 5390033
Report generated 07/18/2017 13:51

Login Number: L17070560
Analytical Method: 9056
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: 5390033
Report generated 07/18/2017 13:51

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070560 Run Date: 06/26/2017 Sample ID: WG619464-07
Instrument ID: IC3 Run Time: 19:33 Method: 9056
File ID: I3_062617-09 Analyst: CAS QC Key: DOD4
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: 5390038
Report generated 07/18/2017 13:51

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070560 | Run Date: 07/18/2017 | Sample ID: WG622092-06
Instrument ID: IC3 | Run Time: 00:11 | Method: 9056
File ID: I3_071717-22 | Analyst: CAS | Units: mg/L
Workgroup (AAB#): WG622089 | Cal ID: IC3 - 26-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.400	0.100	U
Sulfate	0.500	2.00	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: 5389523
Report generated 07/18/2017 13:52

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17070560	Run Date:	07/18/2017	Sample ID:	WG622092-08
Instrument ID:	IC3	Run Time:	04:16	Method:	9056
File ID:	I3_071717-34	Analyst:	CAS	Units:	mg/L
Workgroup (AAB#):	WG622089	Cal ID:	IC3 - 26-JUN-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.400	0.100	U
Sulfate	0.500	2.00	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: 5389523
Report generated 07/18/2017 13:52

Login Number: L17070560 Run Date: 07/17/2017 Sample ID: WG622092-05
Instrument ID: IC3 Run Time: 23:51 Method: 9056
File ID: I3_071717-21 Analyst: CAS QC Key: DOD4
Workgroup (AAB#): WG622089 Cal ID: IC3 - 26-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	7.99	mg/L	5.87	0.188	10	
Sulfate		40.0	40.4	mg/L	7.70	1.03	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5389522
Report generated 07/18/2017 13:52

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070560 Run Date: 07/18/2017 Sample ID: WG622092-07

Instrument ID: IC3 Run Time: 03:55 Method: 9056

File ID: I3_071717-33 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG622089 Cal ID: IC3 - 26-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.00	mg/L	5.87	0.0375	10	
Sulfate		40.0	40.5	mg/L	7.69	1.15	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5389522

Report generated 07/18/2017 13:52

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
July 18, 2017

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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	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

Microbac Laboratories Inc.
List of Valid Qualifiers
July 18, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
July 18, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

AECOM — Chain of Custody Record

COC Number:

Laboratory:	Microbac POC: Stephanie Mossburg
Address:	158 Starlite Drive
	Marietta, OH 45750
Phone:	1-800-373-4071
Client:	AECOM
Address:	112 East Pecan Ste. 400
	San Antonio, TX 78205
Turn Around Time:	STANDARD
Project Name/Location:	Longhorn
Project Number:	60256135. GWTPTHRUMAR16

Project Manager:	[redacted] ELSPETH SHARP
Phone/Fax Number:	210-296-2000
Sampler (print):	Scott Beesinger
Signature:	Scott Beesinger

Mail to: Linda Raabe, 112 East Pecan STE. 400, San Antonio, TX 78205, 210-296-2000

Fed Ex Airbill No:

Program:

pH:

ERPIMS REQUIRED FIELDS

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp*	Grab	Matrix	Number of Containers	VOC	CHLORIDE SULFATE	PEACHLORATE	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
GWTP Bi-Weekly	LH18/24-SP650-6456			7/12/17	1500		X	W	5	X	X	X					
	TRIP BLANK			7/12/17			X	W	2	X							

Comments: STANDARD TAT

	Date	Time	Received
Relinquished by: (Signature) Scott Beesinger	7/12/17	1545	
Relinquished by: (Signature)	Date	Time	Received (Signatur

Microbac OVD
Received: 07/13/2017 10:15
By: CARA STRICKLER
221000103257

Time	Relinquished by: (Signature)
Time	Remarks:

*Homogenize all composite samples prior to analysis

Distribution: White to Laboratory, Canary to Project Manager, Pink QA/QC Manager

MICROBAC®

COOLER TEMP >6° C LOG

Cooler ID 3257

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

CHD 7/13/17

pH Exceptions

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

CHD 7/13/17

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

CHD 7/13/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17070560
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 24-JUL-2017

Samplenum	Container ID	Products
L17070560-01	934952	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	13-JUL-2017 12:29	CLS		
2	ANALYZ	L1	ORG4	13-JUL-2017 13:33	JST	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	13-JUL-2017 12:29	CLS		
2	ANALYZ	L1	ORG4	13-JUL-2017 13:33	JST	CLS	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	13-JUL-2017 12:29	CLS		
2	ANALYZ	L1	ORG4	13-JUL-2017 13:33	JST	CLS	

Samplenum	Container ID	Products
L17070560-01	934953	ALK 9056

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		13-JUL-2017 12:29	CLS		

Samplenum	Container ID	Products
L17070560-01	934954	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	13-JUL-2017 12:29	CLS		
2	ANALYZ	W1	SEM	14-JUL-2017 08:12	JWR	CLS	
3	STORE	SEM	A1	17-JUL-2017 15:35	BRG	JWR	

Samplenum	Container ID	Products
L17070560-02	934955	NH3 TKN TOC-1 826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	13-JUL-2017 12:29	CLS		
2	ANALYZ	L1	ORG4	13-JUL-2017 13:33	JST	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	13-JUL-2017 12:29	CLS		
2	ANALYZ	L1	ORG4	13-JUL-2017 13:33	JST	CLS	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L17070961

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on July 31 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17070961
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114415	I	2.0		J4616881999	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)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L17070961
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP650-6458	L17070961-01	07/19/2017 15:00	07/20/2017 09:38
LH18/24-SP650-AFTER ION	L17070961-02	07/19/2017 15:00	07/20/2017 09:38
LH18/24-SP650-BEFORE ION	L17070961-03	07/19/2017 15:00	07/20/2017 09:38

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG623162	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-27 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-07-27 12:21:05

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG623162	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-27 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG623162	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-27 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG623162	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-27 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG623162	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-27 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG623162	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-27 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623509	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-28 17:56:21

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623509	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623509	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623509	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623509	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623509	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG622620	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-28 17:55:45

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG622620	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG622620	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG622620	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG622620	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

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Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG622620	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623227	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-07-28 17:56:49

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623227	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623227	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623227	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623227	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

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5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

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Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17070961
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623227	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-07-28 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Lab Report #: L17070961
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070961-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6458	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	07/27/2017 12:11
Workgroup #:	WG623509	**Analyst:**	DCM	**Run Date:**	07/27/2017 12:30
Collect Date:	07/19/2017 15:00	**Dilution:**	5	**File ID:**	S2170727002.024
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	5.35		1.00	0.500	0.250

Certificate of Analysis

Sample #:	L17070961-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6458	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	06/07/2017 15:40
Workgroup #:	WG622620	**Analyst:**	TMM	**Run Date:**	07/20/2017 14:55
Collect Date:	07/19/2017 15:00	**Dilution:**	5	**File ID:**	00.1707201455-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	3.94		0.500	0.250	0.125

Certificate of Analysis

Sample #:	L17070961-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6458	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG623227	**Analyst:**	EPT	**Run Date:**	07/25/2017 16:58
Collect Date:	07/19/2017 15:00	**Dilution:**	5	**File ID:**	TC07252017.007
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	51.1		10.0	5.00	2.50

Certificate of Analysis

Microbac

Lab Report #: L17070961
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Sample #:	L17070961-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-AFTER ION	**Prep Method:**	6850	**Prep Date:**	07/25/2017 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG623162	**Analyst:**	JWR	**Run Date:**	07/25/2017 13:24
Collect Date:	07/19/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40266
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.18		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L17070961-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-BEFORE ION	**Prep Method:**	6850	**Prep Date:**	07/25/2017 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG623162	**Analyst:**	JWR	**Run Date:**	07/25/2017 14:58
Collect Date:	07/19/2017 15:00	**Dilution:**	20	**File ID:**	1LM.LM40271
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	80.8		8.00	4.00	2.00

2.1 General Chromatography Data

2.1.1 LC/MS Data (6850)

2.1.1.1 Summary Data

Microbac

Lab Report #: L17070961
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070961-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-AFTER ION	**Prep Method:**	6850	**Prep Date:**	07/25/2017 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG623162	**Analyst:**	JWR	**Run Date:**	07/25/2017 13:24
Collect Date:	07/19/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40266
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.18		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L17070961-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-BEFORE ION	**Prep Method:**	6850	**Prep Date:**	07/25/2017 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG623162	**Analyst:**	JWR	**Run Date:**	07/25/2017 14:58
Collect Date:	07/19/2017 15:00	**Dilution:**	20	**File ID:**	1LM.LM40271
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	80.8		8.00	4.00	2.00

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

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

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: NA

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40075	WG619865-01 CCB	1	1		06/29/17 13:13
2	1LM.LM40076	WG619865-02 STD (0.1 ug/L)	1	1	STD80232	06/29/17 13:32
3	1LM.LM40077	WG619865-03 STD (0.2 ug/L)	1	1	STD80232	06/29/17 13:51
4	1LM.LM40078	WG619865-04 STD (0.5 ug/L)	1	1	STD80232	06/29/17 14:10
5	1LM.LM40079	WG619865-05 STD (1.0 ug/L)	1	1	STD80232	06/29/17 14:29
6	1LM.LM40080	WG619865-06 STD (2.0 ug/L)	1	1	STD80232	06/29/17 14:48
7	1LM.LM40081	WG619865-07 STD (5.0 ug/L)	1	1	STD80232	06/29/17 15:07
8	1LM.LM40082	WG619865-08 STD (10 ug/L)	1	1	STD80232	06/29/17 15:26
9	1LM.LM40083	WG619865-09 SSCV (1.0 ug/L)	1	1	STD80234	06/29/17 15:45
10	1LM.LM40084	WG619609-01 CCB	1	1		06/29/17 16:04
11	1LM.LM40085	WG619609-02 CCV (1.0ug/L)	1	1	STD80232	06/29/17 16:23
12	1LM.LM40086	WG619615-05 MRL (0.2ug/L)	1	1	STD80232	06/29/17 16:42
13	1LM.LM40087	WG619615-01 MCT (0.2ug/L)	1	1	STD80234	06/29/17 17:01
14	1LM.LM40088	WG619615-02 BLANK	1	1		06/29/17 17:20
15	1LM.LM40089	WG619615-03 LCS (0.2ug/L)	1	1	STD80234	06/29/17 17:39
16	1LM.LM40090	WG619615-04 LCS2 (0.2ug/L)	1	1	STD80234	06/29/17 17:57
17	1LM.LM40091	L17061390-01 10,000X	1	10000	STD80234	06/29/17 18:16
18	1LM.LM40092	L17061390-02	1	1	STD80234	06/29/17 18:35
19	1LM.LM40093	L17061390-03 100X	1	100	STD80234	06/29/17 18:54
20	1LM.LM40094	L17061390-04	1	1	STD80234	06/29/17 19:13
21	1LM.LM40095	L17061390-05 10X	1	10		06/29/17 19:32
22	1LM.LM40096	L17061390-06	1	1		06/29/17 19:51
23	1LM.LM40097	WG619609-03 CCV (1.0ug/L)	1	1	STD80232	06/29/17 20:10
24	1LM.LM40098	WG619615-06 MRL (0.2ug/L)	1	1	STD80232	06/29/17 20:29
25	1LM.LM40099	WG619609-04 CCB	1	1		06/29/17 20:48
26	1LM.LM40100	L17061390-07	1	1		06/29/17 21:07
27	1LM.LM40101	L17061390-09 100,000X	1	100000		06/29/17 21:26
28	1LM.LM40102	L17061390-10	1	1		06/29/17 21:45
29	1LM.LM40103	L17061390-12	1	1		06/29/17 22:04
30	1LM.LM40104	L17061390-13	1	1		06/29/17 22:23
31	1LM.LM40105	L17061390-15	1	1		06/29/17 22:42
32	1LM.LM40106	L17061390-16 2X	1	2		06/29/17 23:01
33	1LM.LM40107	WG619609-05 CCV (1.0ug/L)	1	1	STD80232	06/29/17 23:20

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Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 NA

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM40108	WG619615-07 MRL (0.2ug/L)	1	1	STD80232	06/29/17 23:39
35	1LM.LM40109	WG619609-06 CCB	1	1		06/29/17 23:57

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L17061390-01 Analyzed at a dilution based on historical data.			
19				
	L17061390-03 Analyzed at a dilution based on historical data.			
21				
	L17061390-05 Analyzed at a dilution based on historical data.			
27				
	L17061390-09 Analyzed at a dilution based on historical data.			
32				
	L17061390-16 Analyzed at a dilution based on historical data.			

Page: 2 Approved: 30-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 072517_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG623162 (waters)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (06/29/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: NA

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40259	WG623165-01 CCB	1	1		07/25/17 11:11
2	1LM.LM40260	WG623165-02 CCV (1.0ug/L)	1	1	STD80232	07/25/17 11:30
3	1LM.LM40261	WG623162-05 MRL (0.2ug/L)	1	1	STD80232	07/25/17 11:49
4	1LM.LM40262	WG623162-01 MCT (0.2ug/L)	1	1	STD80234	07/25/17 12:08
5	1LM.LM40263	WG623162-02 BLANK	1	1		07/25/17 12:27
6	1LM.LM40264	WG623162-03 LCS (0.2ug/L)	1	1	STD80234	07/25/17 12:46
7	1LM.LM40265	WG623162-04 LCS2 (0.2ug/L)	1	1	STD80234	07/25/17 13:05
8	1LM.LM40266	L17070961-02	1	1		07/25/17 13:24
9	1LM.LM40267	L17070961-03 (NR)	1	1		07/25/17 13:43
10	1LM.LM40268	WG623165-03 CCV (1.0ug/L)	1	1	STD80232	07/25/17 14:02
11	1LM.LM40269	WG623162-06 MRL (0.2ug/L)	1	1	STD80232	07/25/17 14:21
12	1LM.LM40270	WG623165-04 CCB	1	1		07/25/17 14:39
13	1LM.LM40271	L17070961-03 RR 20x	1	20		07/25/17 14:58
14	1LM.LM40272	WG623165-05 CCV (1.0ug/L)	1	1	STD80232	07/25/17 15:17
15	1LM.LM40273	WG623162-07 MRL (0.2ug/L)	1	1	STD80232	07/25/17 15:36
16	1LM.LM40274	WG623165-06 CCB	1	1		07/25/17 15:55

Comments

Seq.	Rerun	Dil.	Reason	Analytes
9	X	20	Over Calibration Range	perchlorate
	L17070961-03 (NR)			

Page: 1 Approved: 26-JUL-17

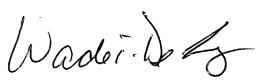
Microbac Laboratories Inc.

Data Checklist

Date: 29-JUN-2017
Analyst: WTD
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83086
Analytical Workgroups: L17061390

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	X
Check for completeness	X
Primary Reviewer	WTD
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:



Secondary Reviewer:
30-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-30-2017 12:54:25

Microbac Laboratories Inc.

Data Checklist

Date: 25-JUL-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83594
Analytical Workgroups: L17070961

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	
Check for completeness	X
Primary Reviewer	JWR
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	MES

Primary Reviewer:
26-JUL-2017

John Richards

Secondary Reviewer:
26-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-26-2017 14:29:08

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG623162

Login Number: L17070961

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
LH18/24-SP650-AFTER ION	02	07/19/17					07/25/2017	5.9	28		07/25/17	.1	28	
LH18/24-SP650-BEFORE IO	03	07/19/17					07/25/2017	5.9	28		07/25/17	.1	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5404119
Report generated 07/31/2017 09:17

METHOD BLANK SUMMARY

Login Number: L17070961
Work Group: WG623162
Blank File ID: 1LM.LM40263
Blank Sample ID: WG623162-02
Prep Date: 07/25/17 12:00
Instrument ID: LCMS1
Analyzed Date: 07/25/17 12:27
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG623162-05	1LM.LM40261	07/25/17 11:49	01
MCT	WG623162-01	1LM.LM40262	07/25/17 12:08	01
LCS	WG623162-03	1LM.LM40264	07/25/17 12:46	01
LCS2	WG623162-04	1LM.LM40265	07/25/17 13:05	01
LH18/24-SP650-AFTER ION	L17070961-02	1LM.LM40266	07/25/17 13:24	01
QCMRL	WG623162-06	1LM.LM40269	07/25/17 14:21	01
LH18/24-SP650-BEFORE ION	L17070961-03	1LM.LM40271	07/25/17 14:58	DL01
QCMRL	WG623162-07	1LM.LM40273	07/25/17 15:36	01

Report Name: BLANK_SUMMARY
PDF File ID: 5404120
Report generated 07/31/2017 09:17

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070961 Prep Date: 07/25/17 12:00 Sample ID: WG623162-02
Instrument ID: LCMS1 Run Date: 07/25/17 12:27 Prep Method: 6850
File ID: 1LM.LM40263 Analyst: JWR Method: 6850
Workgroup (AAB#): WG623162 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5404121
31-JUL-2017 09:17

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070961 Analyst: JWR Prep Method: 6850
Instrument ID: LCMS1 Matrix: Water Method: 6850
Workgroup (AAB#): WG623162 Units: ug/L
QC Key: DOD4 Lot #: STD80234

Sample ID: WG623162-03 LCS File ID: 1LM.LM40264 Run Date: 07/25/2017 12:46
Sample ID: WG623162-04 LCS2 File ID: 1LM.LM40265 Run Date: 07/25/2017 13:05

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Perchlorate	0.200	0.186	93.0	0.200	0.181	90.5	2.72	80 - 120	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5404122
Report generated: 07/31/2017 09:17

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17070961
Analytical Method: 6850
ICAL Workgroup: WG619865

Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.454	6.38	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5404215
Report generated 07/31/2017 09:17

Login Number: L17070961
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-02			WG619865-03			WG619865-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	20800.0000	1.476	0.200	44600.0000	1.521	0.500	102000.000	1.433

INT_CAL - Modified 03/06/2008
PDF File ID: 5404215
Report generated 07/31/2017 09:17

Login Number: L17070961
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-05			WG619865-06			WG619865-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	214000.000	1.464	2.00	408000.000	1.442	5.00	981000.000	1.437

INT_CAL - Modified 03/06/2008
PDF File ID: 5404215
Report generated 07/31/2017 09:17

Login Number: L17070961
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-08		
	CONC	RESP	RF
Perchlorate	10.0	1820000.00	1.407

INT_CAL - Modified 03/06/2008
PDF File ID: 5404215
Report generated 07/31/2017 09:17

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17070961 Run Date: 06/29/2017 Sample ID: WG619865-09
Instrument ID: LCMS1 Run Time: 15:45 Method: 6850
File ID: 1LM.LM40083 Analyst: WTD QC Key: DOD4
ICal Workgroup: WG619865 Cal ID: LCMS1 - 29-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.980	ug/L	1.40	2.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5404216
Report generated 07/31/2017 09:17

Login Number: L17070961 Run Date: 07/25/2017 Sample ID: WG623165-01
Instrument ID: LCMS1 Run Time: 11:11 Method: 6850
File ID: 1LM.LM40259 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG623162 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5404125
Report generated 07/31/2017 09:17

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070961 | Run Date: 07/25/2017 | Sample ID: WG623165-04
Instrument ID: LCMS1 | Run Time: 14:39 | Method: 6850
File ID: 1LM.LM40270 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG623162 | Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5404125
Report generated 07/31/2017 09:17

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17070961 | Run Date: 07/25/2017 | Sample ID: WG623165-06
Instrument ID: LCMS1 | Run Time: 15:55 | Method: 6850
File ID: 1LM.LM40274 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG623162 | Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5404125
Report generated 07/31/2017 09:17

Login Number: L17070961 Run Date: 07/25/2017 Sample ID: WG623165-02
Instrument ID: LCMS1 Run Time: 11:30 Method: 6850
File ID: 1LM.LM40260 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG623162 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.948	ug/L	1.36	5.20	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5404124
Report generated 07/31/2017 09:17

Login Number: L17070961 Run Date: 07/25/2017 Sample ID: WG623165-03
Instrument ID: LCMS1 Run Time: 14:02 Method: 6850
File ID: 1LM.LM40268 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG623162 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.933	ug/L	1.34	6.70	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5404124
Report generated 07/31/2017 09:17

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17070961 Run Date: 07/25/2017 Sample ID: WG623165-05

Instrument ID: LCMS1 Run Time: 15:17 Method: 6850

File ID: 1LM.LM40272 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG623162 Cal ID: LCMS1 - 29-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.940	ug/L	1.35	6.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5404124

Report generated 07/31/2017 09:17

Login Number: L17070961 Run Date: 07/25/2017 Sample ID: WG623162-05
Instrument ID: LCMS1 Run Time: 11:49 Prep Method: 6850
File ID: 1LM.LM40261 Analyst: JWR Method: 6850
Workgroup (AAB#): WG623162 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.183	91.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5404123
Report generated 07/31/2017 09:17

Login Number: L17070961 Run Date: 07/25/2017 Sample ID: WG623162-06
Instrument ID: LCMS1 Run Time: 14:21 Prep Method: 6850
File ID: 1LM.LM40269 Analyst: JWR Method: 6850
Workgroup (AAB#): WG623162 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.181	90.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5404123
Report generated 07/31/2017 09:17

Login Number: L17070961 Run Date: 07/25/2017 Sample ID: WG623162-07
Instrument ID: LCMS1 Run Time: 15:36 Prep Method: 6850
File ID: 1LM.LM40273 Analyst: JWR Method: 6850
Workgroup (AAB#): WG623162 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.181	90.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5404123
Report generated 07/31/2017 09:17

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L17070961
Instrument ID: LCMS1
Workgroup (AAB#): WG623162

ICAL CCV Number: WG619865-05
CAL ID: LCMS1-29-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG619865	NA	NA	703000
Upper Limit	NA	NA	1054500
Lower Limit	NA	NA	351500
L17070961-02	1.00	01	704000
L17070961-03	20.0	DL01	739000
WG623162-02	1.00	01	690000
WG623162-03	1.00	01	640000
WG623162-04	1.00	01	703000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5404126
Report generated 07/31/2017 09:17

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	L17070961-02
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40266
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 13:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	237000	75000	3.16	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	L17070961-03
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40271
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 14:58	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	849000	266000	3.19	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG619865-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40076
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	06/29/2017 13:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	20800	6780	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG619865-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40077
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	06/29/2017 13:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44600	13700	3.26	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG619865-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40078
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	06/29/2017 14:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	102000	31100	3.28	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG619865-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40079
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	06/29/2017 14:29	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	65900	3.25	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG619865-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40080
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	06/29/2017 14:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	408000	126000	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG619865-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40081
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	06/29/2017 15:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	981000	306000	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG619865-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40082
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	06/29/2017 15:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1820000	577000	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG619865-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40083
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	06/29/2017 15:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	200000	61800	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	WG623162-01
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40262
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 12:08	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	37100	11700	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	WG623162-02
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40263
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 12:27	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	WG623162-03
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40264
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 12:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	35500	11000	3.23	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	WG623162-04
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40265
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 13:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38000	12300	3.09	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	WG623162-05
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40261
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 11:49	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	37000	12100	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	WG623162-06
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40269
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 14:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40300	13700	2.94	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**	6850	**Samplenum:**	WG623162-07
Instrument:	LCMS1	**Prep Date:**	07/25/2017 12:00	**File ID:**	1LM.LM40273
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 15:36	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40900	12700	3.22	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG623165-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40259
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 11:11	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	234	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG623165-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40260
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 11:30	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	174000	55200	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG623165-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40268
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 14:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	185000	58800	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG623165-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40270
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 14:39	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG623165-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40272
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 15:17	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	198000	61700	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17070961	**Prep Method:**		**Samplenum:**	WG623165-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40274
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG623162	**Analysis Date:**	07/25/2017 15:55	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

2.2 General Chemistry Data

2.2.1 Ammonia Data

2.2.1.1 Summary Data

Microbac

Lab Report #: L17070961
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070961-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6458	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	07/27/2017 12:11
Workgroup #:	WG623509	**Analyst:**	DCM	**Run Date:**	07/27/2017 12:30
Collect Date:	07/19/2017 15:00	**Dilution:**	5	**File ID:**	S2170727002.024
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	5.35		1.00	0.500	0.250

2.2.1.2 QC Summary Data

Example Ammonia Calculations

(absorbance - intercept)/(slope * dilution) = 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: 27-JUL-2017
Analyst: DCM
Analyst: NA
Method: NH3
Instrument: SC2
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG623505 WG623509

Calibration/Linearity	07-27-2017
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	DCM
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
28-JUL-2017

Secondary Reviewer:
28-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-28-2017 13:53:06

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1 AAB#: WG623509

Login Number: L17070961

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
LH18/24-SP650-6458	01	07/19/17					07/27/2017	7.9	28		07/27/17	7.9	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5408668
Report generated 07/28/2017 13:45

METHOD BLANK SUMMARY

Login Number:	L17070961	Work Group:	WG623509
Blank File ID:	S2170727002.019	Blank Sample ID:	WG623509-01
Prep Date:	07/27/17 12:25	Instrument ID:	SMARTCHEM2
Analyzed Date:	07/27/17 12:25	Method:	350.1
Analyst:	DCM		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG623509-02	S2170727002.022	07/27/17 12:28	01
LH18/24-SP650-6458	L17070961-01	S2170727002.024	07/27/17 12:30	DL01
DUP	WG623509-04	S2170727002.036	07/27/17 12:45	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5408669
Report generated 07/28/2017 13:45

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17070961 Prep Date: 07/27/17 12:25 Sample ID: WG623509-01
Instrument ID: SMARTCHEM2 Run Date: 07/27/17 12:25 Prep Method: 350.1
File ID: S2170727002.019 Analyst: DCM Method: 350.1
Workgroup (AAB#): WG623509 Matrix: Water Units: mg/L
Contract #: Cal ID: SMARTC-27-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.200	0.0500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5408670
28-JUL-2017 13:45

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070961 **Run Date:** 07/27/2017 **Sample ID:** WG623509-02
Instrument ID: SMARTCHEM2 **Run Time:** 12:28 **Prep Method:** 350.1
File ID: S2170727002.022 **Analyst:** DCM **Method:** 350.1
Workgroup (AAB#): WG623509 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80299 **Cal ID:** SMARTC-27-JUL-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.86	93.2	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5408671
Report generated: 07/28/2017 13:45

2.2 General Chemistry Data

2.2.2 Orthophosphate Data

2.2.2.1 Summary Data

Microbac

Lab Report #: L17070961
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070961-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6458	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	06/07/2017 15:40
Workgroup #:	WG622620	**Analyst:**	TMM	**Run Date:**	07/20/2017 14:55
Collect Date:	07/19/2017 15:00	**Dilution:**	5	**File ID:**	00.1707201455-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	3.94		0.500	0.250	0.125

2.2.2.2 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: 20-JUL-2017
Analyst: TMM
Analyst: NA
Method: PO4
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG622620

Calibration/Linearity	6/7/17
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:
20-JUL-2017

Secondary Reviewer:
26-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-26-2017 09:14:56

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.2 AAB#: WG622620

Login Number: L17070961

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
LH18/24-SP650-6458	01	07/19/17					07/20/2017	1	2		07/20/17	1	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5401272
Report generated 07/25/2017 11:09

METHOD BLANK SUMMARY

Login Number:	L17070961	**Work Group:**	WG622620
Blank File ID:	00.1707201455-03	**Blank Sample ID:**	WG622620-01
Prep Date:	07/20/17 14:55	**Instrument ID:**	UV-2600
Analyzed Date:	07/20/17 14:55	**Method:**	365.2
Analyst:	TMM		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG622620-02	00.1707201455-04	07/20/17 14:55	
LCS2	WG622620-03	00.1707201455-05	07/20/17 14:55	
LH18/24-SP650-6458	L17070961-01	00.1707201455-06	07/20/17 14:55	
DUP	WG622620-05	00.1707201455-07	07/20/17 14:55	

Report Name: BLANK_SUMMARY
PDF File ID: 5401273
Report generated 07/25/2017 11:09

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17070961 Prep Date: 07/20/17 14:55 Sample ID: WG622620-01
Instrument ID: UV-2600 Run Date: 07/20/17 14:55 Prep Method: 365.2
File ID: 00.1707201455-03 Analyst: TMM Method: 365.2
Workgroup (AAB#): WG622620 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-11-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Orthophosphate	0.0250	0.100	0.0250	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5401274
25-JUL-2017 11:09

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070961 Analyst: TMM Prep Method: 365.2
Instrument ID: UV-2600 Matrix: Water Method: 365.2
Workgroup (AAB#): WG622620 Units: mg/L
QC Key: DOD4 Lot #: STD82902

Sample ID: WG622620-02 LCS File ID: 00.1707201455-04 Run Date: 07/20/2017 14:55
Sample ID: WG622620-03 LCS2 File ID: 00.1707201455-05 Run Date: 07/20/2017 14:55

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Orthophosphate	1.00	1.02	102	1.00	1.03	103	1.09	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5401275
Report generated: 07/25/2017 11:09

2.2.2.3 Raw Data

WG616995

Curves

Parameter: PO4

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: STD79640

Concentration: 1000 mg/L

Recipe for preparation of curve standards found in:
SOP: 3653 Revision: 17 Page: 09

Second Source Stock: STD82182 (concentration: 10)

Daily Preparation: 10(100)/100

concentration = =1.0

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
1.0	50	1cm	880	0.623
0.7	↓	↓	↓	0.442
0.5	↓	↓	↓	0.311
0.2	↓	↓	↓	0.127
0.1	↓	↓	↓	0.063
0.05	↓	↓	↓	0.031
0	↓	↓	↓	0
2nd Source (1.0)	50	1cm	880	0.630

Analyst: Tammy Morris

Date/Time: 6/7/17 @ 1540

DCN#126309

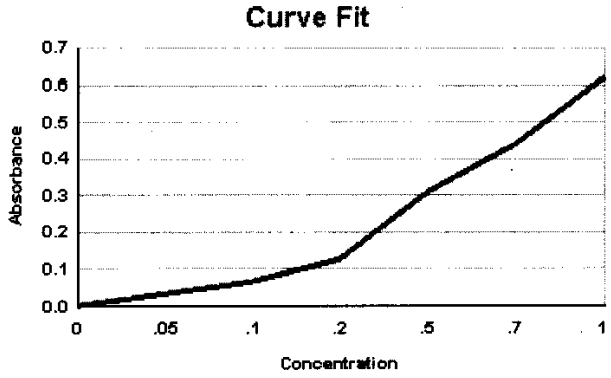
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG616995
Analytical Method:300
Instrument ID:UV-2600

Analyst:TMM
Initial Calibration Date:06/07/2017

Analyte: ORTHOPHOSPHATE
Number of Points: 7
Slope: 0.624599
Y-Intercept: 0.000610422
Coef. Of Correlation (R^2): 0.999913
Coef. Of Correlation (R): 0.999957

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00	0.00	0.00	0.000610422
0.0500	0.0310	0.00250	0.00155	0.0318404
0.100	0.0630	0.0100	0.00630	0.0630703
0.200	0.127	0.0400	0.0254	0.125530
0.500	0.311	0.250	0.156	0.312910
0.700	0.442	0.490	0.309	0.437830
1.00	0.623	1.00	0.623	0.625209



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 06/07/2017 16:24

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG616995
File ID: 00.1706071540-08
CCV ID: WG616995-08
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 06/07/2017
Run Time: 15:40
Analyst: TMM
Cal ID: UV-260 - 07-JUN-17 15:40:07

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	1	1.01	0.630	1.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 06/07/2017 16:25

[redacted]

WORKGROUP: WG622620

Orthophosphate

(orthophosphate1)

EPA 365.2 / SM4500-P E
SOP K3653 Rev 17
Color Reagent Chemicals
40280
40466
39475
COA18278

CCV: 82901
Daily Dilution: 5(5)/50
Daily Dilution: =0.5
Spectrophotometer: UV-2600

LCS: 82902
Daily Dilution: 10(10)/100
Daily Dilution: = 1
Curve ID: 6/7/17

Spike: 82902
Daily Dilution: 2(10)/50
Daily Dilution: 0.4

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: 0.5 mg/L	50	✓		0.324
BLK/CCB:	50	✓		0.001
LCS: 1.0 ppm	50	✓		0.640
LCSD: 1.0 ppm	50	✓		0.647
07-961-01	50	✓	1/5	0.493
07-961-01	50		1/2	0.940
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP: 07-961-01	50	✓	1/5	0.496
MS: (0.4) ✓	50	✓	1/5	0.498
MSD: ( )	50			
CCV: 0.5)	50	✓		0.324
CCB:	50	✓		0.324-0.001

Analyst: Tammy Morris
Date / Time: 7/20/17 1455

DCN#127155

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG622620
Analyte: ORTHOPHOSPHATE

Analyst: TMM
Date: 07/20/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG622620-01	50	50	0.00100	0.6246	0.0006104	0.00062373	0.00062373	1	mg/L
WG622620-02	50	50	0.640	0.6246	0.0006104	1.0237	1.0237	1	mg/L
WG622620-03	50	50	0.647	0.6246	0.0006104	1.0349	1.0349	1	mg/L
L17070961-01	50	50	0.493	0.6246	0.0006104	0.78833	3.9416	5	mg/L
WG622620-04	50	50	0.493	0.6246	0.0006104	0.78833	3.9416	5	mg/L
WG622620-05	50	50	0.496	0.6246	0.0006104	0.79313	3.9657	5	mg/L
WG622620-06	50	50	0.498	0.6246	0.0006104	0.79633	3.9817	5	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 07/25/2017 11:07

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG622664
File ID: 00.1707201455-01
CCV ID: WG622664-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 07/20/2017
Run Time: 14:55
Analyst: TMM
Cal ID: UV-260 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.518	0.648	3.6	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/20/2017 15:31

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG622664
File ID: 00.1707201455-09
CCV ID: WG622664-03
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 07/20/2017
Run Time: 14:55
Analyst: TMM
Cal ID: UV-260 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.518	0.648	3.6	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/20/2017 15:31

[redacted]

2.2 General Chemistry Data

2.2.3 Total Organic Carbon Data

2.2.3.1 Summary Data

Microbac

Lab Report #: L17070961
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17070961-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6458	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG623227	**Analyst:**	EPT	**Run Date:**	07/25/2017 16:58
Collect Date:	07/19/2017 15:00	**Dilution:**	5	**File ID:**	TC07252017.007
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	51.1		10.0	5.00	2.50

2.2.3.2 QC Summary Data

Total Organic Carbon Example Calculations
(Direct Readout Parameter)

(Readout)/(dilution) = 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: 25-JUL-2017
Analyst: EPT
Analyst: NA
Method: TOC
Instrument: TOC-VWP
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG623227

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:
26-JUL-2017

Secondary Reviewer:
26-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-26-2017 14:01:18

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 415.1 **AAB#:** WG623227

Login Number: L17070961

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
LH18/24-SP650-6458	01	07/19/17					07/25/2017	6.1	28		07/25/17	6.1	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5403984
Report generated 07/26/2017 13:15

METHOD BLANK SUMMARY

Login Number:	L17070961	Work Group:	WG623227
Blank File ID:	TC07252017.004	Blank Sample ID:	WG623227-01
Prep Date:	07/25/17 15:18	Instrument ID:	TOC-VWP
Analyzed Date:	07/25/17 15:18	Method:	415.1
Analyst:	EPT		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG623227-02	TC07252017.005	07/25/17 15:37	01
LCS2	WG623227-03	TC07252017.006	07/25/17 15:58	01
LH18/24-SP650-6458	L17070961-01	TC07252017.007	07/25/17 16:58	DL01
DUP	WG623227-05	TC07252017.031	07/26/17 01:08	01

Report Name: BLANK_SUMMARY
PDF File ID: 5403985
Report generated 07/26/2017 13:15

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L17070961 Prep Date:07/25/17 15:18 Sample ID:WG623227-01
Instrument ID:TOC-VWP Run Date:07/25/17 15:18 Prep Method:415.1
File ID:TC07252017.004 Analyst:EPT Method:415.1
Workgroup (AAB#):WG623227 Matrix:Water Units:mg/L
Contract #: Cal ID:TOC-VW-10-FEB-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Total Organic Carbon	0.500	2.00	0.500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5403986
26-JUL-2017 13:15

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17070961 Analyst: EPT Prep Method: 415.1
Instrument ID: TOC-VWP Matrix: Water Method: 415.1
Workgroup (AAB#): WG623227 Units: mg/L
QC Key: DOD4 Lot #: STD80787

Sample ID: WG623227-02 LCS File ID: TC07252017.005 Run Date: 07/25/2017 15:37
Sample ID: WG623227-03 LCS2 File ID: TC07252017.006 Run Date: 07/25/2017 15:58

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	27.0	108	25.0	27.2	109	0.774	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5403987
Report generated: 07/26/2017 13:15

2.2.3.3 Raw Data

Curve

~~WG602411~~ ~~WG602476~~ dm 1/13/17 WG602481

Total Organic Carbon

MAKE DAILY

CCV (TOC): _____ (5/200)(1000) = 25mg/L

LCS (TOC): _____ (5/200)(1000) = 25mg/L

CCV (TIC): _____ (5/200)(1000) = 25mg/L

MS (TOC): _____

Calibration Curve Date: _____

Reagent: RGT 38944, RGT 37673

☑ SM5310-C : Matrix 2 WG_____

☐ EPA 415.1/9060A(mod): Matrix 1 WG_____ WG_____

SOP: K 4151 Rev. ~~17~~ 18 dm 1/13/17

Instrument: Shimadza TOC-VWP/ASI

DAILY CHECK

☑ drain reservoir filled
☑ ASI water bottle full
☐ dilution water bottle full

☑ 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	all points analyzed in duplicate	
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		
45		
46		
47		
48		
49		
50		

Position	Sample ID	Dilution
51		
52	See SOP	
53	for point	
54	Preparation	
55		
56		
57		
58		
59		
60	5/200 (100) = 25	
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		

Analyst: David Merkle Date/Time: 2/10/17

DCN#123915

C:\TOC3201\Data\CURVES-02-10-2017.t32

	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

Instr.Information

System	TOCVW ASI
Detector	Wet Chemical

Cal. Curve

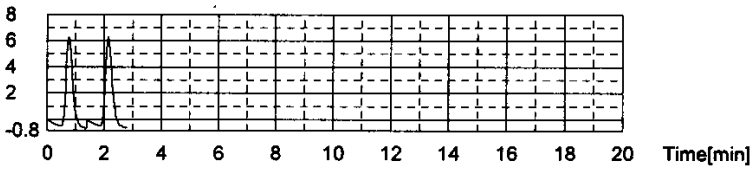
Sample Name:	TCCURVE
Sample ID:	Untitled
Cal. Curve:	TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status	Completed

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

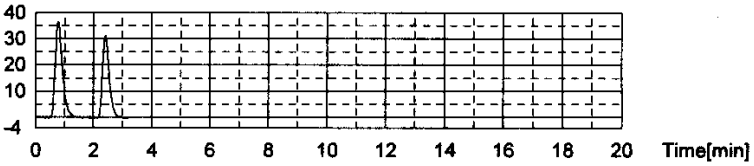
Acid Add. 0.000%
Mean Area 10.82



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

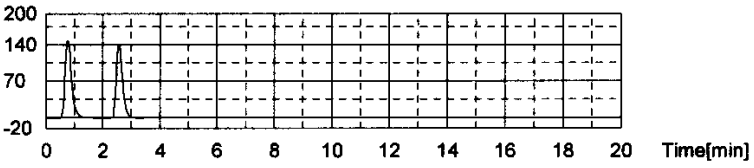
Acid Add. 0.000%
Mean Area 57.92



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

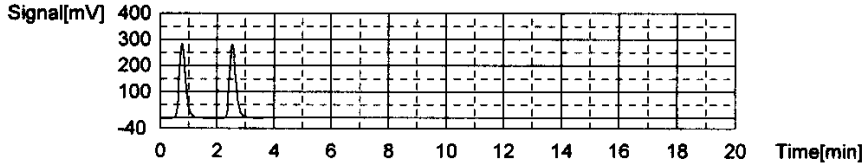
Acid Add. 0.000%
Mean Area 227.4



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

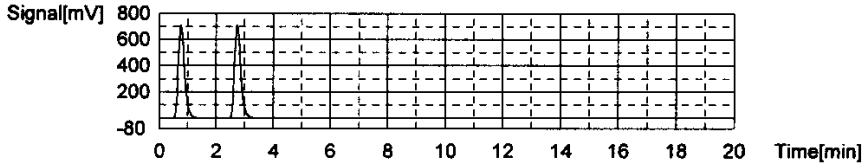
Acid Add. 0.000%
Mean Area 440.2



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

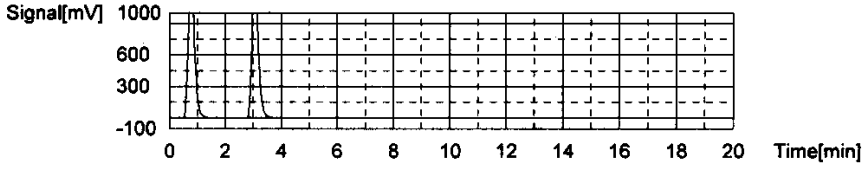
Acid Add. 0.000%
Mean Area 1092



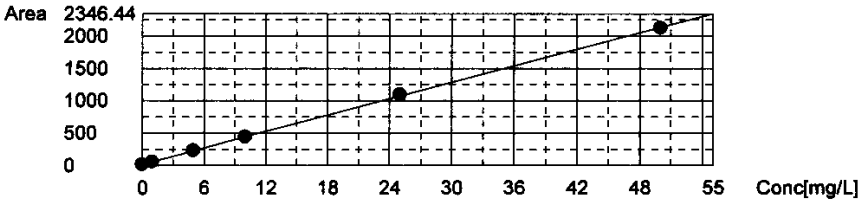
Conc: 50.00mg/L

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

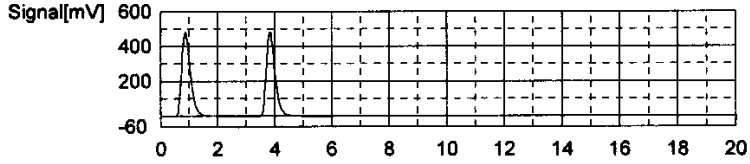
1. Det

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

95.6%

Mean Area 1029
Mean Conc. 23.90mg/L



Cal. Curve

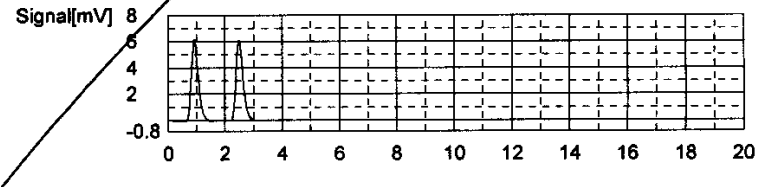
Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed

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

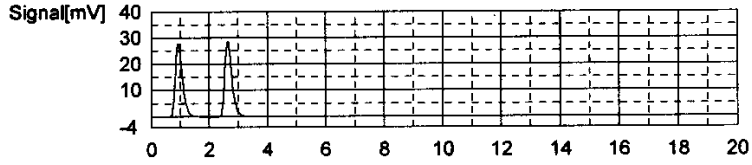
Acid Add. 3.000%
Mean Area 10.51



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

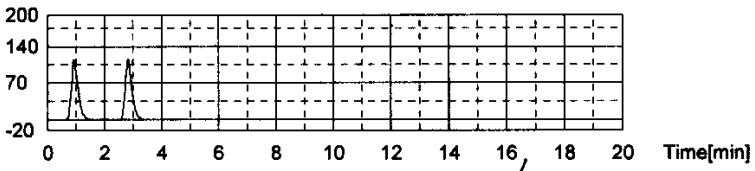


Conc: 5.000mg/L

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

dcm
3/23/17

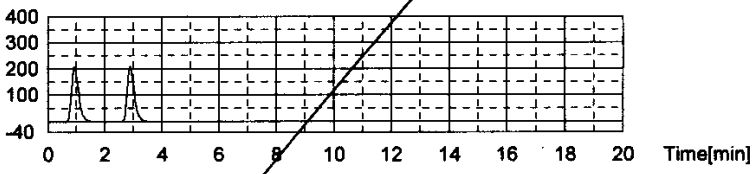
Acid Add. 3.000%
Mean Area 189.6



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

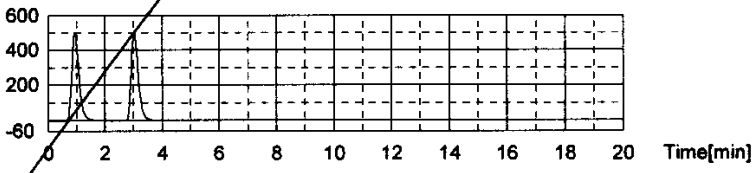
Acid Add. 3.000%
Mean Area 361.4



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

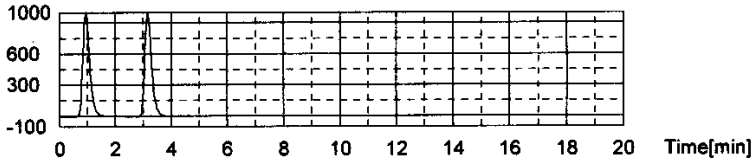
Acid Add. 3.000%
Mean Area 858.1



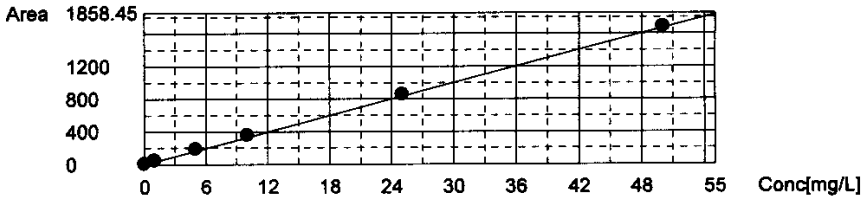
Conc: 50.00mg/L

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

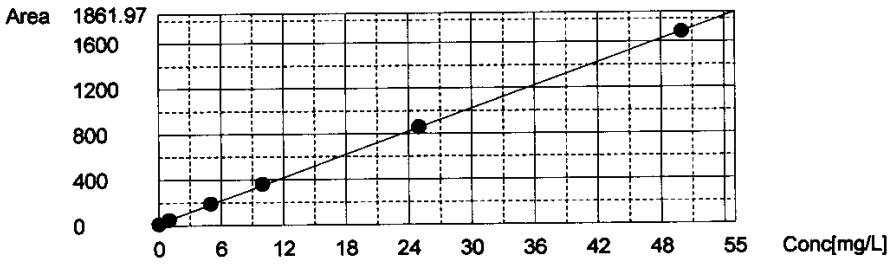
Acid Add.	3.000%
Mean Area	858.1
SD Area	1.697
CV Area	0.20%
Vial	4

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
r^2	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

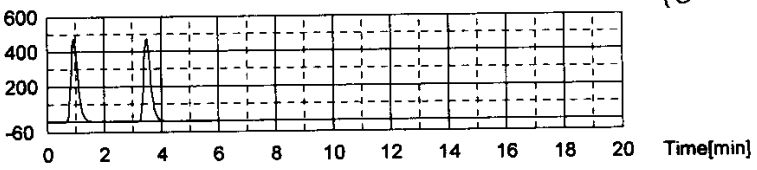
1. Det

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_1	2/10/2017 4:06:15 PM
2	814.6	24.33mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	2/10/2017 4:12:07 PM

96.9%

Mean Area 812.5
Mean Conc. 24.27mg/L



Sample

Sample Name:
Sample ID: Untitled
Origin: TCCURVE-02-10-2017.2017_02_10_14_14_25.cal
Status Completed
Chk. Result

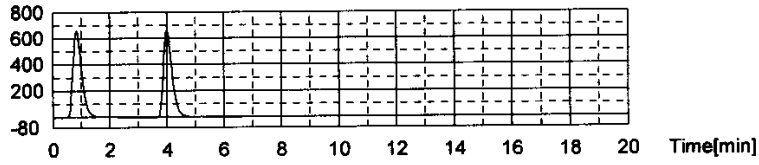
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

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	2/10/2017 4:25:42 PM
2	1411	0.000mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_14_14_2	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

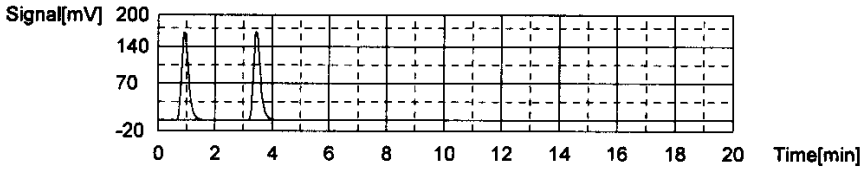
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

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_1	2/10/2017 4:37:09 PM
2	287.2	8.577mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	2/10/2017 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

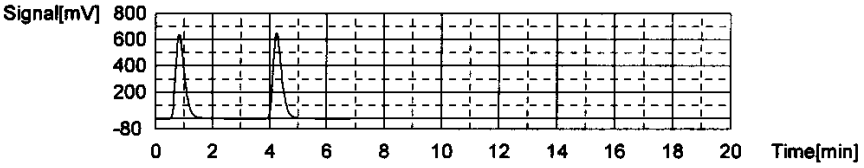
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

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_59	2/10/2017 4:55:07 PM
2	1373	32.04mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_59	2/10/2017 5:01:02 PM

Mean Area 1376
Mean Conc. 32.10mg/L



WORKGROUP: WG623227

Total Organic Carbon

MAKE DAILY

CCV (TOC): Std 79381 (5/200)(1000) = 25mg/L

LCS (TOC): Std 80787 (5/200)(1000) = 25mg/L

CCV (TIC): Std 80416 (5/200)(1000) = 25mg/L

MS (TOC): Std 80787 .4(1000)/40=10

Calibration Curve Date: 2/10/17

Reagent: 40592, 39266

☒ SM5310-C : Matrix 2 WG 623227
☐ EPA 415.1/9060A(mod): Matrix 1 WG
☐ SW846 9060A (4 rep) WG

SOP: K 4151 Rev. 18

Instrument: Shimadza TOC-VWP/ASI

DAILY CHECK

☒ drain reservoir filled
☒ ASI water bottle full
☒ dilution water bottle full

☒ 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	LCSDUP	
7	07-0961-01	1/5
8	07-1071-01	
9	-02	
10	-03	
11	-04	
12	07-1148-01	
13	-03	
14	CCV	
15	CCB	
16	07-1174-01	
17	-02	
18	-03	
19	-04	
20	07-1176-01	
21	07-1190-01	
22	-03	
23	-05	
24	-07	
25	-09	

Position	Sample ID	Dilution
26	CCV	
27	CCB	
28	07-1190-11	
29	-13	
30	-15	
31	DUP 1190-15	
32	MS 1190-15	
33	CCV	
34	CCB	
35	CCV	
36	CCB	
37	1174-01	1/2
38	1174-02	1/2
39	CCV	
40	CCB	
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		

Position	Sample ID	Dilution
51		
52		
53		
54		
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75		

Analyst: Ester Tech

Date/Time: 7/25/17 1445

DCN#127244

C:\TOC3201\Data\07-25-2017-EPT-TOC.t32

	Analysis	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:1.493mg/L TC:28.07mg/L IC:26.58mg/L	Complete	7/25/2017 2:47:32 PM	1
2	TOC	TOC/TIC	TOC:27.95mg/L TC:37.00mg/L IC:9.048mg/L	Complete	7/25/2017 3:00:36 PM	2
3	TOC	CCV	!!Error!! TOC:26.73mg/L TC:26.44mg/L IC:-0.2923mg/L	Complete	7/25/2017 3:13:02 PM	3
4	TOC	WG623227-01 BLK	!!Error!! TOC:0.1305mg/L TC:-0.1257mg/L IC:-0.2562mg/L	Complete	7/25/2017 3:29:49 PM	0
5	TOC	WG623227-02 LCS	!!Error!! TOC:27.01mg/L TC:26.68mg/L IC:-0.3301mg/L	Complete	7/25/2017 3:51:02 PM	5
6	TOC	WG623227-03 LCSDUP	!!Error!! TOC:27.22mg/L TC:26.89mg/L IC:-0.3347mg/L	Complete	7/25/2017 4:12:13 PM	6
7	TOC	L17070961-01 (5)	TOC:10.21mg/L TC:22.07mg/L IC:11.87mg/L	Complete	7/25/2017 5:13:20 PM	7
8	TOC	L17071071-01	TOC:3.035mg/L TC:21.20mg/L IC:18.17mg/L	Complete	7/25/2017 5:35:42 PM	8
9	TOC	L17071071-02	TOC:2.926mg/L TC:28.83mg/L IC:25.90mg/L	Complete	7/25/2017 5:59:22 PM	9
10	TOC	L17071071-03	TOC:2.598mg/L TC:22.46mg/L IC:19.86mg/L	Complete	7/25/2017 6:21:33 PM	10
11	TOC	L17071071-04	TOC:2.680mg/L TC:25.63mg/L IC:22.95mg/L	Complete	7/25/2017 6:43:37 PM	11
12	TOC	L17071148-01	TOC:2.653mg/L TC:8.627mg/L IC:5.974mg/L	Complete	7/25/2017 7:04:46 PM	12
13	TOC	L17071148-03	TOC:2.634mg/L TC:7.134mg/L IC:4.500mg/L	Complete	7/25/2017 7:26:05 PM	13
14	TOC	CCV	!!Error!! TOC:26.83mg/L TC:26.56mg/L IC:-0.2745mg/L	Complete	7/25/2017 7:38:19 PM	14
15	TOC	CCB	!!Error!! TOC:0.09181mg/L TC:-0.1704mg/L IC:-0.2622mg/	Complete	7/25/2017 7:47:23 PM	0
16	TOC	L17071174-01	TOC:5.579mg/L TC:15.53mg/L IC:9.950mg/L	Complete	7/25/2017 8:09:24 PM	16
17	TOC		!!Error!! TOC:-2.680mg/L TC:65.02mg/L IC:67.70mg/L	Complete	7/25/2017 8:35:26 PM	17
18	TOC		TOC:7.385mg/L TC:56.20mg/L IC:48.81mg/L	Complete	7/25/2017 9:00:27 PM	18
19	TOC	L17071174-04	TOC:6.341mg/L TC:29.61mg/L IC:23.27mg/L	Complete	7/25/2017 9:23:37 PM	19
20	TOC	L17071176-01	!!Error!! TOC:0.2824mg/L TC:0.2129mg/L IC:-0.06957mg/L	Complete	7/25/2017 9:43:10 PM	20
21	TOC	L17071190-01	TOC:3.590mg/L TC:26.22mg/L IC:22.63mg/L	Complete	7/25/2017 10:05:16 PM	21
22	TOC	L17071190-03	TOC:2.444mg/L TC:14.07mg/L IC:11.63mg/L	Complete	7/25/2017 10:26:40 PM	22
23	TOC	L17071190-05	TOC:2.577mg/L TC:25.35mg/L IC:22.78mg/L	Complete	7/25/2017 10:49:03 PM	23
24	TOC	L17071190-07	TOC:4.670mg/L TC:40.69mg/L IC:36.02mg/L	Complete	7/25/2017 11:12:00 PM	24
25	TOC	L17071190-09	TOC:3.198mg/L TC:21.02mg/L IC:17.82mg/L	Complete	7/25/2017 11:34:18 PM	25
26	TOC	CCV	!!Error!! TOC:26.22mg/L TC:26.02mg/L IC:-0.1990mg/L	Complete	7/25/2017 11:46:38 PM	26
27	TOC	CCB	!!Error!! TOC:0.08111mg/L TC:-0.1591mg/L IC:-0.2402mg	Complete	7/25/2017 11:55:41 PM	0
28	TOC	L17071190-11	TOC:2.886mg/L TC:16.40mg/L IC:13.52mg/L	Complete	7/26/2017 12:17:35 AM	28
29	TOC	L17071190-13	TOC:2.006mg/L TC:10.85mg/L IC:8.842mg/L	Complete	7/26/2017 12:39:08 AM	29
30	TOC	L17071190-15	TOC:2.290mg/L TC:13.05mg/L IC:10.76mg/L	Complete	7/26/2017 1:00:51 AM	30
31	TOC	WG623227-05 DUP	TOC:2.500mg/L TC:12.72mg/L IC:10.22mg/L	Complete	7/26/2017 1:22:21 AM	31
32	TOC	WG623227-06 MS	TOC:12.86mg/L TC:24.03mg/L IC:11.17mg/L	Complete	7/26/2017 1:44:31 AM	32
33	TOC	CCV	!!Error!! TOC:26.88mg/L TC:26.65mg/L IC:-0.2241mg/L	Complete	7/26/2017 1:56:54 AM	33
34	TOC	CCB	!!Error!! TOC:0.08126mg/L TC:-0.1620mg/L IC:-0.2432mg	Complete	7/26/2017 2:05:58 AM	0
35	TOC	CCV	!!Error!! TOC:26.91mg/L TC:26.58mg/L IC:-0.3292mg/L	Complete	7/26/2017 8:17:49 AM	35
36	TOC	CCB	!!Error!! TOC:0.09065mg/L TC:-0.1579mg/L IC:-0.2486mg	Complete	7/26/2017 8:26:59 AM	0
37	TOC		TOC:2.838mg/L TC:8.316mg/L IC:5.478mg/L	Complete	7/26/2017 8:48:01 AM	37
38	TOC	L17071174-02 (2)	TOC:7.451mg/L TC:39.60mg/L IC:32.15mg/L	Complete	7/26/2017 9:11:54 AM	38
39	TOC	CCV	!!Error!! TOC:26.83mg/L TC:26.68mg/L IC:-0.1539mg/L	Complete	7/26/2017 9:24:15 AM	39
40	TOC	CCB	!!Error!! TOC:0.05968mg/L TC:-0.1632mg/L IC:-0.2229mg	Complete	7/26/2017 9:33:19 AM	0

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

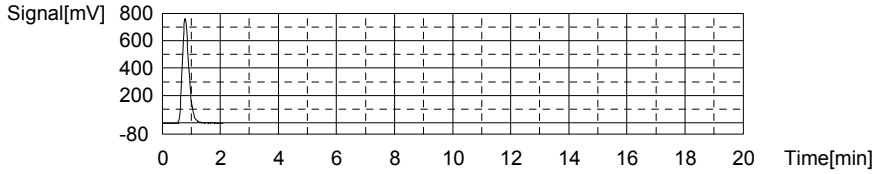
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.493mg/L TC:28.07mg/L IC:26.58mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1205	28.07mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 2:41:53 PM

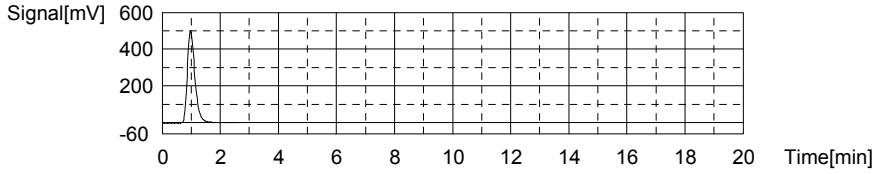
Mean Area 1205
Mean Conc. 28.07mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	908.4	26.58mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 2:47:32 PM

Mean Area 908.4
Mean Conc. 26.58mg/L



Sample

Sample Name: TOC/TIC
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

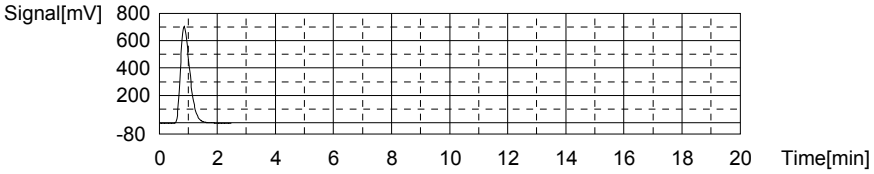
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:27.95mg/L TC:37.00mg/L IC:9.048mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1583	37.00mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 2:55:26 PM

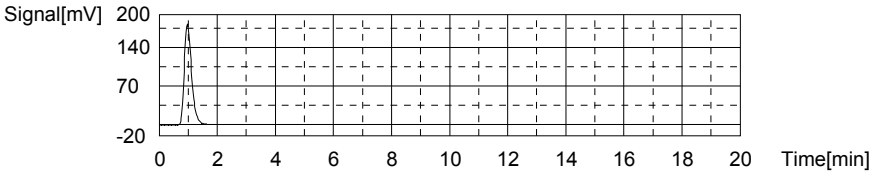
Mean Area 1583
Mean Conc. 37.00mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	321.4	9.048mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 3:00:36 PM

Mean Area 321.4
Mean Conc. 9.048mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

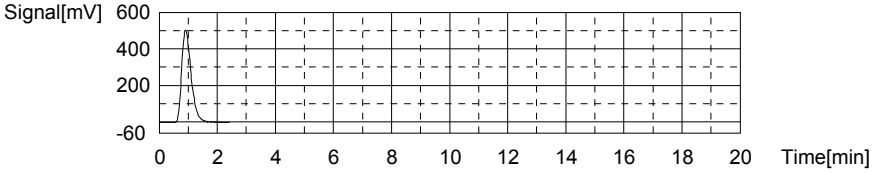
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.73mg/L TC:26.44mg/L IC:-0.2923mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1136	26.44mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 3:08:27 PM

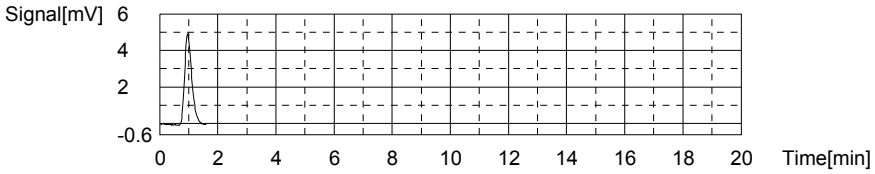
Mean Area 1136
Mean Conc. 26.44mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.625	-0.2923mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 3:13:02 PM

Mean Area 8.625
Mean Conc. -0.2923mg/L



Sample

Sample Name: WG623227-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

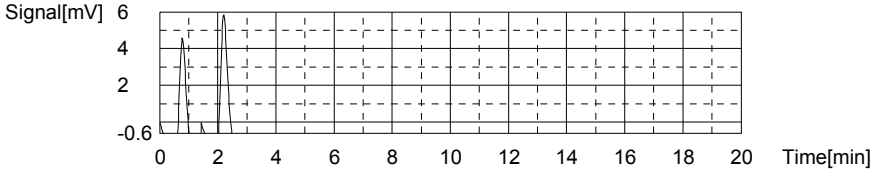
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1305mg/L TC:-0.1257mg/L IC:-0.2562mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.07	-0.1605mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 3:18:05 PM
2	13.02	-0.09085mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 3:21:44 PM

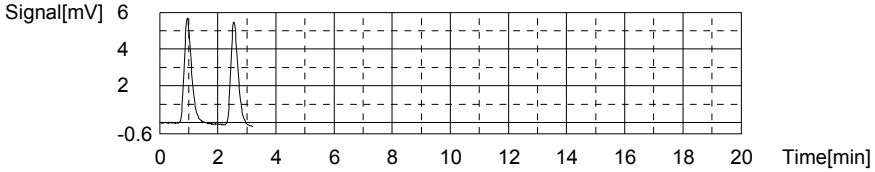
Mean Area 11.55
Mean Conc. -0.1257mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.974	-0.2521mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 3:25:45 PM
2	9.695	-0.2604mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 3:29:49 PM

Mean Area 9.835
Mean Conc. -0.2562mg/L



Sample

Sample Name: WG623227-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

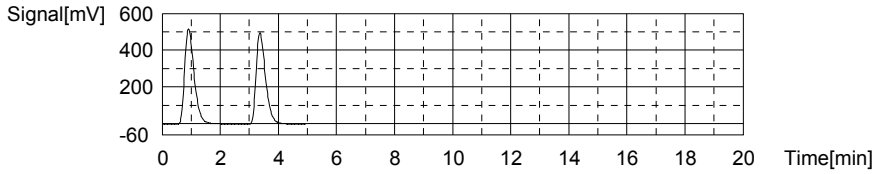
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.01mg/L TC:26.68mg/L IC:-0.3301mg/L

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_57	7/25/2017 3:37:43 PM
2	1116	25.97mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 3:42:27 PM

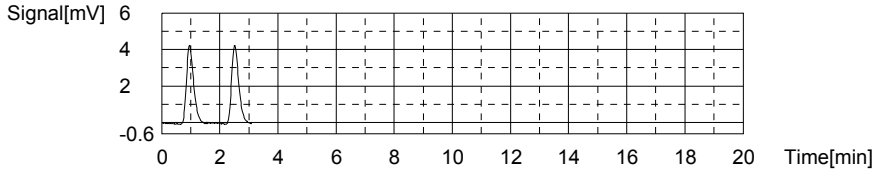
Mean Area 1146
Mean Conc. 26.68mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.340	-0.3307mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 3:46:51 PM
2	7.381	-0.3295mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 3:51:02 PM

Mean Area 7.361
Mean Conc. -0.3301mg/L



Sample

Sample Name: WG623227-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

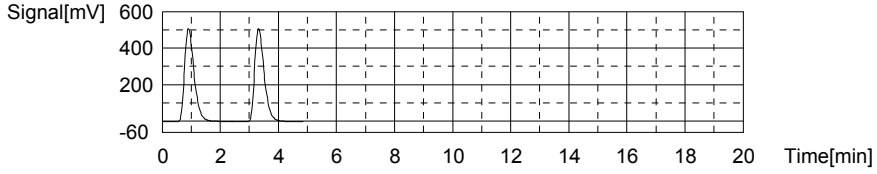
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:27.22mg/L TC:26.89mg/L IC:-0.3347mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1157	26.94mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 3:58:54 PM
2	1153	26.84mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 4:03:37 PM

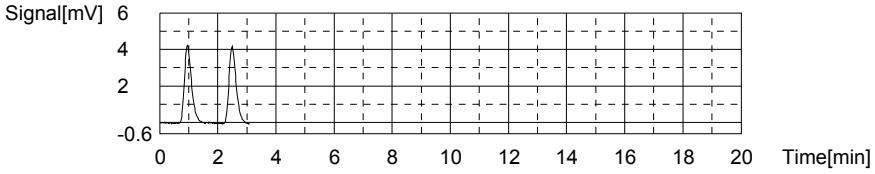
Mean Area 1155
Mean Conc. 26.89mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.269	-0.3328mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 4:08:00 PM
2	7.146	-0.3365mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 4:12:13 PM

Mean Area 7.207
Mean Conc. -0.3347mg/L



Sample

Sample Name: L17070961-01 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

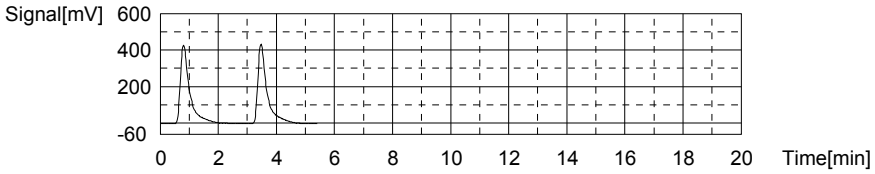
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:10.21mg/L TC:22.07mg/L IC:11.87mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	947.6	21.99mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 4:58:25 PM
2	954.7	22.16mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 5:03:29 PM

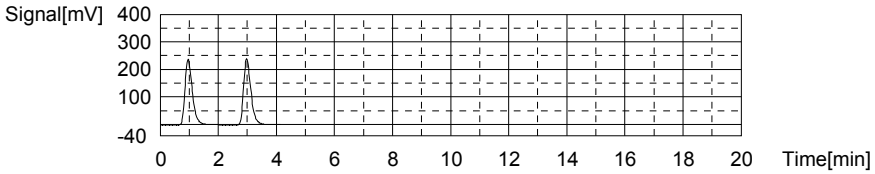
Mean Area 951.2
Mean Conc. 22.07mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	413.3	11.79mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 5:08:29 PM
2	418.2	11.94mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 5:13:20 PM

Mean Area 415.8
Mean Conc. 11.87mg/L



Sample

Sample Name: L17071071-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

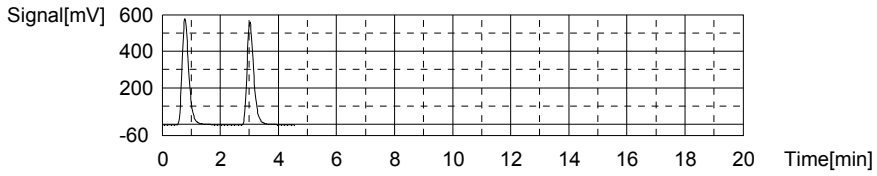
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.035mg/L TC:21.20mg/L IC:18.17mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	926.3	21.49mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 5:21:01 PM
2	902.2	20.92mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 5:25:36 PM

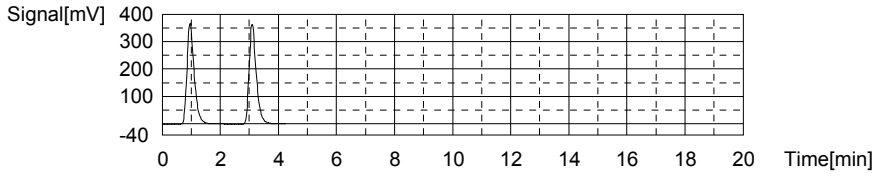
Mean Area 914.3
Mean Conc. 21.20mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	632.5	18.34mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 5:30:49 PM
2	621.0	18.00mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 5:35:42 PM

Mean Area 626.8
Mean Conc. 18.17mg/L



Sample

Sample Name: L17071071-02
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

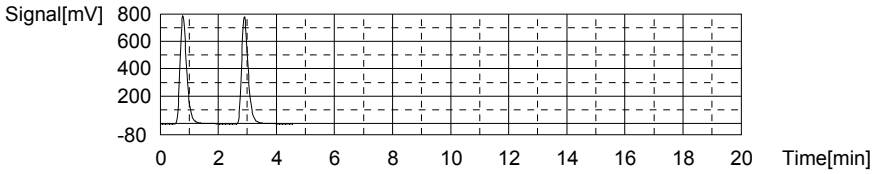
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.926mg/L TC:28.83mg/L IC:25.90mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1245	29.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 5:43:15 PM
2	1229	28.64mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 5:48:56 PM

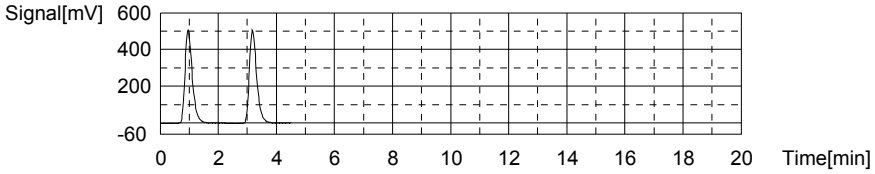
Mean Area 1237
Mean Conc. 28.83mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	883.0	25.82mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 5:54:15 PM
2	888.5	25.98mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 5:59:22 PM

Mean Area 885.8
Mean Conc. 25.90mg/L



Sample

Sample Name: L17071071-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

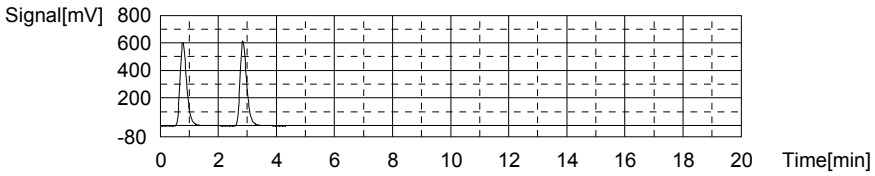
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.598mg/L TC:22.46mg/L IC:19.86mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	953.1	22.12mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 6:06:53 PM
2	981.6	22.79mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 6:11:37 PM

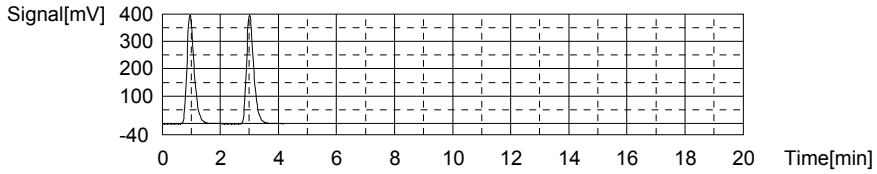
Mean Area 967.4
Mean Conc. 22.46mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	683.3	19.86mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 6:16:39 PM
2	683.5	19.86mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 6:21:33 PM

Mean Area 683.4
Mean Conc. 19.86mg/L



Sample

Sample Name: L17071071-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

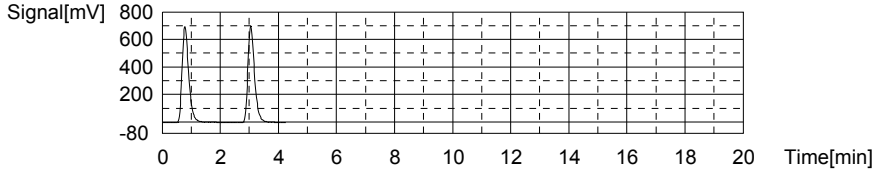
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.680mg/L TC:25.63mg/L IC:22.95mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1096	25.50mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 6:29:15 PM
2	1107	25.76mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 6:33:31 PM

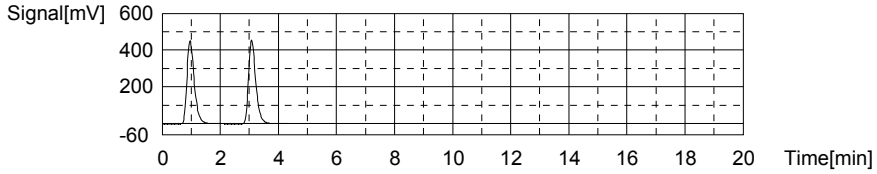
Mean Area 1102
Mean Conc. 25.63mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	787.2	22.96mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 6:38:40 PM
2	786.4	22.93mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 6:43:37 PM

Mean Area 786.8
Mean Conc. 22.95mg/L



Sample

Sample Name: L17071148-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

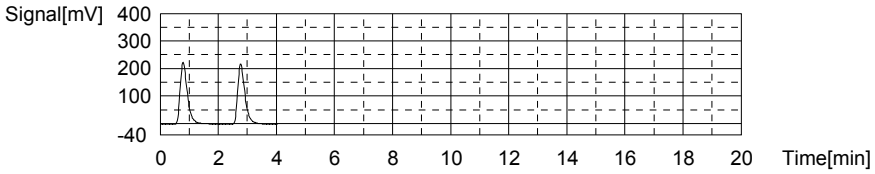
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.653mg/L TC:8.627mg/L IC:5.974mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	384.3	8.681mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 6:51:02 PM
2	379.7	8.573mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 6:55:22 PM

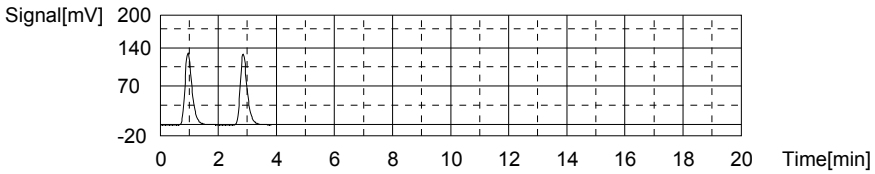
Mean Area 382.0
Mean Conc. 8.627mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	221.4	6.062mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 7:00:13 PM
2	215.5	5.886mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 7:04:46 PM

Mean Area 218.4
Mean Conc. 5.974mg/L



Sample

Sample Name: L17071148-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

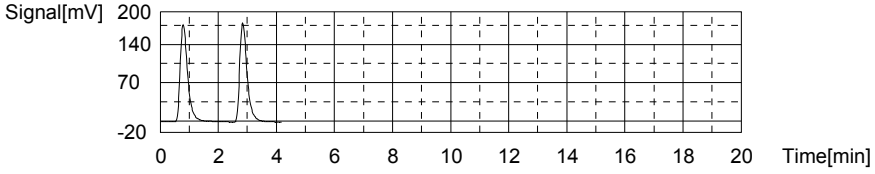
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.634mg/L TC:7.134mg/L IC:4.500mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	315.2	7.049mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 7:12:16 PM
2	322.4	7.219mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 7:16:43 PM

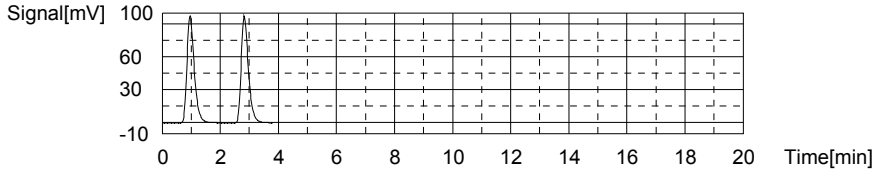
Mean Area 318.8
Mean Conc. 7.134mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	169.4	4.509mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 7:21:31 PM
2	168.8	4.491mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 7:26:05 PM

Mean Area 169.1
Mean Conc. 4.500mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

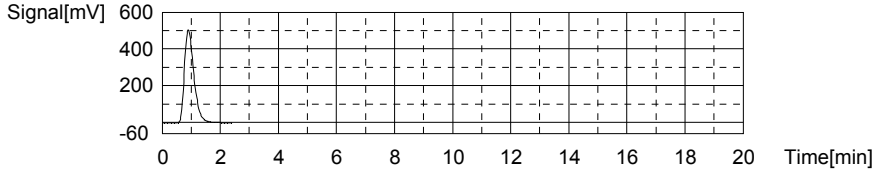
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.83mg/L TC:26.56mg/L IC:-0.2745mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1141	26.56mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 7:33:55 PM

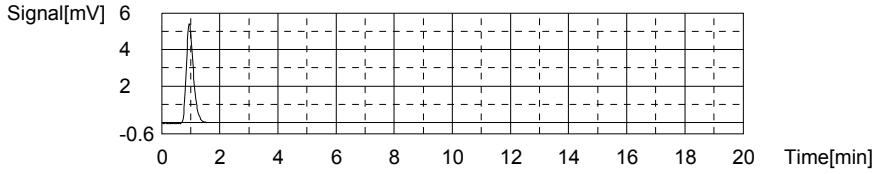
Mean Area 1141
Mean Conc. 26.56mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.224	-0.2745mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 7:38:19 PM

Mean Area 9.224
Mean Conc. -0.2745mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

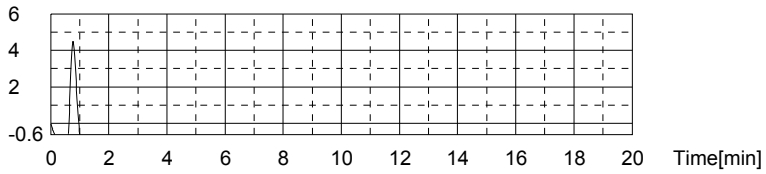
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.09181mg/L TC:-0.1704mg/L IC:-0.2622mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.655	-0.1704mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 7:43:26 PM

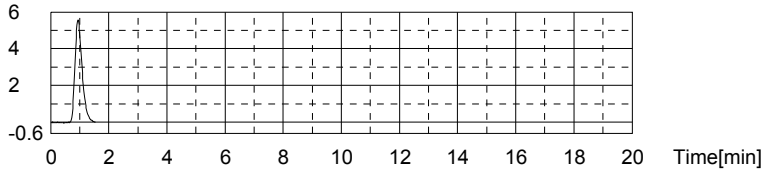
Mean Area 9.655
Mean Conc. -0.1704mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.636	-0.2622mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 7:47:23 PM

Mean Area 9.636
Mean Conc. -0.2622mg/L



Sample

Sample Name: L17071174-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

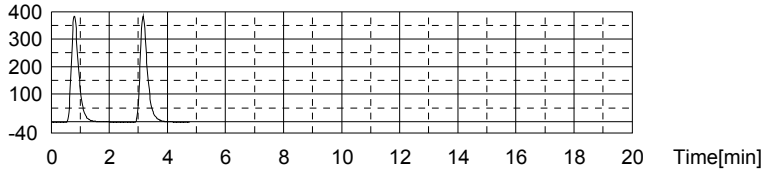
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.579mg/L TC:15.53mg/L IC:9.950mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	671.9	15.48mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 7:55:12 PM
2	676.4	15.58mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 7:59:52 PM

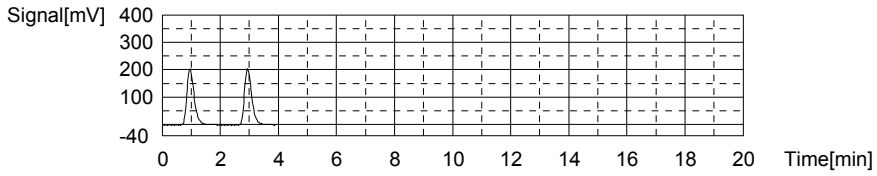
Mean Area 674.1
Mean Conc. 15.53mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	350.2	9.908mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 8:04:45 PM
2	353.0	9.992mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 8:09:24 PM

Mean Area 351.6
Mean Conc. 9.950mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

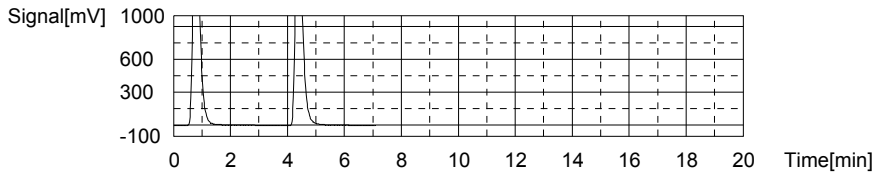
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-2.680mg/L TC:65.02mg/L IC:67.70mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2733	64.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 8:18:28 PM
2	2805	65.87mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 8:24:13 PM

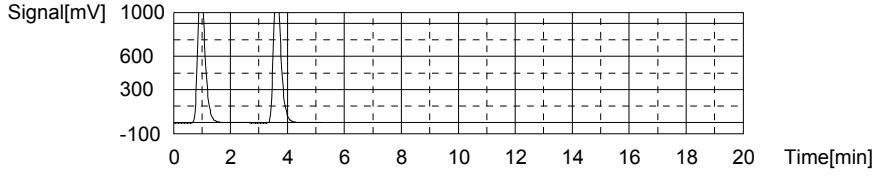
Mean Area 2769
Mean Conc. 65.02mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2264	67.06mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 8:30:03 PM
2	2307	68.35mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 8:35:26 PM

Mean Area 2286
Mean Conc. 67.70mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

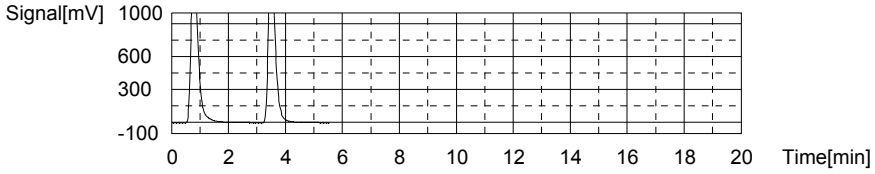
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:7.385mg/L TC:56.20mg/L IC:48.81mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2423	56.85mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 8:43:36 PM
2	2368	55.55mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 8:49:36 PM

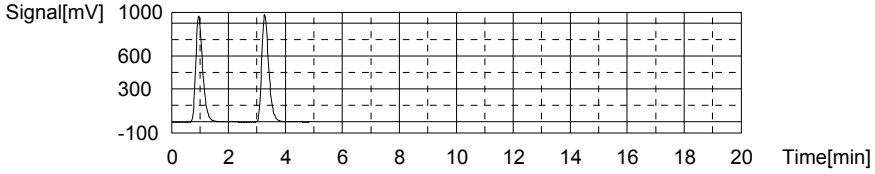
Mean Area 2396
Mean Conc. 56.20mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1636	48.31mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 8:55:02 PM
2	1670	49.32mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 9:00:27 PM

Mean Area 1653
Mean Conc. 48.81mg/L



Sample

Sample Name: L17071174-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

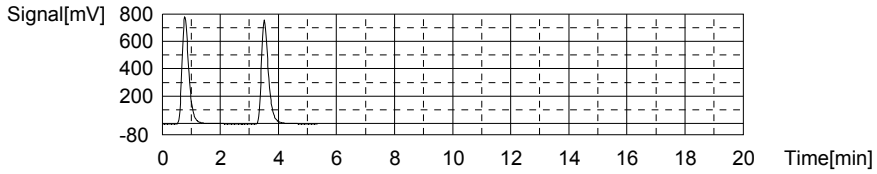
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.341mg/L TC:29.61mg/L IC:23.27mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1269	29.58mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 9:08:37 PM
2	1271	29.63mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 9:13:39 PM

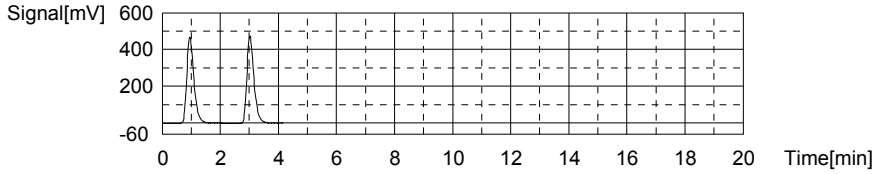
Mean Area 1270
Mean Conc. 29.61mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	795.8	23.22mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 9:18:44 PM
2	799.2	23.32mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 9:23:37 PM

Mean Area 797.5
Mean Conc. 23.27mg/L



Sample

Sample Name: L17071176-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

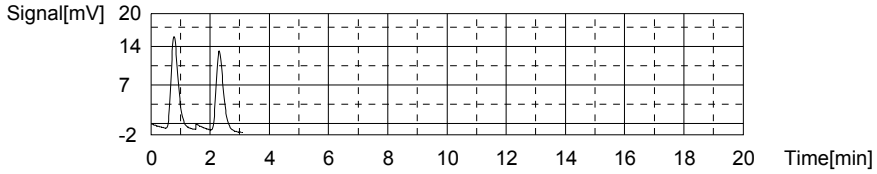
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.2824mg/L TC:0.2129mg/L IC:-0.06957mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	27.65	0.2548mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 9:30:34 PM
2	24.10	0.1709mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 9:34:24 PM

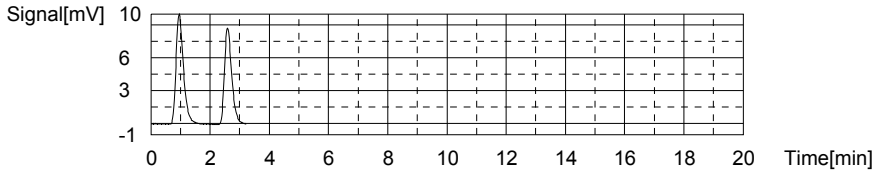
Mean Area 25.88
Mean Conc. 0.2129mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	17.17	-0.03717mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 9:38:56 PM
2	15.00	-0.1020mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 9:43:10 PM

Mean Area 16.09
Mean Conc. -0.06957mg/L



Sample

Sample Name: L17071190-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

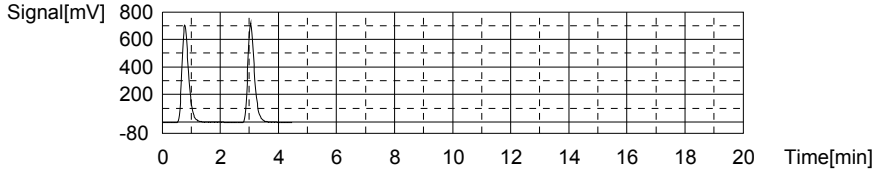
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.590mg/L TC:26.22mg/L IC:22.63mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1116	25.97mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 9:50:53 PM
2	1137	26.46mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 9:55:23 PM

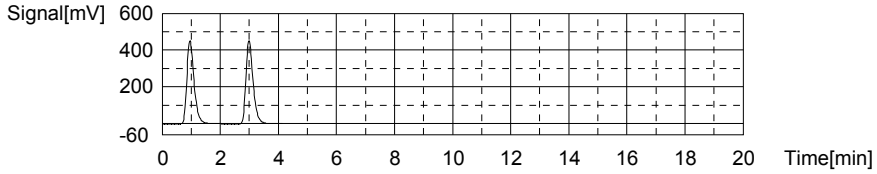
Mean Area 1127
Mean Conc. 26.22mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	776.4	22.64mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 10:00:25 PM
2	775.8	22.62mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 10:05:16 PM

Mean Area 776.1
Mean Conc. 22.63mg/L



Sample

Sample Name: L17071190-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

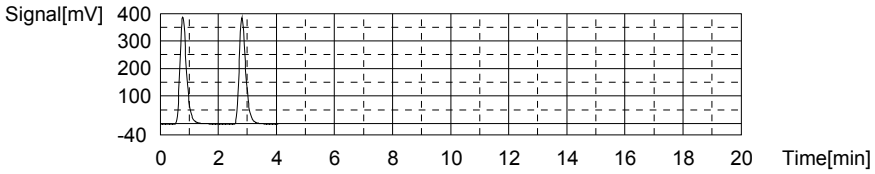
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.444mg/L TC:14.07mg/L IC:11.63mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	610.4	14.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 10:12:44 PM
2	614.4	14.12mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 10:17:02 PM

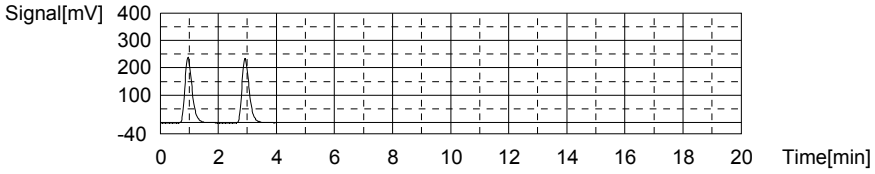
Mean Area 612.4
Mean Conc. 14.07mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	409.3	11.67mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 10:21:57 PM
2	406.2	11.58mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 10:26:40 PM

Mean Area 407.8
Mean Conc. 11.63mg/L



Sample

Sample Name: L17071190-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

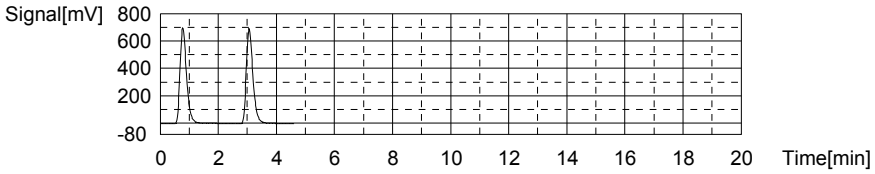
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.577mg/L TC:25.35mg/L IC:22.78mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1085	25.24mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 10:34:24 PM
2	1095	25.47mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 10:39:11 PM

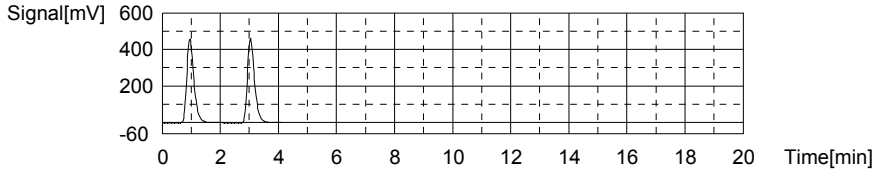
Mean Area 1090
Mean Conc. 25.35mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	780.7	22.76mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 10:44:15 PM
2	781.6	22.79mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 10:49:03 PM

Mean Area 781.2
Mean Conc. 22.78mg/L



Sample

Sample Name: L17071190-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

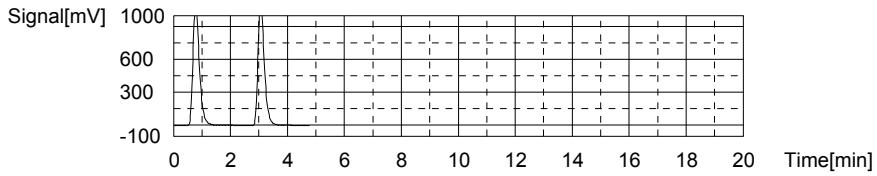
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.670mg/L TC:40.69mg/L IC:36.02mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1744	40.81mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 10:56:47 PM
2	1734	40.57mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 11:01:37 PM

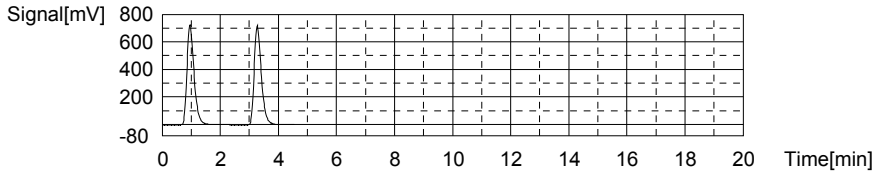
Mean Area 1739
Mean Conc. 40.69mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1227	36.09mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 11:06:58 PM
2	1222	35.94mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 11:12:00 PM

Mean Area 1225
Mean Conc. 36.02mg/L



Sample

Sample Name: L17071190-09
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

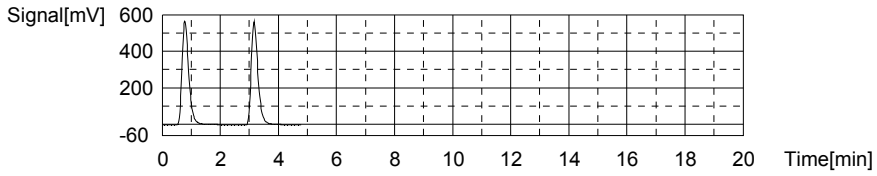
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.198mg/L TC:21.02mg/L IC:17.82mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	909.1	21.08mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 11:19:49 PM
2	903.7	20.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 11:24:29 PM

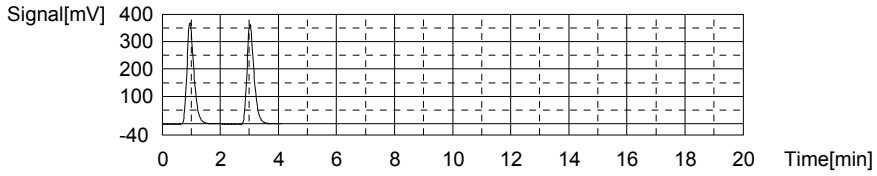
Mean Area 906.4
Mean Conc. 21.02mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	622.4	18.04mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 11:29:32 PM
2	607.8	17.60mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 11:34:18 PM

Mean Area 615.1
Mean Conc. 17.82mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

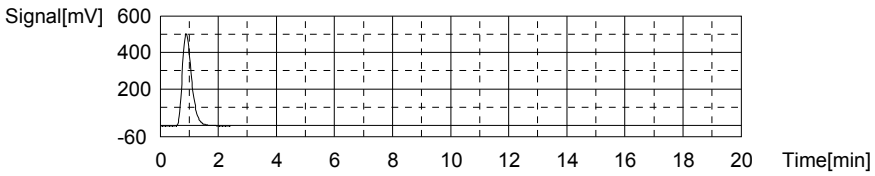
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.22mg/L TC:26.02mg/L IC:-0.1990mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1118	26.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/25/2017 11:42:10 PM

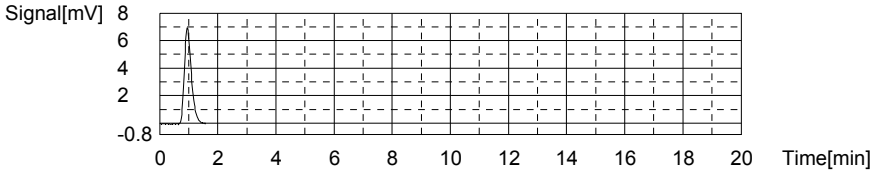
Mean Area 1118
Mean Conc. 26.02mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.75	-0.1990mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 11:46:38 PM

Mean Area 11.75
Mean Conc. -0.1990mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

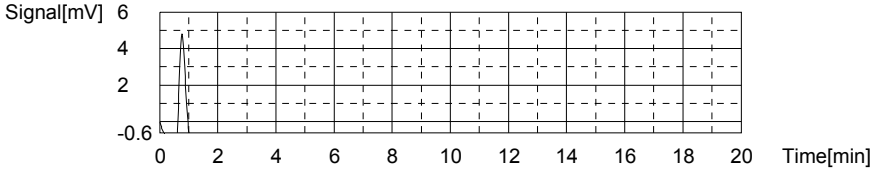
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.08111mg/L TC:-0.1591mg/L IC:-0.2402mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.13	-0.1591mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/25/2017 11:51:41 PM

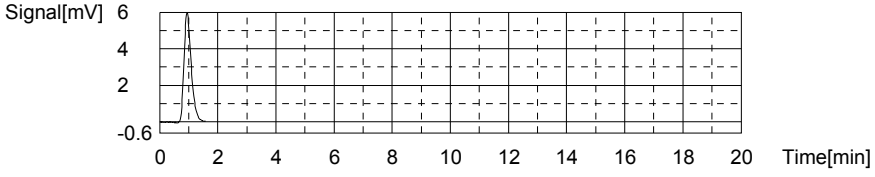
Mean Area 10.13
Mean Conc. -0.1591mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.37	-0.2402mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/25/2017 11:55:41 PM

Mean Area 10.37
Mean Conc. -0.2402mg/L



Sample

Sample Name: L17071190-11
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

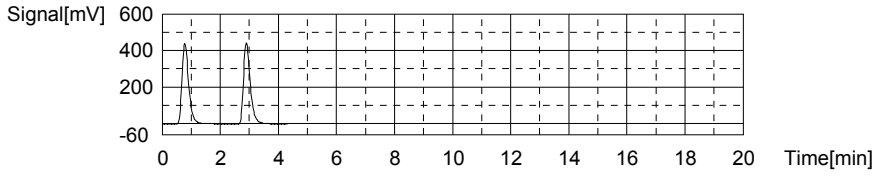
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.886mg/L TC:16.40mg/L IC:13.52mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	700.9	16.16mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 12:03:16 AM
2	721.5	16.65mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 12:07:55 AM

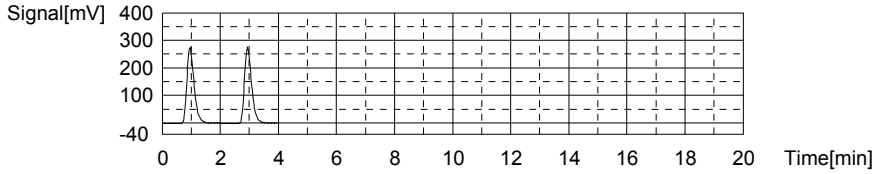
Mean Area 711.2
Mean Conc. 16.40mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	472.3	13.55mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 12:12:51 AM
2	469.9	13.48mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 12:17:35 AM

Mean Area 471.1
Mean Conc. 13.52mg/L



Sample

Sample Name: L17071190-13
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

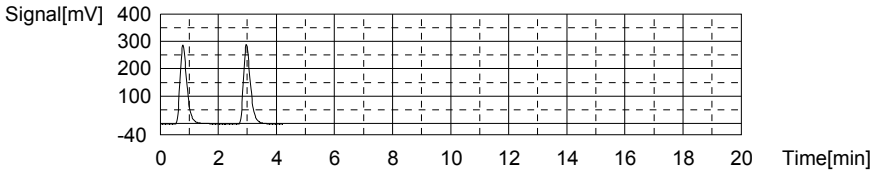
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.006mg/L TC:10.85mg/L IC:8.842mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	471.7	10.75mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 12:25:16 AM
2	480.3	10.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 12:29:35 AM

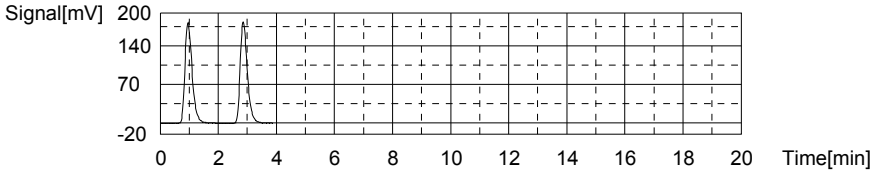
Mean Area 476.0
Mean Conc. 10.85mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	312.7	8.788mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 12:34:25 AM
2	316.3	8.896mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 12:39:08 AM

Mean Area 314.5
Mean Conc. 8.842mg/L



Sample

Sample Name: L17071190-15
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

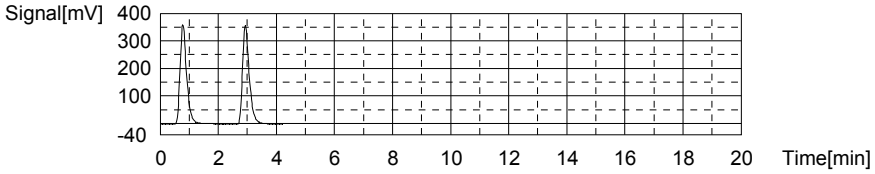
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.290mg/L TC:13.05mg/L IC:10.76mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	563.8	12.92mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 12:46:46 AM
2	574.3	13.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 12:51:08 AM

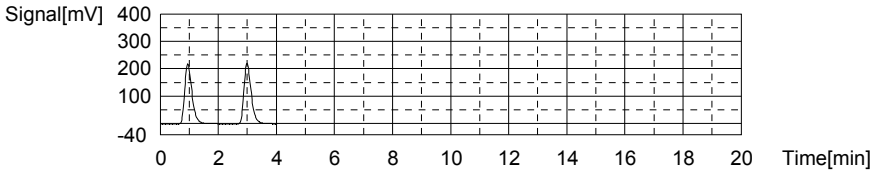
Mean Area 569.1
Mean Conc. 13.05mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	378.2	10.74mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 12:56:09 AM
2	379.0	10.77mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 1:00:51 AM

Mean Area 378.6
Mean Conc. 10.76mg/L



Sample

Sample Name: WG623227-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

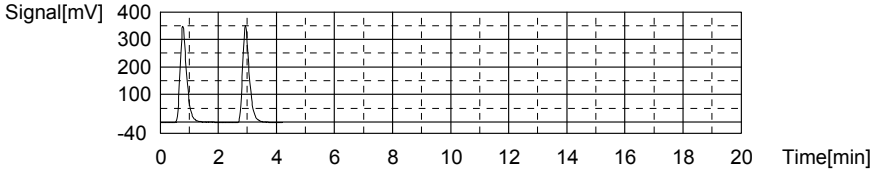
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.500mg/L TC:12.72mg/L IC:10.22mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	547.3	12.53mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 1:08:28 AM
2	563.2	12.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 1:12:48 AM

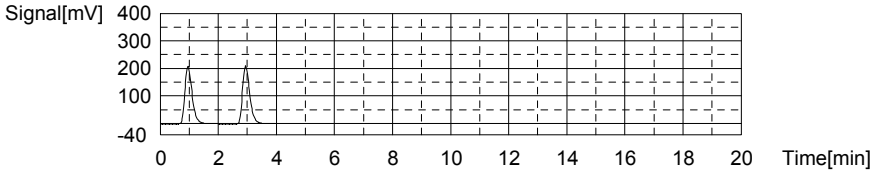
Mean Area 555.3
Mean Conc. 12.72mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	358.2	10.15mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 1:17:41 AM
2	363.1	10.29mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 1:22:21 AM

Mean Area 360.7
Mean Conc. 10.22mg/L



Sample

Sample Name: WG623227-06 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

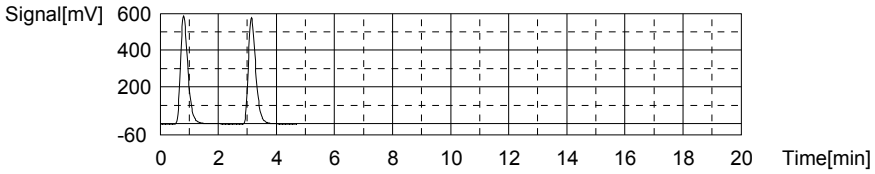
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:12.86mg/L TC:24.03mg/L IC:11.17mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1037	24.10mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/26/2017 1:30:08 AM
2	1031	23.96mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/26/2017 1:34:54 AM

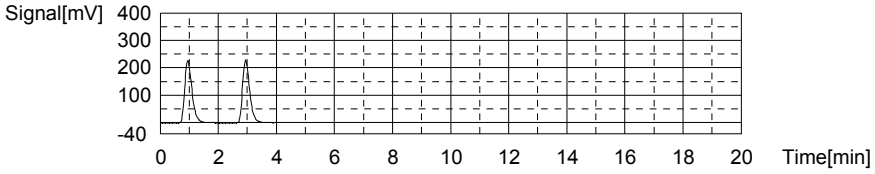
Mean Area 1034
Mean Conc. 24.03mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	394.0	11.22mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 1:39:53 AM
2	390.8	11.12mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 1:44:31 AM

Mean Area 392.4
Mean Conc. 11.17mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

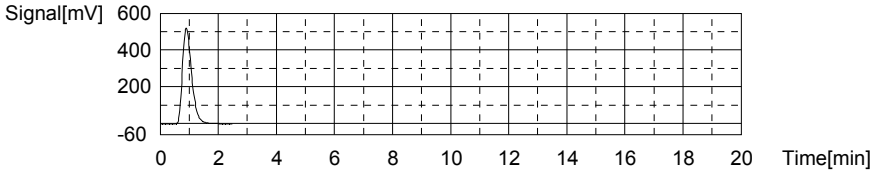
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.88mg/L TC:26.65mg/L IC:-0.2241mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1145	26.65mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/26/2017 1:52:27 AM

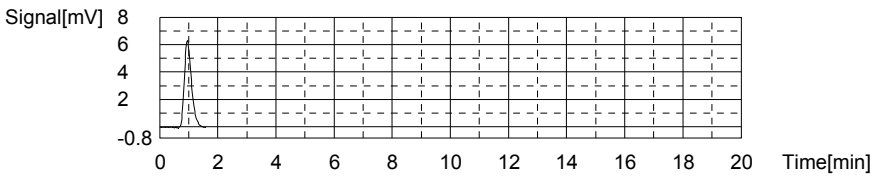
Mean Area 1145
Mean Conc. 26.65mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.91	-0.2241mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 1:56:54 AM

Mean Area 10.91
Mean Conc. -0.2241mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

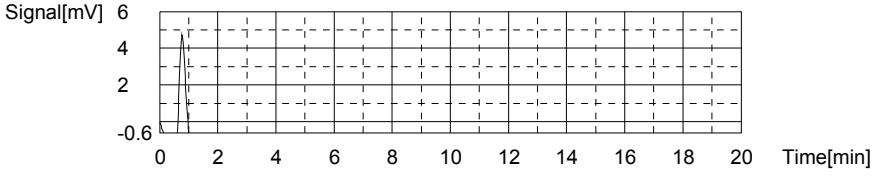
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.08126mg/L TC:-0.1620mg/L IC:-0.2432mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.01	-0.1620mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 2:02:00 AM

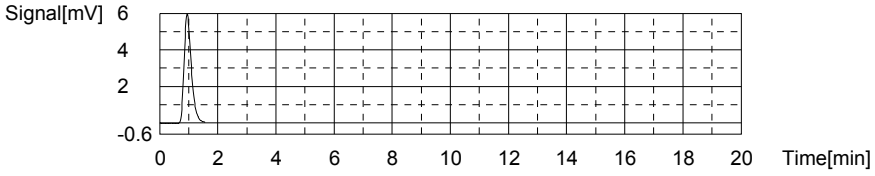
Mean Area 10.01
Mean Conc. -0.1620mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.27	-0.2432mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 2:05:58 AM

Mean Area 10.27
Mean Conc. -0.2432mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

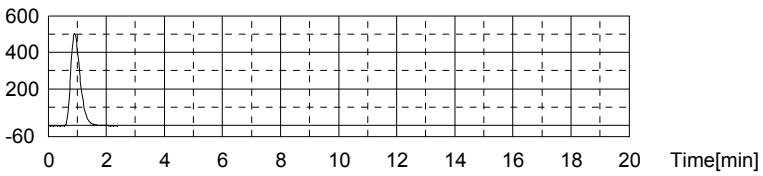
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.91mg/L TC:26.58mg/L IC:-0.3292mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1142	26.58mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/26/2017 8:13:27 AM

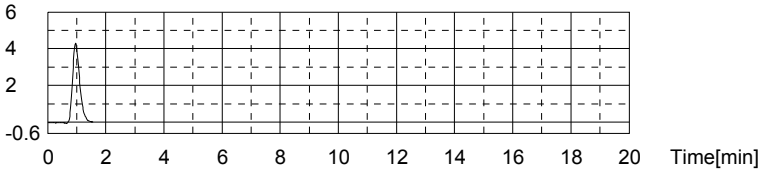
Mean Area 1142
Mean Conc. 26.58mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.392	-0.3292mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 8:17:49 AM

Mean Area 7.392
Mean Conc. -0.3292mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

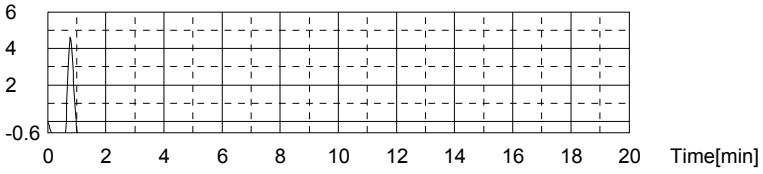
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.09065mg/L TC:-0.1579mg/L IC:-0.2486mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.18	-0.1579mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/26/2017 8:22:59 AM

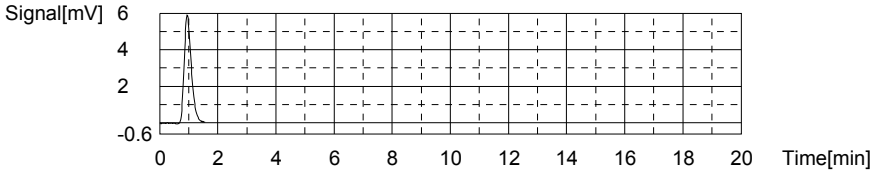
Mean Area 10.18
Mean Conc. -0.1579mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.09	-0.2486mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 8:26:59 AM

Mean Area 10.09
Mean Conc. -0.2486mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

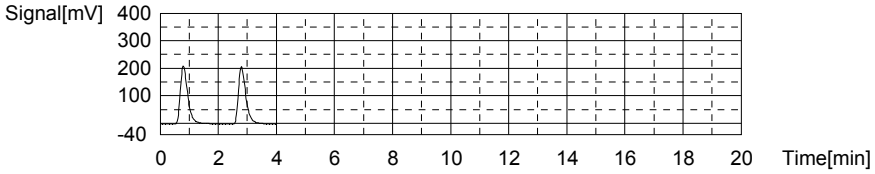
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.838mg/L TC:8.316mg/L IC:5.478mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	368.1	8.298mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/26/2017 8:34:27 AM
2	369.6	8.334mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/26/2017 8:38:44 AM

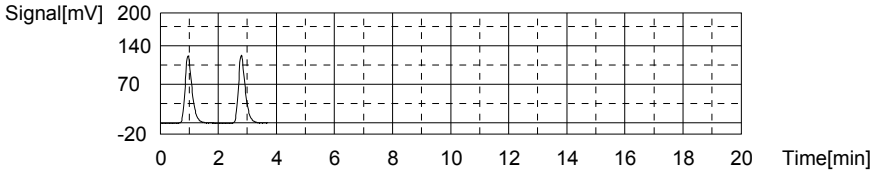
Mean Area 368.9
Mean Conc. 8.316mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	201.3	5.462mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 8:43:27 AM
2	202.4	5.494mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 8:48:01 AM

Mean Area 201.9
Mean Conc. 5.478mg/L



Sample

Sample Name: L17071174-02 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

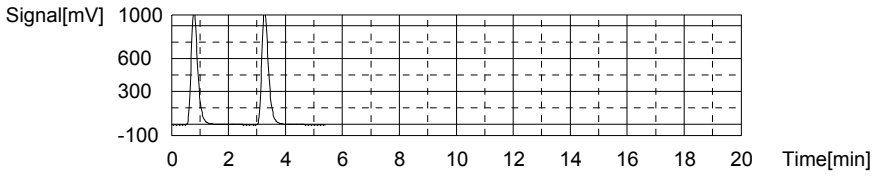
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:7.451mg/L TC:39.60mg/L IC:32.15mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1687	39.46mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/26/2017 8:55:58 AM
2	1699	39.74mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/26/2017 9:01:22 AM

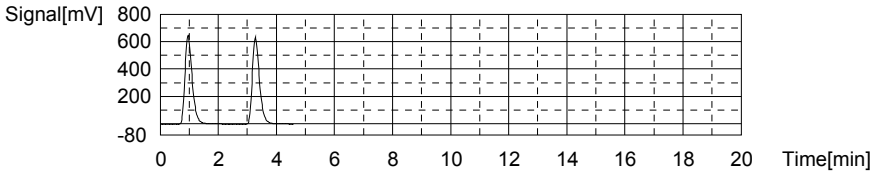
Mean Area 1693
Mean Conc. 39.60mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1110	32.60mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 9:06:40 AM
2	1080	31.70mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 9:11:54 AM

Mean Area 1095
Mean Conc. 32.15mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

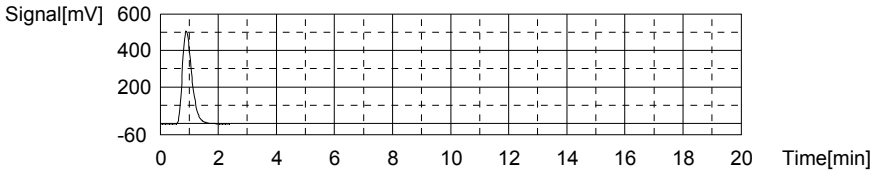
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.83mg/L TC:26.68mg/L IC:-0.1539mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1146	26.68mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/26/2017 9:19:44 AM

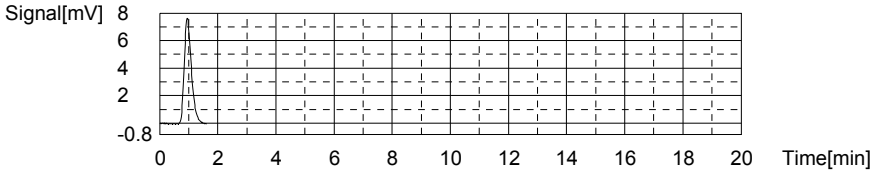
Mean Area 1146
Mean Conc. 26.68mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	13.26	-0.1539mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 9:24:15 AM

Mean Area 13.26
Mean Conc. -0.1539mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

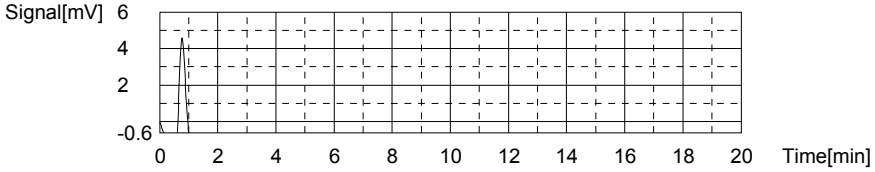
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.05968mg/L TC:-0.1632mg/L IC:-0.2229mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.956	-0.1632mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/26/2017 9:29:19 AM

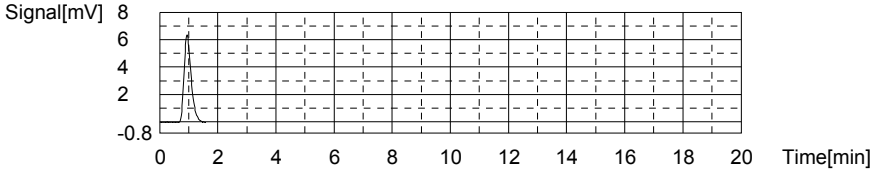
Mean Area 9.956
Mean Conc. -0.1632mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.95	-0.2229mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/26/2017 9:33:19 AM

Mean Area 10.95
Mean Conc. -0.2229mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
July 31, 2017

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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	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

Microbac Laboratories Inc.
List of Valid Qualifiers
July 31, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
July 31, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

CHAIN OF CUSTODY

Name Of Lab Shipping To: MICROBAC (740) 373-4071 ATTN: STEPHANIE MOSSBURG

Project: AECOM
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No.
60256135.GWTPT
HRUMAR16

Job:
GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES

Prepared By:
Scott Beesinger

P.O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: AMMONIA-N	ORTHO-PHOSPHATE	TOTAL ORGANIC CARBON	PERCHLORATE	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650-6458	Water	07/19/17 / 15:00		2	X		X		H2SO4	
LH18/24-SP650-6458	Water	07/19/17 / 15:00		1		X			NONE	
LH18/24-SP650 – After Ion	Water	07/19/17 / 15:00		1				X	NONE	
LH18/24-SP650 – Before Ion	Water	07/19/17 / 15:00		1				X	NONE	

Additional Remarks: **Standard TAT on all parameters** Send results to Linda Raabe at linda.raabe@aecom.com or call at 210-253-7518

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/19/17	15:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

Microbac OVD
Received: 07/20/2017 09:38
By: BRENDA GREGORY 221000103558

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC®

COOLER TEMP >6° C LOG

Cooler ID 3558

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

7/20/17 BCG

pH Exceptions

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

7/20/17 BCG

PRESERVATIVE EXCEPTIONS

✓ NONE

__ AS NOTED

BCG 7/20/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17070961
Account: 2551
Project: 2551.096
Samples: 3
Due Date: 31-JUL-2017

Samplenum	Container ID	Products
L17070961-01	938615	PCT-S PO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	20-JUL-2017 12:20	BRG		
2	ANALYZ	W1	WET	20-JUL-2017 13:00	EPT	BRG	
3	STORE	WET	A1	21-JUL-2017 08:16	CLS	TMM	

Samplenum	Container ID	Products
L17070961-01	938616	PCT-S TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	20-JUL-2017 12:20	BRG		<2
2	ANALYZ	W1	WET	21-JUL-2017 08:11	DLP	CLS	
3	STORE	WET	A1	27-JUL-2017 17:00	BRG	EPT	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	20-JUL-2017 12:20	BRG		<2
2	STORE	W1	A1	31-JUL-2017 09:04	BRG	BRG	

Samplenum	Container ID	Products
L17070961-02	938617	PCT-S 6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	20-JUL-2017 12:20	BRG		
2	ANALYZ	W1	SEM	25-JUL-2017 11:13	JWR	BRG	
3	STORE	SEM	A1	25-JUL-2017 16:07	BRG	JWR	

Samplenum	Container ID	Products
L17070961-03	938618	PCT-S 6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	20-JUL-2017 12:20	BRG		
2	ANALYZ	W1	SEM	25-JUL-2017 11:13	JWR	BRG	
3	STORE	SEM	A1	25-JUL-2017 16:07	BRG	JWR	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L17071280

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on August 09 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17071280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00112873	H	0.0		J4616882005	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)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L17071280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP650-6460	L17071280-01	07/26/2017 15:00	07/27/2017 11:05

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

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG624895	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-08-08 19:49:45

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG624895	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG624895	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG624895	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG624895	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG624895	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623971	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-08-03 15:32:32

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623971	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623971	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623971	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623971	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG623971	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG623538	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-08-03 15:31:48

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG623538	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG623538	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG623538	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG623538	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG623538	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623487	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-08-03 15:33:02

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623487	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623487	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623487	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
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Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623487	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

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3. NA = Not applicable;

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Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071280
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG623487	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-03 00:00:00		

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Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Lab Report #: L17071280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071280-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6460	**Prep Method:**	6850	**Prep Date:**	08/07/2017 16:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG624895	**Analyst:**	JWR	**Run Date:**	08/07/2017 19:26
Collect Date:	07/26/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40325
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.15		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L17071280-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6460	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	08/01/2017 14:03
Workgroup #:	WG623971	**Analyst:**	TB	**Run Date:**	08/01/2017 14:12
Collect Date:	07/26/2017 15:00	**Dilution:**	10	**File ID:**	S2170801003.017
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	14.5		2.00	1.00	0.500

Certificate of Analysis

Sample #:	L17071280-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6460	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	06/07/2017 15:40
Workgroup #:	WG623538	**Analyst:**	ADG	**Run Date:**	07/27/2017 14:55
Collect Date:	07/26/2017 15:00	**Dilution:**	5	**File ID:**	00.1707271455-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	2.12		0.500	0.250	0.125

Certificate of Analysis

Microbac

Lab Report #: L17071280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Sample #:	L17071280-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6460	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG623487	**Analyst:**	ADG	**Run Date:**	07/27/2017 20:32
Collect Date:	07/26/2017 15:00	**Dilution:**	5	**File ID:**	TC07272017.044
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	74.0		10.0	5.00	2.50

2.1 General Chromatography Data

2.1.1 LC/MS Data (6850)

2.1.1.1 Summary Data

Microbac

Lab Report #: L17071280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071280-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6460	**Prep Method:**	6850	**Prep Date:**	08/07/2017 16:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	06/29/2017 15:26
Workgroup #:	WG624895	**Analyst:**	JWR	**Run Date:**	08/07/2017 19:26
Collect Date:	07/26/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM40325
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.15		0.400	0.200	0.100

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

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

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: NA

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40075	WG619865-01 CCB	1	1		06/29/17 13:13
2	1LM.LM40076	WG619865-02 STD (0.1 ug/L)	1	1	STD80232	06/29/17 13:32
3	1LM.LM40077	WG619865-03 STD (0.2 ug/L)	1	1	STD80232	06/29/17 13:51
4	1LM.LM40078	WG619865-04 STD (0.5 ug/L)	1	1	STD80232	06/29/17 14:10
5	1LM.LM40079	WG619865-05 STD (1.0 ug/L)	1	1	STD80232	06/29/17 14:29
6	1LM.LM40080	WG619865-06 STD (2.0 ug/L)	1	1	STD80232	06/29/17 14:48
7	1LM.LM40081	WG619865-07 STD (5.0 ug/L)	1	1	STD80232	06/29/17 15:07
8	1LM.LM40082	WG619865-08 STD (10 ug/L)	1	1	STD80232	06/29/17 15:26
9	1LM.LM40083	WG619865-09 SSCV (1.0 ug/L)	1	1	STD80234	06/29/17 15:45
10	1LM.LM40084	WG619609-01 CCB	1	1		06/29/17 16:04
11	1LM.LM40085	WG619609-02 CCV (1.0ug/L)	1	1	STD80232	06/29/17 16:23
12	1LM.LM40086	WG619615-05 MRL (0.2ug/L)	1	1	STD80232	06/29/17 16:42
13	1LM.LM40087	WG619615-01 MCT (0.2ug/L)	1	1	STD80234	06/29/17 17:01
14	1LM.LM40088	WG619615-02 BLANK	1	1		06/29/17 17:20
15	1LM.LM40089	WG619615-03 LCS (0.2ug/L)	1	1	STD80234	06/29/17 17:39
16	1LM.LM40090	WG619615-04 LCS2 (0.2ug/L)	1	1	STD80234	06/29/17 17:57
17	1LM.LM40091	L17061390-01 10,000X	1	10000	STD80234	06/29/17 18:16
18	1LM.LM40092	L17061390-02	1	1	STD80234	06/29/17 18:35
19	1LM.LM40093	L17061390-03 100X	1	100	STD80234	06/29/17 18:54
20	1LM.LM40094	L17061390-04	1	1	STD80234	06/29/17 19:13
21	1LM.LM40095	L17061390-05 10X	1	10		06/29/17 19:32
22	1LM.LM40096	L17061390-06	1	1		06/29/17 19:51
23	1LM.LM40097	WG619609-03 CCV (1.0ug/L)	1	1	STD80232	06/29/17 20:10
24	1LM.LM40098	WG619615-06 MRL (0.2ug/L)	1	1	STD80232	06/29/17 20:29
25	1LM.LM40099	WG619609-04 CCB	1	1		06/29/17 20:48
26	1LM.LM40100	L17061390-07	1	1		06/29/17 21:07
27	1LM.LM40101	L17061390-09 100,000X	1	100000		06/29/17 21:26
28	1LM.LM40102	L17061390-10	1	1		06/29/17 21:45
29	1LM.LM40103	L17061390-12	1	1		06/29/17 22:04
30	1LM.LM40104	L17061390-13	1	1		06/29/17 22:23
31	1LM.LM40105	L17061390-15	1	1		06/29/17 22:42
32	1LM.LM40106	L17061390-16 2X	1	2		06/29/17 23:01
33	1LM.LM40107	WG619609-05 CCV (1.0ug/L)	1	1	STD80232	06/29/17 23:20

Page: 1 Approved: 30-JUN-17

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 062917_WTD.TXT

Analyst1: WTD Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG619865 ICAL, WG619615

Internal STD: COA19471 Surrogate STD: NA STD80232 (062917)

CCV STD: STD80232 LCS STD: STD80234 NA

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM40108	WG619615-07 MRL (0.2ug/L)	1	1	STD80232	06/29/17 23:39
35	1LM.LM40109	WG619609-06 CCB	1	1		06/29/17 23:57

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L17061390-01 Analyzed at a dilution based on historical data.			
19				
	L17061390-03 Analyzed at a dilution based on historical data.			
21				
	L17061390-05 Analyzed at a dilution based on historical data.			
27				
	L17061390-09 Analyzed at a dilution based on historical data.			
32				
	L17061390-16 Analyzed at a dilution based on historical data.			

 Approved: 30-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 080717_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG624895 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (06/29/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: NA

Comments: Sample L17080163-01 was analyzed at a dilution only based on its historical results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM40318	WG624896-01 CCB	1	1		08/07/17 17:13
2	1LM.LM40319	WG624896-02 CCV (1.0ug/L)	1	1	STD80232	08/07/17 17:32
3	1LM.LM40320	WG624895-05 MRL (0.2ug/L)	1	1	STD80232	08/07/17 17:51
4	1LM.LM40321	WG624895-01 MCT (0.2ug/L)	1	1	STD80234	08/07/17 18:10
5	1LM.LM40322	WG624895-02 BLANK	1	1		08/07/17 18:29
6	1LM.LM40323	WG624895-03 LCS (0.2ug/L)	1	1	STD80234	08/07/17 18:48
7	1LM.LM40324	WG624895-04 LCS2 (0.2ug/L)	1	1	STD80234	08/07/17 19:07
8	1LM.LM40325	L17071280-01	1	1		08/07/17 19:26
9	1LM.LM40326	L17080163-01 (10,000x)	1	10000		08/07/17 19:45
10	1LM.LM40327	L17080164-02 (NR)	1	1		08/07/17 20:04
11	1LM.LM40328	L17080164-03	1	1		08/07/17 20:23
12	1LM.LM40329	WG624896-03 CCV (1.0ug/L)	1	1	STD80232	08/07/17 20:42
13	1LM.LM40330	WG624895-06 MRL (0.2ug/L)	1	1	STD80232	08/07/17 21:01
14	1LM.LM40331	WG624896-04 CCB	1	1		08/07/17 21:19
15	1LM.LM40332	WG624896-05 CCV (1.0ug/L)	1	1	STD80232	08/08/17 12:01
16	1LM.LM40333	WG624895-07 MRL (0.2ug/L)	1	1	STD80232	08/08/17 12:20
17	1LM.LM40334	WG624896-06 CCB	1	1		08/08/17 12:38
18	1LM.LM40335	L17080164-02 RR 10x	1	10		08/08/17 12:57
19	1LM.LM40336	WG624896-07 CCV (1.0ug/L)	1	1	STD80232	08/08/17 13:16
20	1LM.LM40337	WG624895-08 MRL (0.2ug/L)	1	1	STD80232	08/08/17 13:35
21	1LM.LM40338	WG624896-08 CCB	1	1		08/08/17 13:54

Comments

Seq.	Rerun	Dil.	Reason	Analytes
10	X	10	Over Calibration Range	perchlorate
	L17080164-02			

Page: 1 Approved: 08-AUG-17

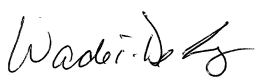
Microbac Laboratories Inc.

Data Checklist

Date: 29-JUN-2017
Analyst: WTD
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83086
Analytical Workgroups: L17061390

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	X
Check for completeness	X
Primary Reviewer	WTD
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:



Secondary Reviewer:
30-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-30-2017 12:54:25

Microbac Laboratories Inc.

Data Checklist

Date: 07-AUG-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 83844
Analytical Workgroups: L17071280 L17080163, L17080164

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
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 (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	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
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	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	NA
Check for completeness	X
Primary Reviewer	JWR
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:
08-AUG-2017
John Richards

Secondary Reviewer:
08-AUG-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-08-2017 15:48:06

Microbac

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 AAB#: WG624895

Login Number: L17071280

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
LH18/24-SP650-6460	01	07/26/17					08/07/2017	12.1	28		08/07/17	.1	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5422247
Report generated 08/08/2017 16:02

METHOD BLANK SUMMARY

Login Number: L17071280
Work Group: WG624895
Blank File ID: 1LM.LM40322
Blank Sample ID: WG624895-02
Prep Date: 08/07/17 16:30
Instrument ID: LCMS1
Analyzed Date: 08/07/17 18:29
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG624895-05	1LM.LM40320	08/07/17 17:51	01
MCT	WG624895-01	1LM.LM40321	08/07/17 18:10	01
LCS	WG624895-03	1LM.LM40323	08/07/17 18:48	01
LCS2	WG624895-04	1LM.LM40324	08/07/17 19:07	01
LH18/24-SP650-6460	L17071280-01	1LM.LM40325	08/07/17 19:26	01
QCMRL	WG624895-06	1LM.LM40330	08/07/17 21:01	01
QCMRL	WG624895-07	1LM.LM40333	08/08/17 12:20	01
QCMRL	WG624895-08	1LM.LM40337	08/08/17 13:35	01

Report Name: BLANK_SUMMARY
PDF File ID: 5422248
Report generated 08/08/2017 16:02

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17071280 Prep Date: 08/07/17 16:30 Sample ID: WG624895-02
Instrument ID: LCMS1 Run Date: 08/07/17 18:29 Prep Method: 6850
File ID: 1LM.LM40322 Analyst: JWR Method: 6850
Workgroup (AAB#): WG624895 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5422249
08-AUG-2017 16:02

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17071280 Analyst: JWR Prep Method: 6850
Instrument ID: LCMS1 Matrix: Water Method: 6850
Workgroup (AAB#): WG624895 Units: ug/L
QC Key: DOD4 Lot #: STD80234

Sample ID: WG624895-03 LCS File ID: 1LM.LM40323 Run Date: 08/07/2017 18:48
Sample ID: WG624895-04 LCS2 File ID: 1LM.LM40324 Run Date: 08/07/2017 19:07

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Perchlorate	0.200	0.177	88.5	0.200	0.186	93.0	4.96	80 - 120	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5422250
Report generated: 08/08/2017 16:02

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17071280
Analytical Method: 6850
ICAL Workgroup: WG619865

Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.454	6.38	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5422380
Report generated 08/08/2017 16:02

Login Number: L17071280
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-02			WG619865-03			WG619865-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	20800.0000	1.476	0.200	44600.0000	1.521	0.500	102000.000	1.433

INT_CAL - Modified 03/06/2008
PDF File ID: 5422380
Report generated 08/08/2017 16:02

Login Number: L17071280
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-05			WG619865-06			WG619865-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	214000.000	1.464	2.00	408000.000	1.442	5.00	981000.000	1.437

INT_CAL - Modified 03/06/2008
PDF File ID: 5422380
Report generated 08/08/2017 16:02

Login Number: L17071280
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 29-JUN-17 15:26
Column ID: F

Analyte	WG619865-08		
	CONC	RESP	RF
Perchlorate	10.0	1820000.00	1.407

INT_CAL - Modified 03/06/2008
PDF File ID: 5422380
Report generated 08/08/2017 16:02

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17071280 Run Date: 06/29/2017 Sample ID: WG619865-09
Instrument ID: LCMS1 Run Time: 15:45 Method: 6850
File ID: 1LM.LM40083 Analyst: WTD QC Key: DOD4
ICal Workgroup: WG619865 Cal ID: LCMS1 - 29-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.980	ug/L	1.40	2.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5422384
Report generated 08/08/2017 16:02

Login Number: L17071280 | Run Date: 08/07/2017 | Sample ID: WG624896-01
Instrument ID: LCMS1 | Run Time: 17:13 | Method: 6850
File ID: 1LM.LM40318 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG624895 | Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5422253
Report generated 08/08/2017 16:03

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17071280	Run Date:	08/07/2017	Sample ID:	WG624896-04
Instrument ID:	LCMS1	Run Time:	21:19	Method:	6850
File ID:	1LM.LM40331	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG624895	Cal ID:	LCMS1 - 29-JUN-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5422253
Report generated 08/08/2017 16:03

Login Number: L17071280 | Run Date: 08/08/2017 | Sample ID: WG624896-06
Instrument ID: LCMS1 | Run Time: 12:38 | Method: 6850
File ID: 1LM.LM40334 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG624895 | Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5422253
Report generated 08/08/2017 16:03

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17071280	Run Date:	08/08/2017	Sample ID:	WG624896-08
Instrument ID:	LCMS1	Run Time:	13:54	Method:	6850
File ID:	1LM.LM40338	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG624895	Cal ID:	LCMS1 - 29-JUN-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	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: 5422253
Report generated 08/08/2017 16:03

Login Number: L17071280 Run Date: 08/07/2017 Sample ID: WG624896-02
Instrument ID: LCMS1 Run Time: 17:32 Method: 6850
File ID: 1LM.LM40319 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG624895 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.920	ug/L	1.32	8.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5422252
Report generated 08/08/2017 16:03

Login Number: L17071280 Run Date: 08/07/2017 Sample ID: WG624896-03
Instrument ID: LCMS1 Run Time: 20:42 Method: 6850
File ID: 1LM.LM40329 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG624895 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.950	ug/L	1.36	5.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5422252
Report generated 08/08/2017 16:03

Login Number: L17071280 Run Date: 08/08/2017 Sample ID: WG624896-05
Instrument ID: LCMS1 Run Time: 12:01 Method: 6850
File ID: 1LM.LM40332 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG624895 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.977	ug/L	1.40	2.30	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5422252
Report generated 08/08/2017 16:03

Login Number: L17071280 Run Date: 08/08/2017 Sample ID: WG624896-07
Instrument ID: LCMS1 Run Time: 13:16 Method: 6850
File ID: 1LM.LM40336 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG624895 Cal ID: LCMS1 - 29-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.940	ug/L	1.35	6.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5422252
Report generated 08/08/2017 16:03

Login Number: L17071280 Run Date: 08/07/2017 Sample ID: WG624895-05
Instrument ID: LCMS1 Run Time: 17:51 Prep Method: 6850
File ID: 1LM.LM40320 Analyst: JWR Method: 6850
Workgroup (AAB#): WG624895 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.173	86.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5422251
Report generated 08/08/2017 16:02

Login Number: L17071280 Run Date: 08/07/2017 Sample ID: WG624895-06
Instrument ID: LCMS1 Run Time: 21:01 Prep Method: 6850
File ID: 1LM.LM40330 Analyst: JWR Method: 6850
Workgroup (AAB#): WG624895 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.193	96.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5422251
Report generated 08/08/2017 16:02

Login Number: L17071280 Run Date: 08/08/2017 Sample ID: WG624895-07
Instrument ID: LCMS1 Run Time: 12:20 Prep Method: 6850
File ID: 1LM.LM40333 Analyst: JWR Method: 6850
Workgroup (AAB#): WG624895 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.184	92.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5422251
Report generated 08/08/2017 16:02

Login Number: L17071280 Run Date: 08/08/2017 Sample ID: WG624895-08
Instrument ID: LCMS1 Run Time: 13:35 Prep Method: 6850
File ID: 1LM.LM40337 Analyst: JWR Method: 6850
Workgroup (AAB#): WG624895 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-29-JUN-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.185	92.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5422251
Report generated 08/08/2017 16:02

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number:L17071280
Instrument ID:LCMS1
Workgroup (AAB#):WG624895

ICAL CCV Number:WG619865-05
CAL ID: LCMS1-29-JUN-17
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG619865	NA	NA	703000
Upper Limit	NA	NA	1054500
Lower Limit	NA	NA	351500
L17071280-01	1.00	01	504000
WG624895-02	1.00	01	512000
WG624895-03	1.00	01	545000
WG624895-04	1.00	01	554000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5422254
Report generated 08/08/2017 16:03

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	L17071280-01
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40325
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 19:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	165000	53600	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG619865-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40076
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	06/29/2017 13:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	20800	6780	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG619865-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40077
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	06/29/2017 13:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44600	13700	3.26	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG619865-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40078
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	06/29/2017 14:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	102000	31100	3.28	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG619865-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40079
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	06/29/2017 14:29	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	65900	3.25	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG619865-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40080
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	06/29/2017 14:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	408000	126000	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG619865-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40081
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	06/29/2017 15:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	981000	306000	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG619865-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40082
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	06/29/2017 15:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1820000	577000	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG619865-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40083
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	06/29/2017 15:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	200000	61800	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	WG624895-01
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40321
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 18:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	27500	9350	2.94	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	WG624895-02
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40322
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 18:29	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	WG624895-03
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40323
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 18:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	28800	8540	3.37	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	WG624895-04
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40324
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 19:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	30700	9560	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	WG624895-05
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40320
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 17:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	24600	9260	2.66	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	WG624895-06
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40330
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 21:01	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	35900	11100	3.23	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	WG624895-07
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40333
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/08/2017 12:20	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	30800	10100	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**	6850	**Samplenum:**	WG624895-08
Instrument:	LCMS1	**Prep Date:**	08/07/2017 16:30	**File ID:**	1LM.LM40337
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/08/2017 13:35	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	33600	10300	3.26	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG624896-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40318
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 17:13	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG624896-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40319
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 17:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	118000	37600	3.14	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG624896-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40329
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 20:42	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	158000	48000	3.29	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG624896-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40331
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/07/2017 21:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG624896-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40332
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/08/2017 12:01	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	146000	45100	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG624896-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40334
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/08/2017 12:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	516	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG624896-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40336
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/08/2017 13:16	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	162000	50500	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17071280	**Prep Method:**		**Samplenum:**	WG624896-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM40338
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG624895	**Analysis Date:**	08/08/2017 13:54	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

2.2 General Chemistry Data

2.2.1 Ammonia Data

2.2.1.1 Summary Data

Microbac

Lab Report #: L17071280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071280-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6460	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	08/01/2017 14:03
Workgroup #:	WG623971	**Analyst:**	TB	**Run Date:**	08/01/2017 14:12
Collect Date:	07/26/2017 15:00	**Dilution:**	10	**File ID:**	S2170801003.017
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	14.5		2.00	1.00	0.500

2.2.1.2 QC Summary Data

Example Ammonia Calculations

(absorbance - intercept)/(slope * dilution) = 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: 01-AUG-2017
Analyst: TB
Analyst: NA
Method: NH3
Instrument: SC2
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG623971 WG623974 WG623975

Calibration/Linearity	08/01/2017
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:
02-AUG-2017

Secondary Reviewer:
03-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-03-2017 11:10:01

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1 AAB#: WG623971

Login Number: L17071280

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
LH18/24-SP650-6460	01	07/26/17					08/01/2017	6	28		08/01/17	6	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5413880
Report generated 08/02/2017 14:01

METHOD BLANK SUMMARY

Login Number:	L17071280	**Work Group:**	WG623971
Blank File ID:	S2170801003.011	**Blank Sample ID:**	WG623971-01
Prep Date:	08/01/17 14:06	**Instrument ID:**	SMARTCHEM2
Analyzed Date:	08/01/17 14:06	**Method:**	350.1
Analyst:	TB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG623971-02	S2170801003.012	08/01/17 14:08	01
LH18/24-SP650-6460	L17071280-01	S2170801003.017	08/01/17 14:12	DL01
DUP	WG623971-05	S2170801003.031	08/01/17 14:24	01

Report Name: BLANK_SUMMARY
PDF File ID: 5413881
Report generated 08/02/2017 14:01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17071280 Prep Date: 08/01/17 14:06 Sample ID: WG623971-01
Instrument ID: SMARTCHEM2 Run Date: 08/01/17 14:06 Prep Method: 350.1
File ID: S2170801003.011 Analyst: TB Method: 350.1
Workgroup (AAB#): WG623971 Matrix: Water Units: mg/L
Contract #: Cal ID: SMARTC-01-AUG-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.200	0.0500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5413882
02-AUG-2017 14:01

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17071280 **Run Date:** 08/01/2017 **Sample ID:** WG623971-02
Instrument ID: SMARTCHEM2 **Run Time:** 14:08 **Prep Method:** 350.1
File ID: S2170801003.012 **Analyst:** TB **Method:** 350.1
Workgroup (AAB#): WG623971 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80299 **Cal ID:** SMARTC-01-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.88	94.1	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5413883
Report generated: 08/02/2017 14:01

2.2 General Chemistry Data

2.2.2 Orthophosphate Data

2.2.2.1 Summary Data

Microbac

Lab Report #: L17071280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071280-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6460	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	06/07/2017 15:40
Workgroup #:	WG623538	**Analyst:**	ADG	**Run Date:**	07/27/2017 14:55
Collect Date:	07/26/2017 15:00	**Dilution:**	5	**File ID:**	00.1707271455-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	2.12		0.500	0.250	0.125

2.2.2.2 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: 27-JUL-2017
Analyst: ADG
Analyst: NA
Method: PO4
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG623538

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	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:
28-JUL-2017

Secondary Reviewer:
01-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-01-2017 09:30:59

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.2 **AAB#:** WG623538

Login Number: L17071280

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
LH18/24-SP650-6460	01	07/26/17					07/27/2017	1	2		07/27/17	1	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5410813
Report generated 08/01/2017 08:30

METHOD BLANK SUMMARY

Login Number:	L17071280	**Work Group:**	WG623538
Blank File ID:	00.1707271455-03	**Blank Sample ID:**	WG623538-01
Prep Date:	07/27/17 14:55	**Instrument ID:**	UV-2600
Analyzed Date:	07/27/17 14:55	**Method:**	365.2
Analyst:	ADG		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG623538-02	00.1707271455-04	07/27/17 14:55	
LCS2	WG623538-03	00.1707271455-05	07/27/17 14:55	
LH18/24-SP650-6460	L17071280-01	00.1707271455-06	07/27/17 14:55	
DUP	WG623538-05	00.1707271455-07	07/27/17 14:55	

Report Name: BLANK_SUMMARY
PDF File ID: 5410814
Report generated 08/01/2017 08:30

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17071280 Prep Date: 07/27/17 14:55 Sample ID: WG623538-01
Instrument ID: UV-2600 Run Date: 07/27/17 14:55 Prep Method: 365.2
File ID: 00.1707271455-03 Analyst: ADG Method: 365.2
Workgroup (AAB#): WG623538 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-11-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Orthophosphate	0.0250	0.100	0.0250	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5410815
01-AUG-2017 08:30

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17071280 Analyst: ADG Prep Method: 365.2
Instrument ID: UV-2600 Matrix: Water Method: 365.2
Workgroup (AAB#): WG623538 Units: mg/L
QC Key: DOD4 Lot #: STD83090

Sample ID: WG623538-02 LCS File ID: 00.1707271455-04 Run Date: 07/27/2017 14:55
Sample ID: WG623538-03 LCS2 File ID: 00.1707271455-05 Run Date: 07/27/2017 14:55

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Orthophosphate	1.00	1.03	103	1.00	1.04	104	0.620	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5410816
Report generated: 08/01/2017 08:30

2.2.2.3 Raw Data

WG616995

Curves

Parameter: PO4

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: STD79640

Concentration: 1000 mg/L

Recipe for preparation of curve standards found in:
SOP: 3653 Revision: 17 Page: 09

Second Source Stock: STD82182 (concentration: 10)

Daily Preparation: 10(100)/100

concentration = =1.0

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
1.0	50	1cm	880	0.623
0.7	↓	↓	↓	0.442
0.5				0.311
0.2				0.127
0.1				0.063
0.05				0.031
0				0
2nd Source (1.0)	50	1cm	880	0.630

Analyst: Jammy Morris

Date/Time: 6/7/17 @ 1540

DCN#126309

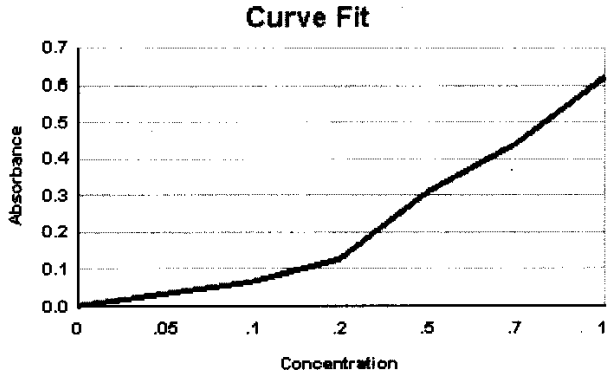
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG616995
Analytical Method:300
Instrument ID:UV-2600

Analyst:TMM
Initial Calibration Date:06/07/2017

Analyte: ORTHOPHOSPHATE
Number of Points: 7
Slope: 0.624599
Y-Intercept: 0.000610422
Coef. Of Correlation (R^2): 0.999913
Coef. Of Correlation (R): 0.999957

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00	0.00	0.00	0.000610422
0.0500	0.0310	0.00250	0.00155	0.0318404
0.100	0.0630	0.0100	0.00630	0.0630703
0.200	0.127	0.0400	0.0254	0.125530
0.500	0.311	0.250	0.156	0.312910
0.700	0.442	0.490	0.309	0.437830
1.00	0.623	1.00	0.623	0.625209



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 06/07/2017 16:24

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG616995
File ID: 00.1706071540-08
CCV ID: WG616995-08
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 06/07/2017
Run Time: 15:40
Analyst: TMM
Cal ID: UV-260 - 07-JUN-17 15:40:07

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	1	1.01	0.630	1.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 06/07/2017 16:25

[redacted]

WORKGROUP: WG623538

Orthophosphate

(orthophosphate1)

EPA 365.2 / SM4500-P E
SOP K3653 Rev 17
Color Reagent Chemicals
Rgt 40722
Rgt 404106
Rgt 39475
ORT 18278

CCV: R3089 LCS: R3090 Spike: R3090
Daily Dilution: 5(5)/150 Daily Dilution: 10(10)/100 Daily Dilution: 2(10)/100
Daily Dilution: 7/27/17 pH = 6.5 Daily Dilution: 10 Daily Dilution: 20.4
Spectrophotometer: UV-2600 Curve ID: 6-7-17

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: 1.0 mg/L	50	✓		0.325
BLK/CCB:	50	✓		0.001
LCS: 1.0 ppm	50	✓		0.644
LCSD: 1.0 ppm	50	✓		0.648
07-1280-01	50	✓	1/5	0.245
1280-01	50	✓	1/2	0.693 * Turbid
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP: 7-1280-01	50	✓	1/5	0.285
MS: (1280-01)	50	✓	1/5	0.347
MSD: ( )	50			
CCV: (1.0)	50	✓		0.334
CCB:	50			0.002

Analyst: [illegible] Date / Time 07-27-17 / 1455
Adq 7/27/17

DCN#127291

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG623538 **Analyst:** ADG
Analyte: ORTHOPHOSPHATE **Date:** 07/27/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG623538-01	50	50	0.00100	0.6246	0.0006104	0.00062373	0.00062373	1	mg/L
WG623538-02	50	50	0.644	0.6246	0.0006104	1.0301	1.0301	1	mg/L
WG623538-03	50	50	0.648	0.6246	0.0006104	1.0365	1.0365	1	mg/L
L17071280-01	50	50	0.265	0.6246	0.0006104	0.42330	2.1165	5	mg/L
WG623538-04	50	50	0.265	0.6246	0.0006104	0.42330	2.1165	5	mg/L
WG623538-05	50	50	0.285	0.6246	0.0006104	0.45532	2.2766	5	mg/L
WG623538-06	50	50	0.347	0.6246	0.0006104	0.55458	2.7729	5	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 07/27/2017 15:47

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG623551
File ID: 00.1707271455-01
CCV ID: WG623551-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 07/27/2017
Run Time: 14:55
Analyst: ADG
Cal ID: UV-260 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.519	0.650	3.8	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 07/31/2017 11:02

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG623551
File ID: 00.1707271455-09
CCV ID: WG623551-03
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 07/27/2017
Run Time: 14:55
Analyst: ADG
Cal ID: UV-260 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.534	0.668	6.8	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

[redacted]

WET_WG_CCV - Modified 03/06/2008

Report generated 07/31/2017 11:02

2.2 General Chemistry Data

2.2.3 Total Organic Carbon Data

2.2.3.1 Summary Data

Microbac

Lab Report #: L17071280
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071280-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6460	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG623487	**Analyst:**	ADG	**Run Date:**	07/27/2017 20:32
Collect Date:	07/26/2017 15:00	**Dilution:**	5	**File ID:**	TC07272017.044
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	74.0		10.0	5.00	2.50

Generated at Aug 9, 2017 11:38

2.2.3.2 QC Summary Data

Total Organic Carbon Example Calculations
(Direct Readout Parameter)

(Readout)/(dilution) = mg/L

where:

Readout = direct readout from the instrument
dilution = dilution in decimal form (ex. 1/5 dilution = 0.2)

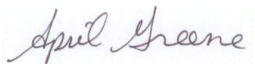
Microbac Laboratories Inc.

Data Checklist

Date: 27-JUL-2017
Analyst: ADG
Analyst: NA
Method: TOC
Instrument: YOCVWP
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG623415 WG623487

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	X
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	ADG
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
28-JUL-2017



Secondary Reviewer:
01-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-01-2017 09:28:56

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 415.1 AAB#: WG623487

Login Number: L17071280

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
LH18/24-SP650-6460	01	07/26/17					07/27/2017	1.2	28		07/27/17	1.2	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5409944
Report generated 07/31/2017 10:08

METHOD BLANK SUMMARY

Login Number:	L17071280	**Work Group:**	WG623487
Blank File ID:	TC07272017.024	**Blank Sample ID:**	WG623487-01
Prep Date:	07/27/17 16:14	**Instrument ID:**	TOC-VWP
Analyzed Date:	07/27/17 16:14	**Method:**	415.1
Analyst:	ADG		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG623487-02	TC07272017.025	07/27/17 16:26	01
LCS2	WG623487-03	TC07272017.028	07/27/17 16:59	01
LH18/24-SP650-6460	L17071280-01	TC07272017.044	07/27/17 20:32	DL01
DUP	WG623487-05	TC07272017.045	07/27/17 20:44	01

Report Name: BLANK_SUMMARY
PDF File ID: 5409945
Report generated 07/31/2017 10:09

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17071280 Prep Date: 07/27/17 16:14 Sample ID: WG623487-01
Instrument ID: TOC-VWP Run Date: 07/27/17 16:14 Prep Method: 415.1
File ID: TC07272017.024 Analyst: ADG Method: 415.1
Workgroup (AAB#): WG623487 Matrix: Water Units: mg/L
Contract #: Cal ID: TOC-VW-10-FEB-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Total Organic Carbon	0.500	2.00	0.500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5409946
31-JUL-2017 10:09

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17071280 Analyst: ADG Prep Method: 415.1
Instrument ID: TOC-VWP Matrix: Water Method: 415.1
Workgroup (AAB#): WG623487 Units: mg/L
QC Key: DOD4 Lot #: STD80787

Sample ID: WG623487-02 LCS File ID: TC07272017.025 Run Date: 07/27/2017 16:26
Sample ID: WG623487-03 LCS2 File ID: TC07272017.028 Run Date: 07/27/2017 16:59

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	25.8	103	25.0	25.4	102	1.37	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5409947
Report generated: 07/31/2017 10:09

2.2.3.3 Raw Data

Curve

~~WG602411~~ ~~WG602476~~ dm 1/13/17 WG602481

Total Organic Carbon

MAKE DAILY

CCV (TOC): _____ (5/200)(1000) = 25mg/L

LCS (TOC): _____ (5/200)(1000) = 25mg/L

CCV (TIC): _____ (5/200)(1000) = 25mg/L

MS (TOC): _____

Calibration Curve Date: _____

Reagent: RGT 38944, RGT 37673

☑ SM5310-C : Matrix 2 WG_____

☐ EPA 415.1/9060A(mod): Matrix 1 WG_____ WG_____

SOP: K 4151 Rev. ~~17~~ 18 dm 1/13/17

Instrument: Shimadza TOC-VWP/ASI

DAILY CHECK

☑ drain reservoir filled
☑ ASI water bottle full
☐ dilution water bottle full

☑ 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	all points analyzed in duplicate	
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		
45		
46		
47		
48		
49		
50		

Position	Sample ID	Dilution
51		
52	See SOP	
53	for point	
54	Preparation	
55		
56		
57		
58		
59		
60	5/200 (100) = 25	
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		

Analyst: David Merkle Date/Time: 2/10/17

DCN#123915

C:\TOC3201\Data\CURVES-02-10-2017.t32

	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

Instr.Information

System	TOCVW ASI
Detector	Wet Chemical

Cal. Curve

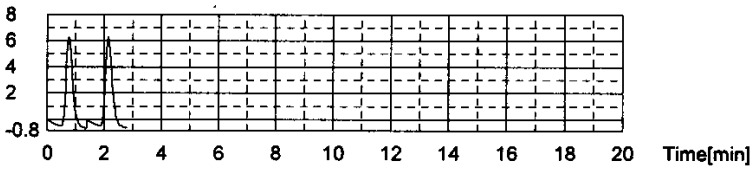
Sample Name:	TCCURVE
Sample ID:	Untitled
Cal. Curve:	TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status	Completed

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

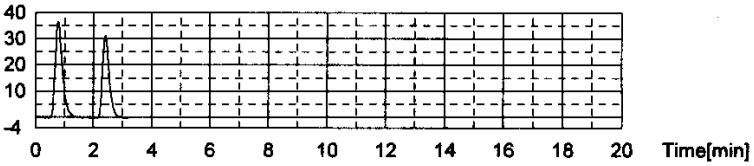
Acid Add. 0.000%
Mean Area 10.82



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

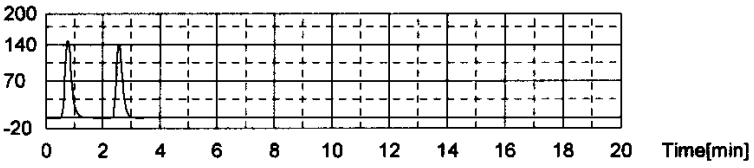
Acid Add. 0.000%
Mean Area 57.92



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

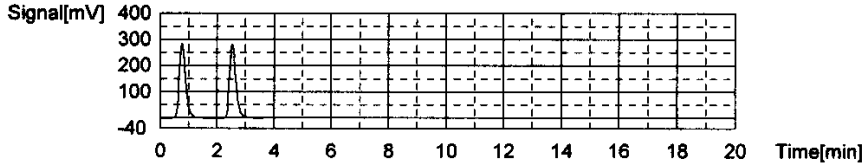
Acid Add. 0.000%
Mean Area 227.4



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

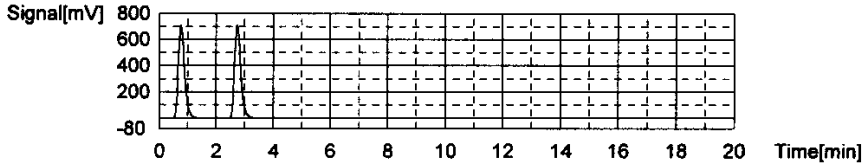
Acid Add. 0.000%
Mean Area 440.2



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

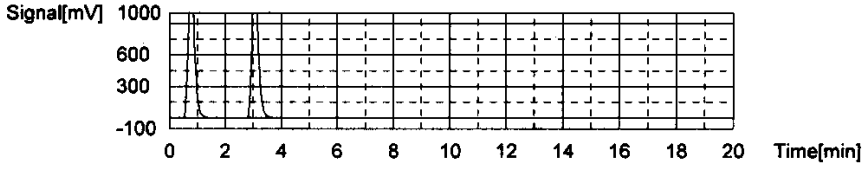
Acid Add. 0.000%
Mean Area 1092



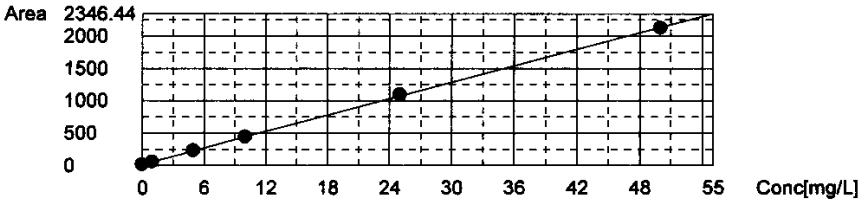
Conc: 50.00mg/L

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

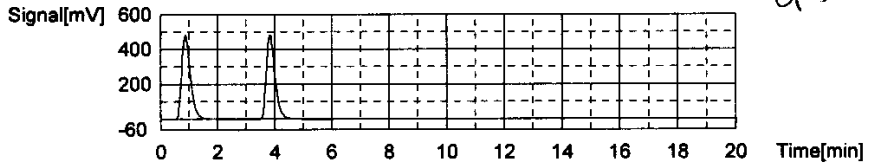
1. Det

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

95.6%

Mean Area 1029
Mean Conc. 23.90mg/L



Cal. Curve

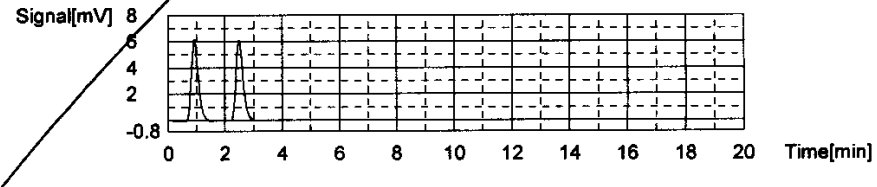
Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed

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

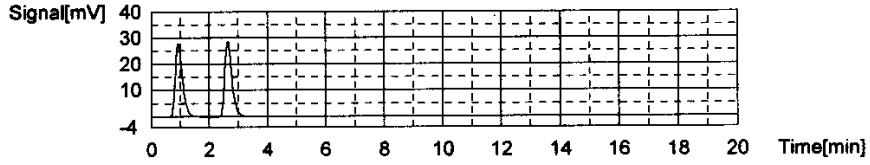
Acid Add. 3.000%
Mean Area 10.51



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



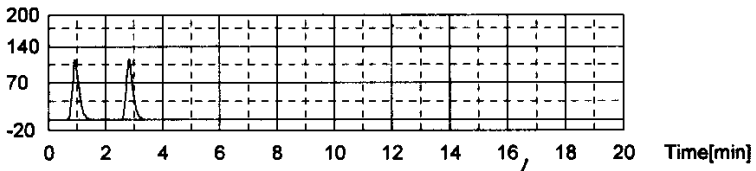
Conc: 5.000mg/L

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

dcm
3/23/17

2/12/2017 11:18:36 AM CURVES-02-10-2017.t32

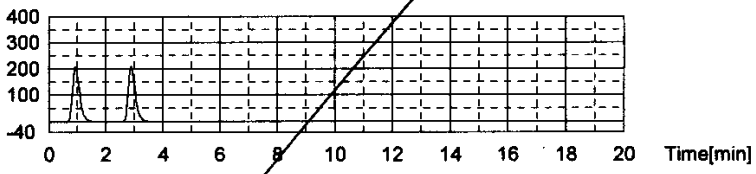
Acid Add. 3.000%
Mean Area 189.6



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

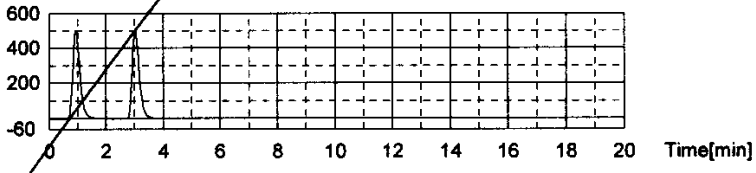
Acid Add. 3.000%
Mean Area 361.4



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

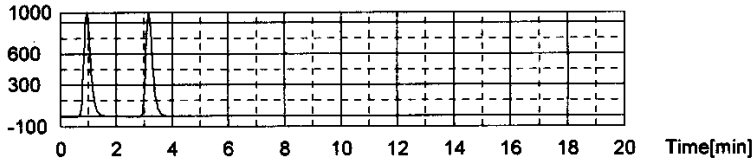
Acid Add. 3.000%
Mean Area 858.1



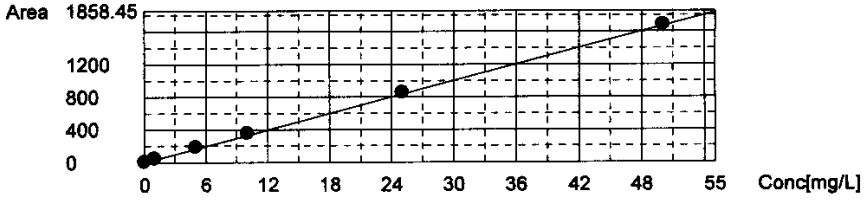
Conc: 50.00mg/L

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

4/6

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

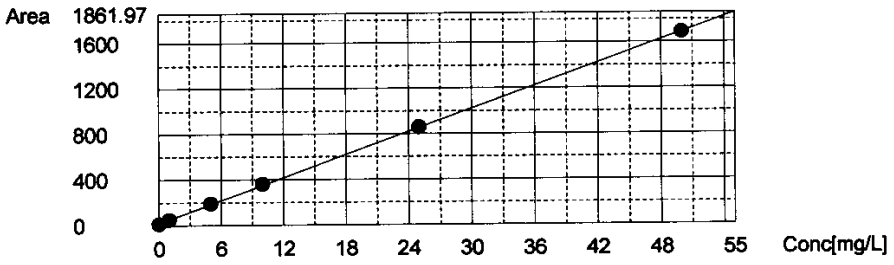
Acid Add.	3.000%
Mean Area	858.1
SD Area	1.697
CV Area	0.20%
Vial	4

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
r^2	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

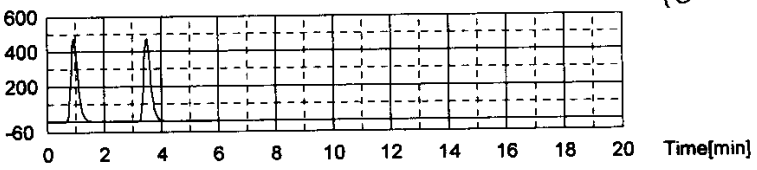
1. Det

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_1	2/10/2017 4:06:15 PM
2	814.6	24.33mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	2/10/2017 4:12:07 PM

96.9%

Mean Area 812.5
Mean Conc. 24.27mg/L



Sample

Sample Name:
Sample ID: Untitled
Origin: TCCURVE-02-10-2017.2017_02_10_14_14_25.cal
Status Completed
Chk. Result

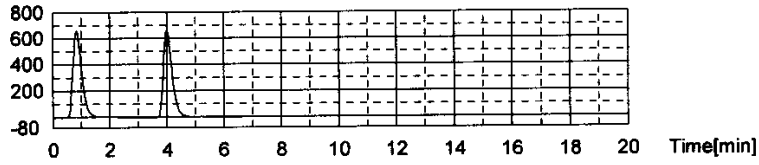
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

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	2/10/2017 4:25:42 PM
2	1411	0.000mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_14_14_2	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

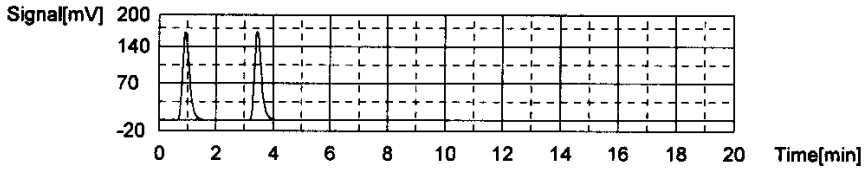
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

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_1	2/10/2017 4:37:09 PM
2	287.2	8.577mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	2/10/2017 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

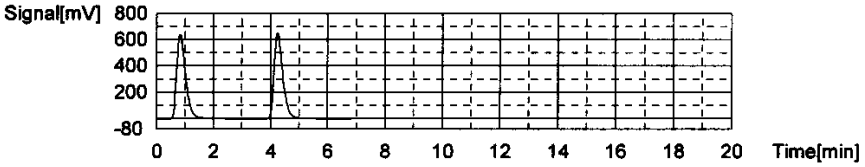
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

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_59	2/10/2017 4:55:07 PM
2	1373	32.04mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_59	2/10/2017 5:01:02 PM

Mean Area 1376
Mean Conc. 32.10mg/L



WORKGROUP: WG623415
WG623487

Total Organic Carbon

MAKE DAILY

CCV (TOC): 79381 (5/200)(1000) = 25mg/L

LCS (TOC): 7/27/17 80748 80787 (5/200)(1000) = 25mg/L

CCV (TIC): 80416 (5/200)(1000) = 25mg/L

MS (TOC): ~~80788~~ 80787 4(1000)/40 = 10

Calibration Curve Date: 2-10-17

Reagent: 40592 392116

☑ SM5310-C : Matrix 2 WG 623415
☒ EPA 415.1/9060A(mod): Matrix 1 WG ~~623487~~ SOP: K 1451 Rev. 18
☐ SW846 9060A (4 rep) WG _____ Instrument: Shimadza TOC-VWP/ASI

DAILY CHECK

☐ drain reservoir filled
☒ ASI water bottle full
☑ dilution water bottle full
☑ 3rd bottle full
☒ sufficient gas
☒ sufficient persulfate
☐ sufficient acid
☒ waste container

Position	Sample ID	Dilution
1	TIC	
2	TOC/TIC	
3	CCV	
4	BIK	
5	LCS	
6	LCS Dup	
7	07 1174-03	
8	07 1190-17	
9	-19	
10	-21	
11	-24	
12	-26	
13	07 1191-01	
14	CCV	
15	CCB	
16	07 1191-03	
17	-05	
18	-07	
19	07 1231-01	
20	MS -02	
21	MSD -03	
22	-04	
23	07 1191-07 Dup	
24	DLK	
25	LCS	

Position	Sample ID	Dilution
26	CCV	
27	CCB	
28	LCS Dup	
29	07 1209-02	
30	-03	
31	-05	
32	-06	
33	-07	
34	07 1248-01	
35	-02	
36	-03	
37	-04	
38	CCV 1249-01	
39	CCB	
40	07 1249-01	
41	-02	
42	-03	
43	-04	
44	07-1250-01	1/5
45	1249-04 Dup	
46	1249-04 MS	
47	CCV	
48	CCB	
49	CCV	
50	CCB	

Position	Sample ID	Dilution
51	071209-02	1/3
52	03	1/3
53	05	1/5
54	06	1/3
55	07	1/2
56	~~CCV~~ 1209-02	1/5
57	~~CCB~~ 1209-05	1/10
58	1209-06	1/5
59	1209-05	1/20
60	CCV	
61	CCB	
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		

Analyst: April Green Date/Time: 7/27/17

DCN#127269

C:\TOC3201\Data\07-27-2017-DCM-TOC.t32

	Analysis	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:1.715mg/L TC:27.48mg/L IC:25.77mg/L	Complete	7/27/2017 7:17:42 AM	1
2	TOC	TOC/TIC	TOC:28.14mg/L TC:37.10mg/L IC:8.956mg/L	Complete	7/27/2017 7:30:38 AM	2
3	TOC	CCV	!!Error!! TOC:26.49mg/L TC:26.21mg/L IC:-0.2878mg/L	Complete	7/27/2017 7:42:59 AM	3
4	TOC	WG623415-01 BLK	!!Error!! TOC:0.07276mg/L TC:-0.1518mg/L IC:-0.2246mg/	Complete	7/27/2017 7:59:42 AM	0
5	TOC	WG623415-02 LCS	!!Error!! TOC:26.08mg/L TC:25.76mg/L IC:-0.3216mg/L	Complete	7/27/2017 8:20:49 AM	5
6	TOC	WG623415-03 LCSDUP	!!Error!! TOC:26.09mg/L TC:25.78mg/L IC:-0.3126mg/L	Complete	7/27/2017 8:42:05 AM	6
7	TOC	L17071174-03	TOC:10.44mg/L TC:38.33mg/L IC:27.89mg/L	Complete	7/27/2017 10:38:30 AM	7
8	TOC	L17071190-17	TOC:3.960mg/L TC:47.56mg/L IC:43.60mg/L	Complete	7/27/2017 11:01:31 AM	8
9	TOC	L17071190-19	TOC:2.291mg/L TC:26.10mg/L IC:23.81mg/L	Complete	7/27/2017 11:23:57 AM	9
10	TOC	L17071190-21	TOC:2.248mg/L TC:22.25mg/L IC:20.00mg/L	Complete	7/27/2017 11:46:16 AM	10
11	TOC	L17071190-24	TOC:1.838mg/L TC:11.79mg/L IC:9.949mg/L	Complete	7/27/2017 12:07:47 PM	11
12	TOC	L17071190-26	TOC:2.387mg/L TC:14.01mg/L IC:11.62mg/L	Complete	7/27/2017 12:29:24 PM	12
13	TOC	L17071191-01	TOC:2.251mg/L TC:14.87mg/L IC:12.62mg/L	Complete	7/27/2017 12:51:08 PM	13
14	TOC	CCV	!!Error!! TOC:25.50mg/L TC:25.31mg/L IC:-0.1937mg/L	Complete	7/27/2017 1:03:26 PM	14
15	TOC	CCB	!!Error!! TOC:0.06451mg/L TC:-0.1647mg/L IC:-0.2292mg/	Complete	7/27/2017 1:12:29 PM	0
16	TOC	L17071191-03	TOC:1.259mg/L TC:7.606mg/L IC:6.347mg/L	Complete	7/27/2017 1:33:32 PM	16
17	TOC	L17071191-05	TOC:1.142mg/L TC:8.955mg/L IC:7.813mg/L	Complete	7/27/2017 1:54:44 PM	17
18	TOC	L17071191-07	TOC:1.748mg/L TC:5.935mg/L IC:4.186mg/L	Complete	7/27/2017 2:15:44 PM	18
19	TOC	L17071231-01	TOC:5.923mg/L TC:14.24mg/L IC:8.321mg/L	Complete	7/27/2017 2:41:33 PM	19
20	TOC	L17071231-02 MS	TOC:16.92mg/L TC:23.95mg/L IC:7.029mg/L	Complete	7/27/2017 3:03:53 PM	20
21	TOC	L17071231-03 MSD	TOC:16.94mg/L TC:23.88mg/L IC:6.940mg/L	Complete	7/27/2017 3:26:03 PM	21
22	TOC	L17071231-04	TOC:8.268mg/L TC:21.50mg/L IC:13.23mg/L	Complete	7/27/2017 3:48:30 PM	22
23	TOC	WG623415-05 DUP	TOC:1.825mg/L TC:5.135mg/L IC:3.310mg/L	Complete	7/27/2017 4:09:15 PM	23
24	TOC	WG623487-01 BLK	!!Error!! TOC:0.05322mg/L TC:-0.1625mg/L IC:-0.2157mg/	Complete	7/27/2017 4:18:19 PM	0
25	TOC	WG623487-02 LCS	!!Error!! TOC:25.79mg/L TC:25.59mg/L IC:-0.2017mg/L	Complete	7/27/2017 4:30:36 PM	25
26	TOC	CCV	!!Error!! TOC:26.07mg/L TC:25.85mg/L IC:-0.2199mg/L	Complete	7/27/2017 4:42:55 PM	26
27	TOC	CCB	!!Error!! TOC:0.06884mg/L TC:-0.1666mg/L IC:-0.2355mg/	Complete	7/27/2017 4:52:02 PM	0
28	TOC	WG623487-03 LCSDUP	!!Error!! TOC:25.44mg/L TC:25.24mg/L IC:-0.2059mg/L	Complete	7/27/2017 5:04:14 PM	28
29	TOC		!!Error!! TOC:-12.55mg/L TC:82.32mg/L IC:94.86mg/L	Complete	7/27/2017 5:20:02 PM	29
30	TOC		!!Error!! TOC:-8.887mg/L TC:79.32mg/L IC:88.20mg/L	Complete	7/27/2017 5:35:56 PM	30
31	TOC		!!Error!! TOC:-23.90mg/L TC:122.2mg/L IC:146.1mg/L	Complete	7/27/2017 5:53:38 PM	31
32	TOC		!!Error!! TOC:-10.36mg/L TC:99.73mg/L IC:110.1mg/L	Complete	7/27/2017 6:10:14 PM	32
33	TOC		TOC:7.027mg/L TC:51.84mg/L IC:44.81mg/L	Complete	7/27/2017 6:24:22 PM	33
34	TOC	L17071248-01	TOC:0.9079mg/L TC:9.723mg/L IC:8.815mg/L	Complete	7/27/2017 6:36:42 PM	34
35	TOC	L17071248-02	TOC:3.870mg/L TC:24.65mg/L IC:20.78mg/L	Complete	7/27/2017 6:49:33 PM	35
36	TOC	L17071248-03	TOC:1.347mg/L TC:10.15mg/L IC:8.806mg/L	Complete	7/27/2017 7:01:48 PM	36
37	TOC	L17071248-04	TOC:1.117mg/L TC:9.825mg/L IC:8.708mg/L	Complete	7/27/2017 7:14:01 PM	37
38	TOC	CCV	!!Error!! TOC:26.50mg/L TC:26.32mg/L IC:-0.1721mg/L	Complete	7/27/2017 7:26:20 PM	38
39	TOC	CCB	!!Error!! TOC:0.07628mg/L TC:-0.1699mg/L IC:-0.2462mg/	Complete	7/27/2017 7:35:24 PM	0
40	TOC	L17071248-01	TOC:3.193mg/L TC:7.401mg/L IC:4.207mg/L	Complete	7/27/2017 7:47:52 PM	40
41	TOC	L17071249-02	TOC:4.885mg/L TC:6.460mg/L IC:1.575mg/L	Complete	7/27/2017 8:00:29 PM	41
42	TOC	L17071249-03	TOC:1.295mg/L TC:4.251mg/L IC:2.956mg/L	Complete	7/27/2017 8:12:31 PM	42
43	TOC	L17071249-04	TOC:0.8785mg/L TC:6.373mg/L IC:5.494mg/L	Complete	7/27/2017 8:24:36 PM	43
44	TOC	L17071280-01 (5)	TOC:14.79mg/L TC:19.41mg/L IC:4.619mg/L	Complete	7/27/2017 8:37:36 PM	44
45	TOC	WG623487-05 DUP	TOC:0.9309mg/L TC:5.903mg/L IC:4.972mg/L	Complete	7/27/2017 8:49:39 PM	45
46	TOC	WG623487-06 MS	TOC:11.89mg/L TC:14.22mg/L IC:2.329mg/L	Complete	7/27/2017 9:01:51 PM	46
47	TOC	CCV	!!Error!! TOC:25.32mg/L TC:25.09mg/L IC:-0.2268mg/L	Complete	7/27/2017 9:14:13 PM	47
48	TOC	CCB	!!Error!! TOC:0.09012mg/L TC:-0.1770mg/L IC:-0.2671mg/	Complete	7/27/2017 9:23:14 PM	0
49	TOC	CCV	!!Error!! TOC:25.33mg/L TC:25.14mg/L IC:-0.1913mg/L	Complete	7/28/2017 7:18:24 AM	49
50	TOC	CCB	!!Error!! TOC:0.08801mg/L TC:-0.1682mg/L IC:-0.2562mg/	Complete	7/28/2017 7:27:24 AM	0
51	TOC		TOC:3.107mg/L TC:51.53mg/L IC:48.43mg/L	Complete	7/28/2017 7:40:51 AM	51
52	TOC	L17071209-03 (3)	TOC:5.714mg/L TC:48.56mg/L IC:42.84mg/L	Complete	7/28/2017 7:54:24 AM	52
53	TOC		!!Error!! TOC:-13.36mg/L TC:73.17mg/L IC:86.53mg/L	Complete	7/28/2017 8:09:04 AM	53
54	TOC		TOC:0.5411mg/L TC:62.50mg/L IC:61.95mg/L	Complete	7/28/2017 8:23:15 AM	54
55	TOC	L17071209-07 (2)	TOC:3.828mg/L TC:31.12mg/L IC:27.29mg/L	Complete	7/28/2017 8:36:18 AM	55
56	TOC	L17071209-02 (5)	TOC:3.169mg/L TC:29.39mg/L IC:26.23mg/L	Complete	7/28/2017 8:51:34 AM	56
57	TOC		TOC:1.589mg/L TC:50.49mg/L IC:48.90mg/L	Complete	7/28/2017 9:05:11 AM	57
58	TOC	L17071209-06 (5)	TOC:5.666mg/L TC:46.48mg/L IC:40.81mg/L	Complete	7/28/2017 9:18:43 AM	58
59	TOC	L17071209-05 (20)	TOC:4.153mg/L TC:31.17mg/L IC:27.01mg/L	Complete	7/28/2017 9:39:08 AM	59
60	TOC	CCV	!!Error!! TOC:25.28mg/L TC:25.19mg/L IC:-0.08614mg/L	Complete	7/28/2017 9:51:39 AM	60
61	TOC	CCB	!!Error!! TOC:0.07250mg/L TC:-0.1689mg/L IC:-0.2414mg/	Complete	7/28/2017 10:00:42 AM	0

7/28/2017 10:03:22 AM

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

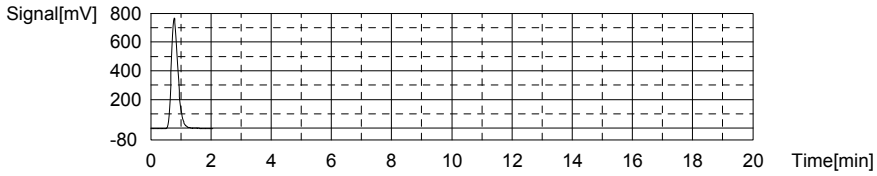
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.715mg/L TC:27.48mg/L IC:25.77mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1180	27.48mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:12:30 AM

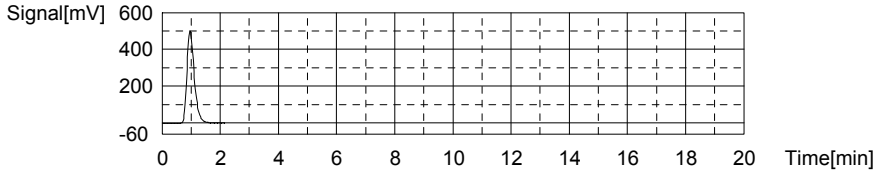
Mean Area 1180
Mean Conc. 27.48mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	881.2	25.77mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 7:17:42 AM

Mean Area 881.2
Mean Conc. 25.77mg/L



Sample

Sample Name: TOC/TIC
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

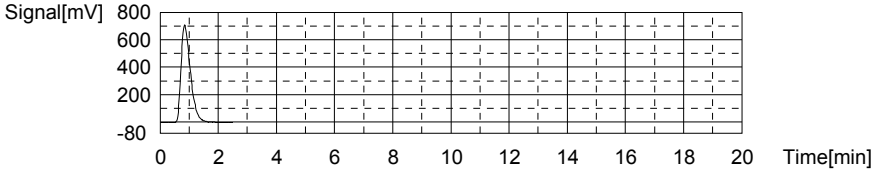
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:28.14mg/L TC:37.10mg/L IC:8.956mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1587	37.10mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:25:38 AM

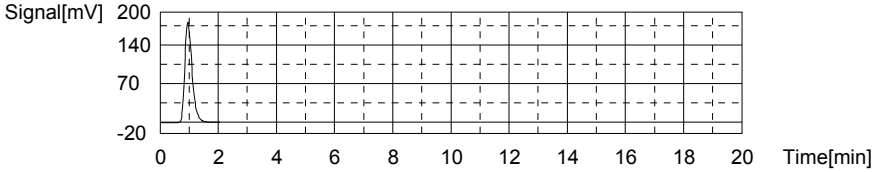
Mean Area 1587
Mean Conc. 37.10mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	318.3	8.956mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 7:30:38 AM

Mean Area 318.3
Mean Conc. 8.956mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

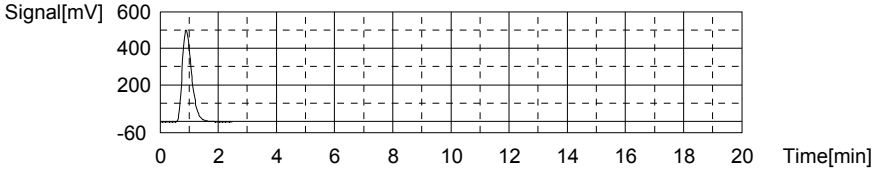
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.49mg/L TC:26.21mg/L IC:-0.2878mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1126	26.21mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:38:32 AM

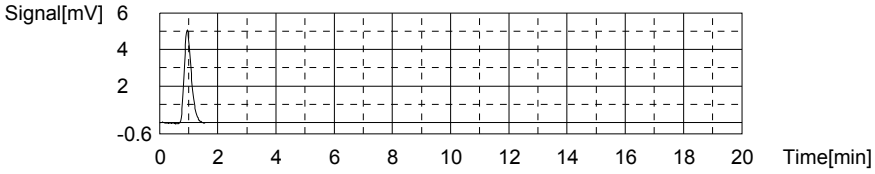
Mean Area 1126
Mean Conc. 26.21mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.778	-0.2878mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 7:42:59 AM

Mean Area 8.778
Mean Conc. -0.2878mg/L



Sample

Sample Name: WG623415-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

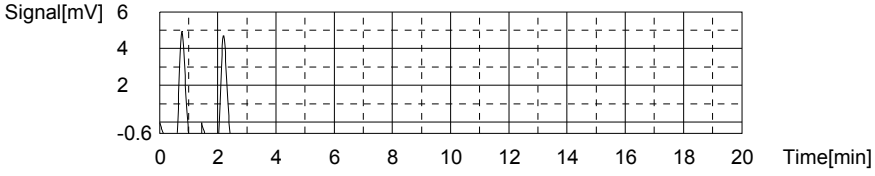
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.07276mg/L TC:-0.1518mg/L IC:-0.2246mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.58	-0.1485mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:48:06 AM
2	10.30	-0.1551mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:51:40 AM

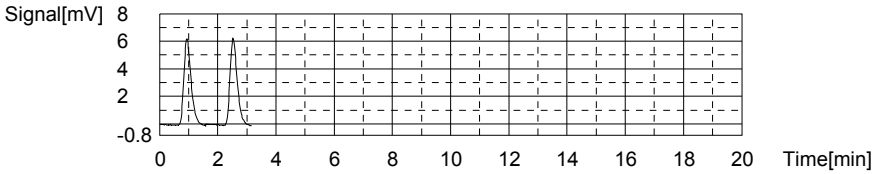
Mean Area 10.44
Mean Conc. -0.1518mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.98	-0.2220mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 7:55:41 AM
2	10.81	-0.2271mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 7:59:42 AM

Mean Area 10.90
Mean Conc. -0.2246mg/L



Sample

Sample Name: WG623415-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

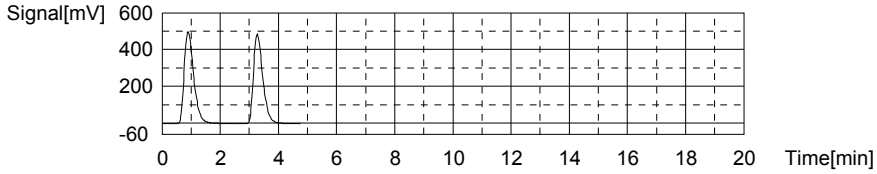
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.08mg/L TC:25.76mg/L IC:-0.3216mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1133	26.37mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 8:07:32 AM
2	1081	25.14mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 8:12:10 AM

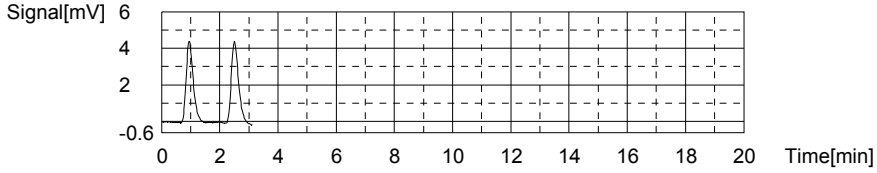
Mean Area 1107
Mean Conc. 25.76mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.532	-0.3250mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 8:16:36 AM
2	7.761	-0.3182mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 8:20:49 AM

Mean Area 7.646
Mean Conc. -0.3216mg/L



Sample

Sample Name: WG623415-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

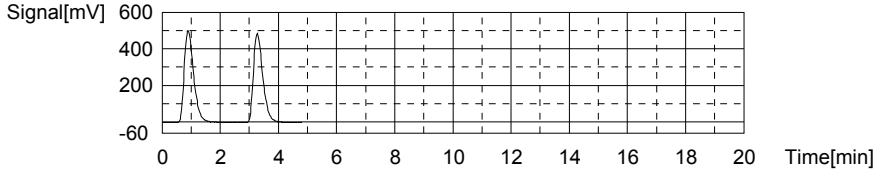
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.09mg/L TC:25.78mg/L IC:-0.3126mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1128	26.25mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 8:28:39 AM
2	1088	25.31mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 8:33:20 AM

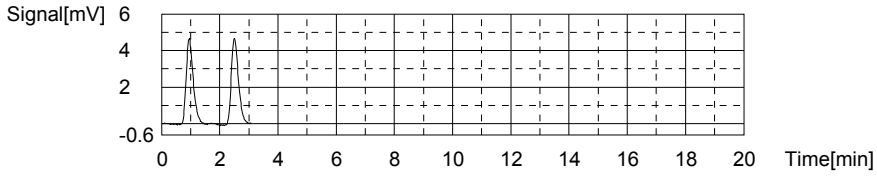
Mean Area 1108
Mean Conc. 25.78mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.937	-0.3129mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 8:37:50 AM
2	7.958	-0.3123mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 8:42:05 AM

Mean Area 7.947
Mean Conc. -0.3126mg/L



Sample

Sample Name: L17071174-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

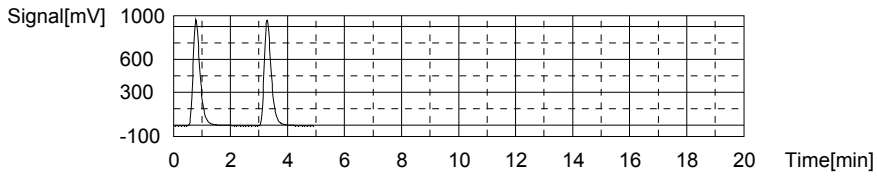
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:10.44mg/L TC:38.33mg/L IC:27.89mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1641	38.37mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 10:23:44 AM
2	1637	38.28mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 10:28:26 AM

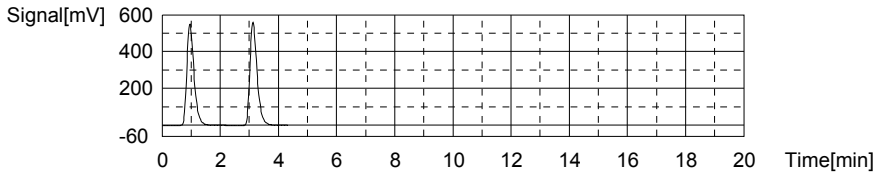
Mean Area 1639
Mean Conc. 38.33mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	944.4	27.65mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 10:33:35 AM
2	960.1	28.12mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 10:38:30 AM

Mean Area 952.3
Mean Conc. 27.89mg/L



Sample

Sample Name: L17071190-17
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

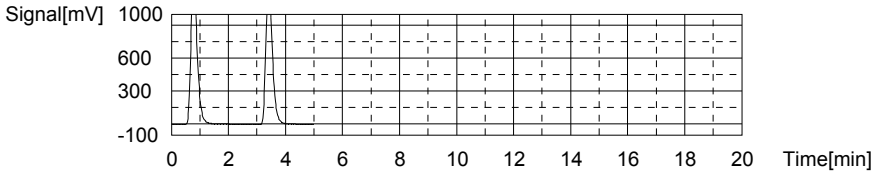
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.960mg/L TC:47.56mg/L IC:43.60mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2023	47.40mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 10:46:34 AM
2	2037	47.73mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 10:51:11 AM

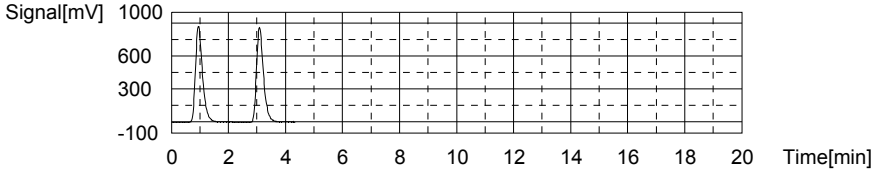
Mean Area 2030
Mean Conc. 47.56mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1491	43.98mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 10:56:24 AM
2	1466	43.23mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 11:01:31 AM

Mean Area 1479
Mean Conc. 43.60mg/L



Sample

Sample Name: L17071190-19
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

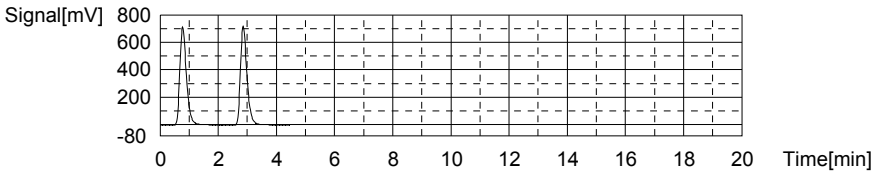
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.291mg/L TC:26.10mg/L IC:23.81mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1115	25.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 11:09:03 AM
2	1128	26.25mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 11:13:40 AM

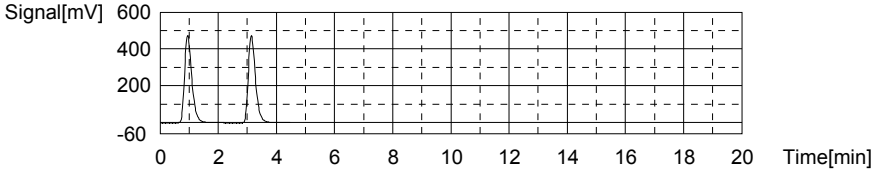
Mean Area 1122
Mean Conc. 26.10mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	821.4	23.98mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 11:18:52 AM
2	809.9	23.64mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 11:23:57 AM

Mean Area 815.7
Mean Conc. 23.81mg/L



Sample

Sample Name: L17071190-21
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

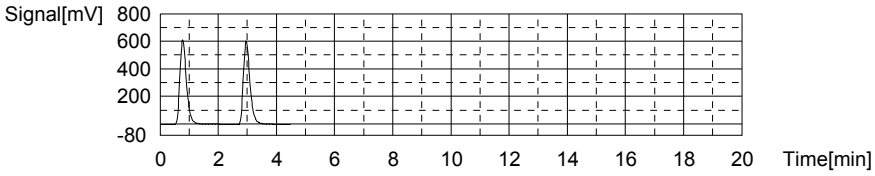
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.248mg/L TC:22.25mg/L IC:20.00mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	960.0	22.28mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/27/2017 11:31:34 AM
2	957.1	22.21mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/27/2017 11:36:18 AM

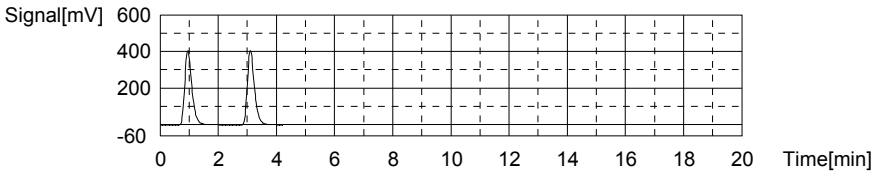
Mean Area 958.5
Mean Conc. 22.25mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	690.2	20.06mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 11:41:26 AM
2	686.1	19.94mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 11:46:16 AM

Mean Area 688.2
Mean Conc. 20.00mg/L



Sample

Sample Name: L17071190-24
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

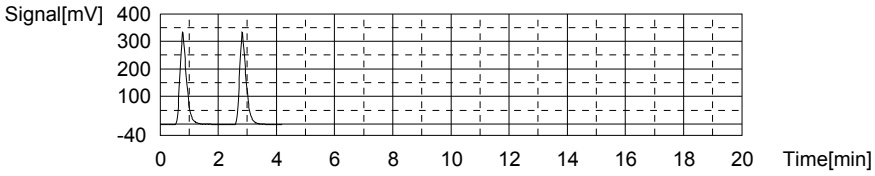
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.838mg/L TC:11.79mg/L IC:9.949mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	512.7	11.71mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 11:53:45 AM
2	518.8	11.86mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 11:58:10 AM

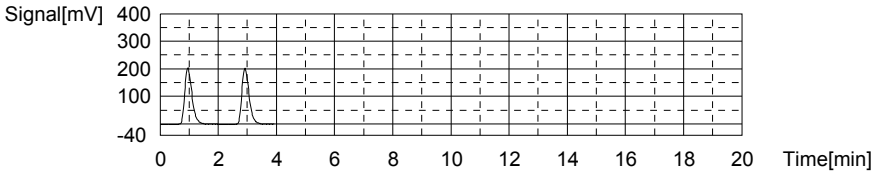
Mean Area 515.8
Mean Conc. 11.79mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	351.2	9.938mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 12:03:06 PM
2	351.9	9.959mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 12:07:47 PM

Mean Area 351.6
Mean Conc. 9.949mg/L



Sample

Sample Name: L17071190-26
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

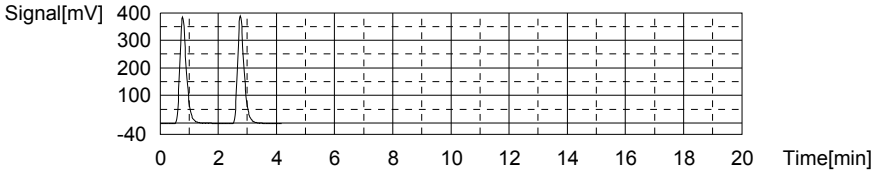
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.387mg/L TC:14.01mg/L IC:11.62mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	604.7	13.89mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 12:15:12 PM
2	614.7	14.12mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 12:19:46 PM

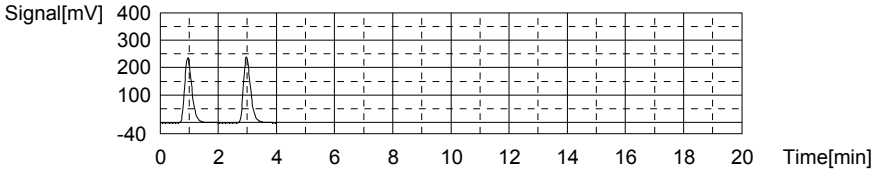
Mean Area 609.7
Mean Conc. 14.01mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	406.9	11.60mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 12:24:44 PM
2	408.1	11.64mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 12:29:24 PM

Mean Area 407.5
Mean Conc. 11.62mg/L



Sample

Sample Name: L17071191-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

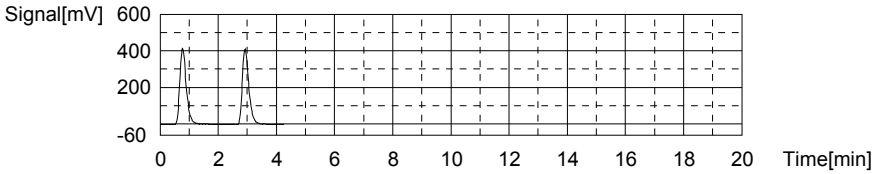
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.251mg/L TC:14.87mg/L IC:12.62mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	644.0	14.82mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 12:37:00 PM
2	648.3	14.92mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 12:41:33 PM

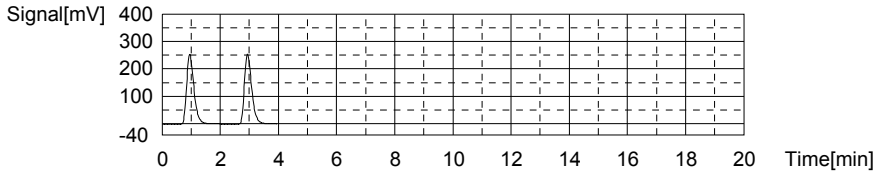
Mean Area 646.2
Mean Conc. 14.87mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	439.6	12.58mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 12:46:27 PM
2	442.2	12.66mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 12:51:08 PM

Mean Area 440.9
Mean Conc. 12.62mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

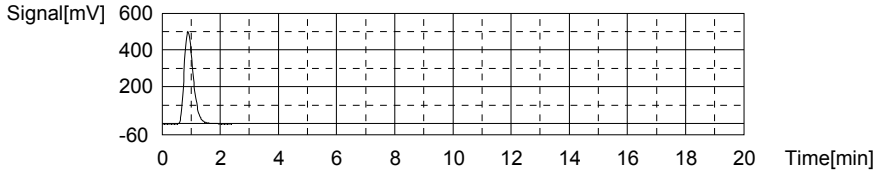
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.50mg/L TC:25.31mg/L IC:-0.1937mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1088	25.31mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_09_32_5	7/27/2017 12:58:57 PM

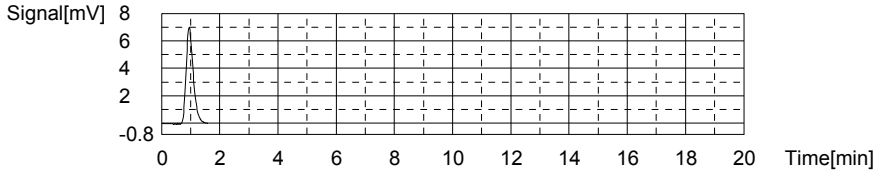
Mean Area 1088
Mean Conc. 25.31mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.93	-0.1937mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 1:03:26 PM

Mean Area 11.93
Mean Conc. -0.1937mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

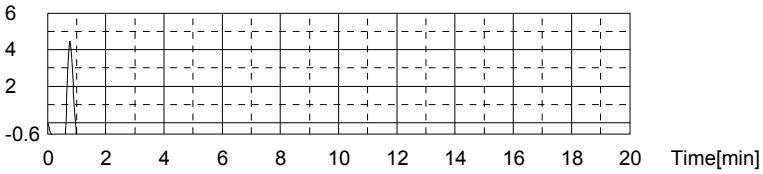
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.06451mg/L TC:-0.1647mg/L IC:-0.2292mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.895	-0.1647mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 1:08:29 PM

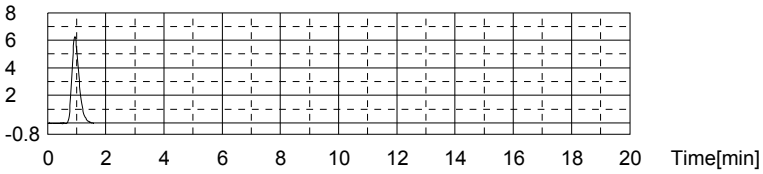
Mean Area 9.895
Mean Conc. -0.1647mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.74	-0.2292mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 1:12:29 PM

Mean Area 10.74
Mean Conc. -0.2292mg/L



Sample

Sample Name: L17071191-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

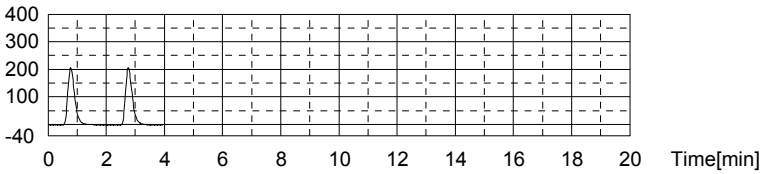
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.259mg/L TC:7.606mg/L IC:6.347mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	338.4	7.597mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 1:19:55 PM
2	339.2	7.616mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 1:24:09 PM

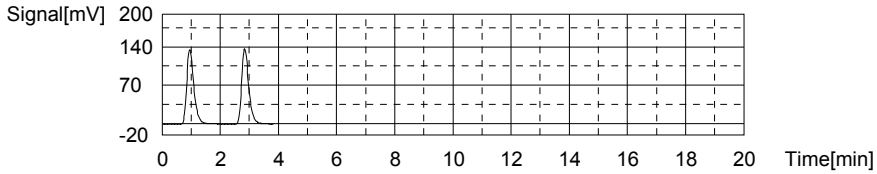
Mean Area 338.8
Mean Conc. 7.606mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	229.1	6.292mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 1:28:55 PM
2	232.8	6.402mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 1:33:32 PM

Mean Area 231.0
Mean Conc. 6.347mg/L



Sample

Sample Name: L17071191-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

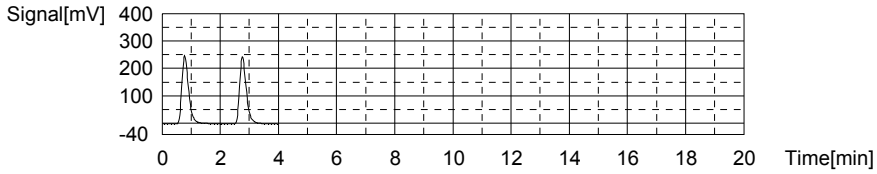
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.142mg/L TC:8.955mg/L IC:7.813mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	398.5	9.017mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 1:40:57 PM
2	393.3	8.894mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 1:45:13 PM

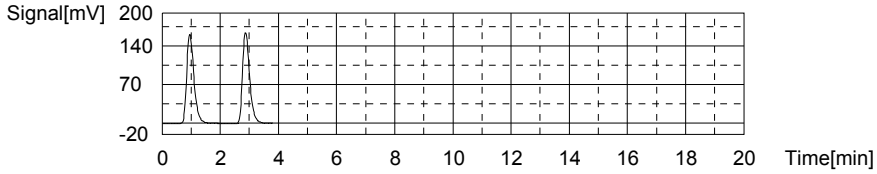
Mean Area 395.9
Mean Conc. 8.955mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	278.6	7.770mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 1:50:06 PM
2	281.5	7.857mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 1:54:44 PM

Mean Area 280.1
Mean Conc. 7.813mg/L



Sample

Sample Name: L17071191-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

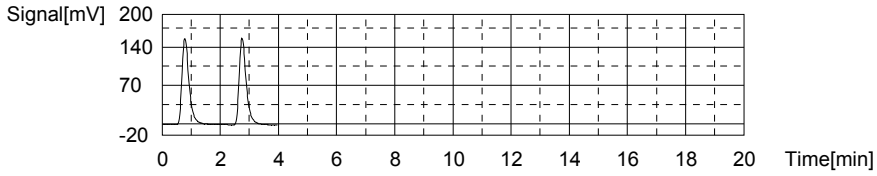
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.748mg/L TC:5.935mg/L IC:4.186mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	266.7	5.903mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 2:02:08 PM
2	269.4	5.967mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 2:06:23 PM

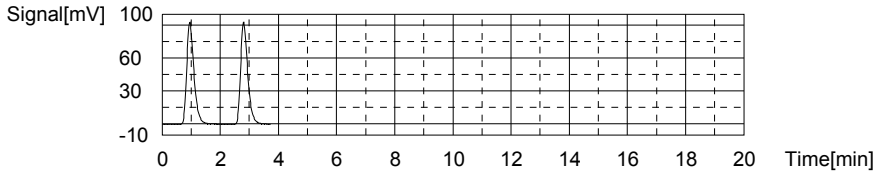
Mean Area 268.1
Mean Conc. 5.935mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	158.8	4.192mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 2:11:09 PM
2	158.4	4.180mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 2:15:44 PM

Mean Area 158.6
Mean Conc. 4.186mg/L



Sample

Sample Name: L17071231-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

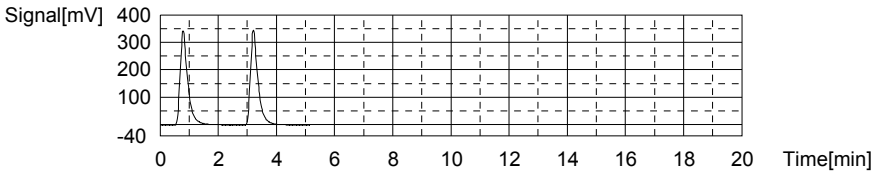
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.923mg/L TC:14.24mg/L IC:8.321mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	616.9	14.18mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 2:26:58 PM
2	622.6	14.31mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 2:32:01 PM

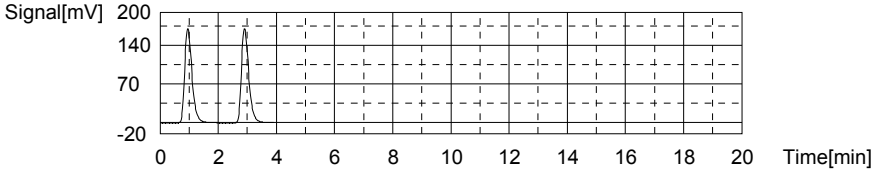
Mean Area 619.8
Mean Conc. 14.24mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	296.0	8.290mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 2:36:56 PM
2	298.1	8.352mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 2:41:33 PM

Mean Area 297.1
Mean Conc. 8.321mg/L



Sample

Sample Name: L17071231-02 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

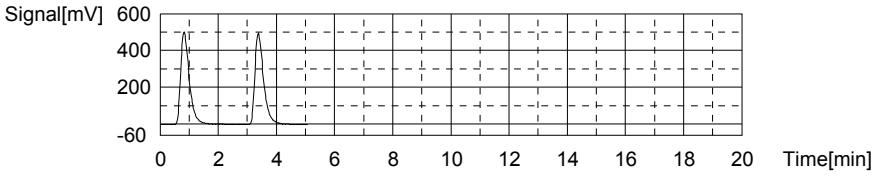
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:16.92mg/L TC:23.95mg/L IC:7.029mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1030	23.94mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/27/2017 2:49:33 PM
2	1031	23.96mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/27/2017 2:54:24 PM

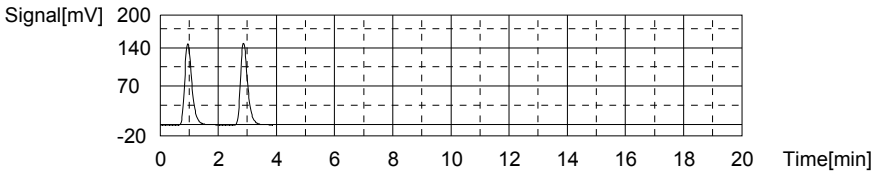
Mean Area 1031
Mean Conc. 23.95mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	252.9	7.003mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 2:59:16 PM
2	254.7	7.056mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 3:03:53 PM

Mean Area 253.8
Mean Conc. 7.029mg/L



Sample

Sample Name: L17071231-03 MSD
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

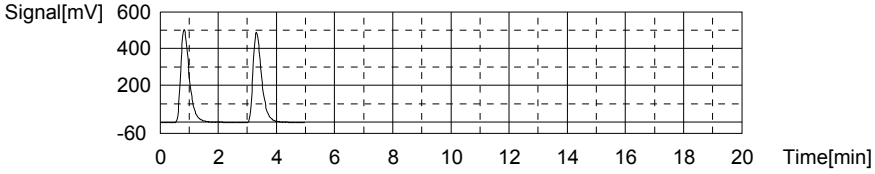
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:16.94mg/L TC:23.88mg/L IC:6.940mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1041	24.20mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 3:11:49 PM
2	1014	23.56mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 3:16:36 PM

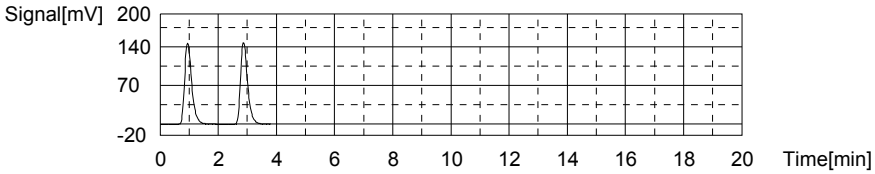
Mean Area 1028
Mean Conc. 23.88mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	249.7	6.907mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 3:21:27 PM
2	251.9	6.973mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 3:26:03 PM

Mean Area 250.8
Mean Conc. 6.940mg/L



Sample

Sample Name: L17071231-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

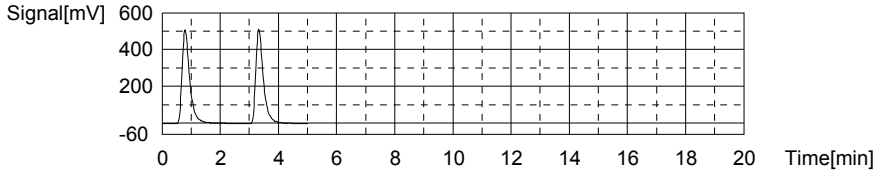
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:8.268mg/L TC:21.50mg/L IC:13.23mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	926.2	21.48mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 3:34:02 PM
2	927.3	21.51mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 3:38:47 PM

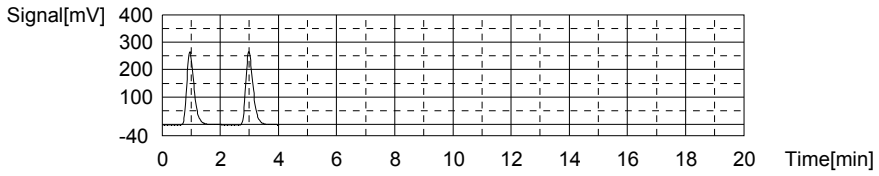
Mean Area 926.8
Mean Conc. 21.50mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	458.7	13.15mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 3:43:47 PM
2	464.1	13.31mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_17	7/27/2017 3:48:30 PM

Mean Area 461.4
Mean Conc. 13.23mg/L



Sample

Sample Name: WG623415-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

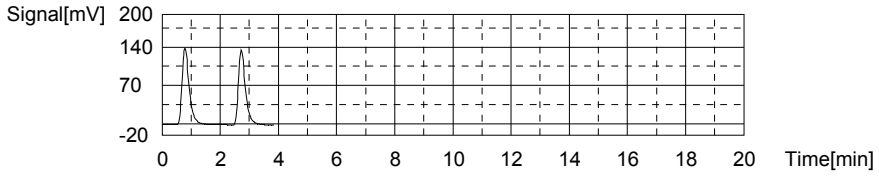
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.825mg/L TC:5.135mg/L IC:3.310mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	237.1	5.203mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 3:55:52 PM
2	231.3	5.066mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 4:00:02 PM

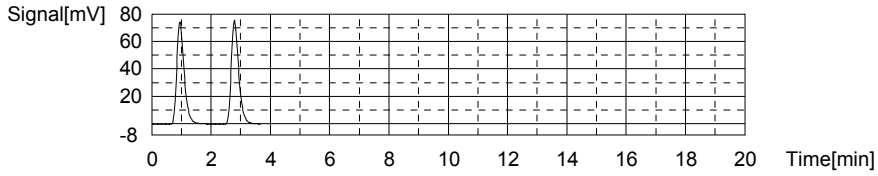
Mean Area 234.2
Mean Conc. 5.135mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	127.9	3.270mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 4:04:45 PM
2	130.6	3.350mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 4:09:15 PM

Mean Area 129.3
Mean Conc. 3.310mg/L



Sample

Sample Name: WG623487-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

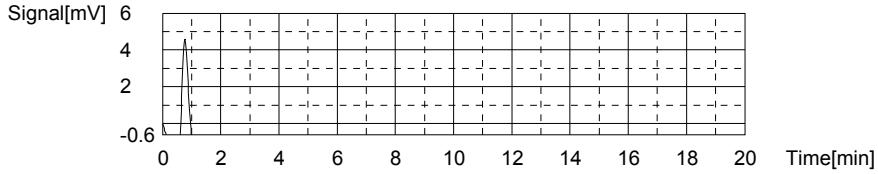
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.05322mg/L TC:-0.1625mg/L IC:-0.2157mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.986	-0.1625mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_09_32_5	7/27/2017 4:14:18 PM

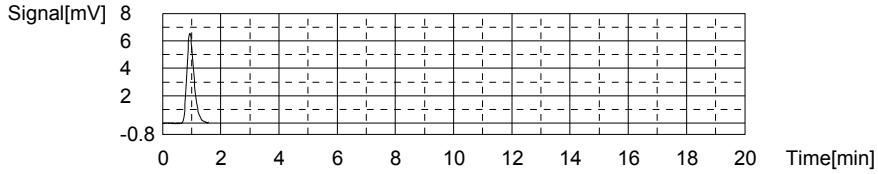
Mean Area 9.986
Mean Conc. -0.1625mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.19	-0.2157mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 4:18:19 PM

Mean Area 11.19
Mean Conc. -0.2157mg/L



Sample

Sample Name: WG623487-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

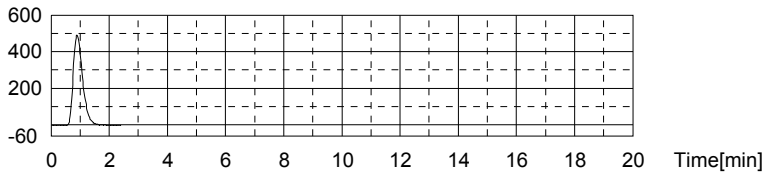
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.79mg/L TC:25.59mg/L IC:-0.2017mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1100	25.59mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 4:26:09 PM

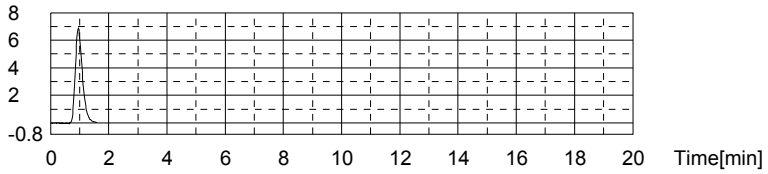
Mean Area 1100
Mean Conc. 25.59mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.66	-0.2017mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 4:30:36 PM

Mean Area 11.66
Mean Conc. -0.2017mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

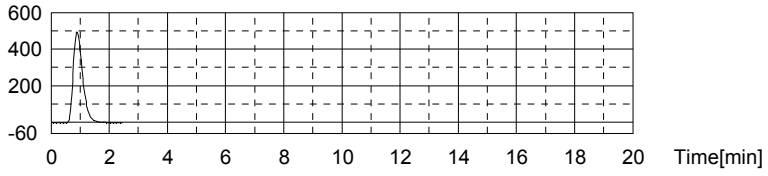
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.07mg/L TC:25.85mg/L IC:-0.2199mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1111	25.85mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 4:38:30 PM

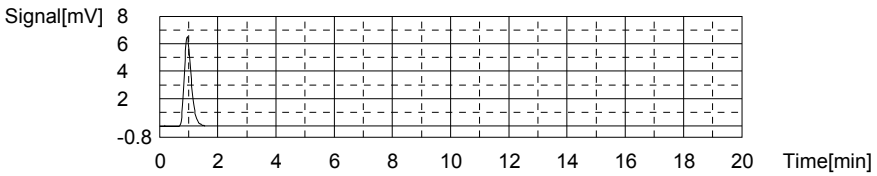
Mean Area 1111
Mean Conc. 25.85mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.05	-0.2199mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 4:42:55 PM

Mean Area 11.05
Mean Conc. -0.2199mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

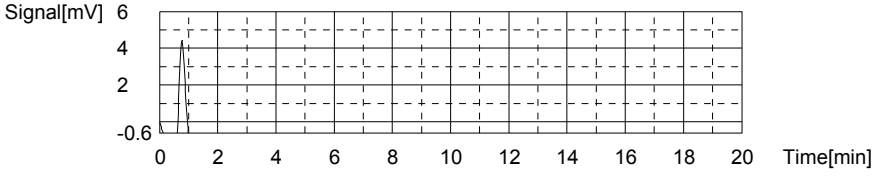
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.06884mg/L TC:-0.1666mg/L IC:-0.2355mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.813	-0.1666mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 4:47:59 PM

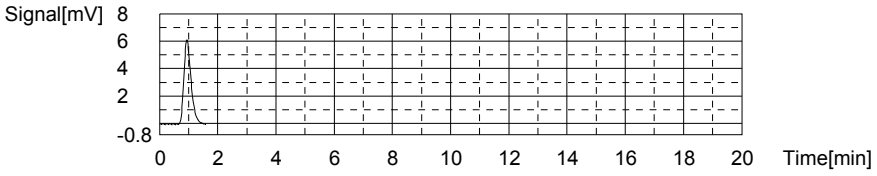
Mean Area 9.813
Mean Conc. -0.1666mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.53	-0.2355mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 4:52:02 PM

Mean Area 10.53
Mean Conc. -0.2355mg/L



Sample

Sample Name: WG623487-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

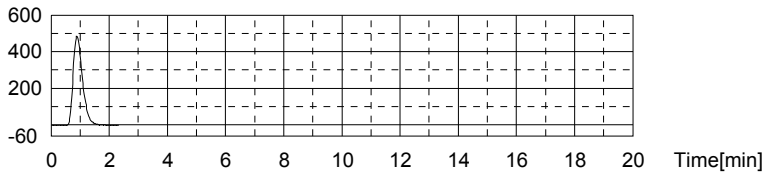
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.44mg/L TC:25.24mg/L IC:-0.2059mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1085	25.24mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 4:59:48 PM

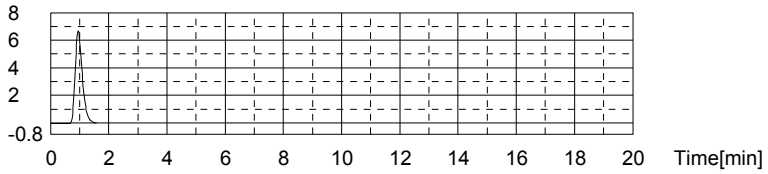
Mean Area 1085
Mean Conc. 25.24mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.52	-0.2059mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 5:04:14 PM

Mean Area 11.52
Mean Conc. -0.2059mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

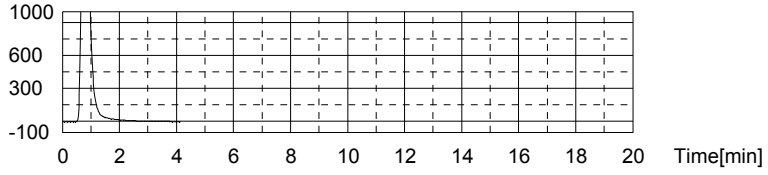
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-12.55mg/L TC:82.32mg/L IC:94.86mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3501	82.32mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 5:13:50 PM

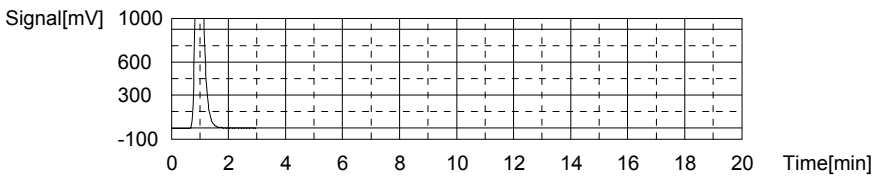
Mean Area 3501
Mean Conc. 82.32mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3195	94.86mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 5:20:02 PM

Mean Area 3195
Mean Conc. 94.86mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

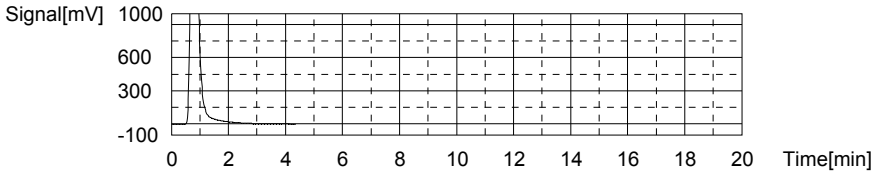
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-8.887mg/L TC:79.32mg/L IC:88.20mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3374	79.32mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 5:29:50 PM

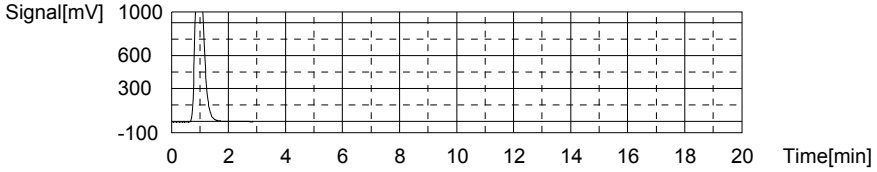
Mean Area 3374
Mean Conc. 79.32mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2972	88.20mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 5:35:56 PM

Mean Area 2972
Mean Conc. 88.20mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

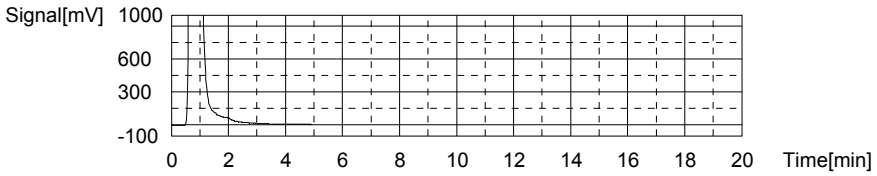
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-23.90mg/L TC:122.2mg/L IC:146.1mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	5188	122.2mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 5:46:18 PM

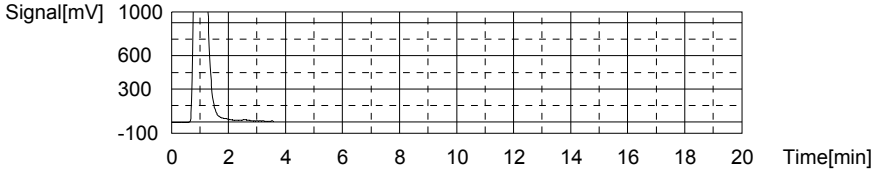
Mean Area 5188
Mean Conc. 122.2mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	4910	146.1mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 5:53:38 PM

Mean Area 4910
Mean Conc. 146.1mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

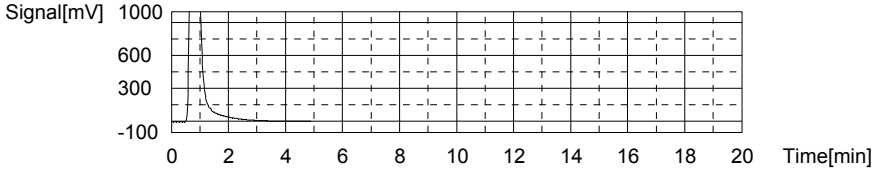
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-10.36mg/L TC:99.73mg/L IC:110.1mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	4238	99.73mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 6:03:58 PM

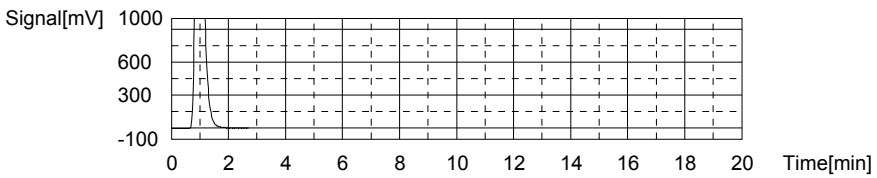
Mean Area 4238
Mean Conc. 99.73mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3705	110.1mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 6:10:14 PM

Mean Area 3705
Mean Conc. 110.1mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

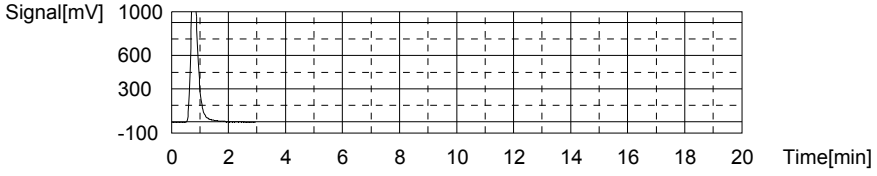
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:7.027mg/L TC:51.84mg/L IC:44.81mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2211	51.84mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 6:18:38 PM

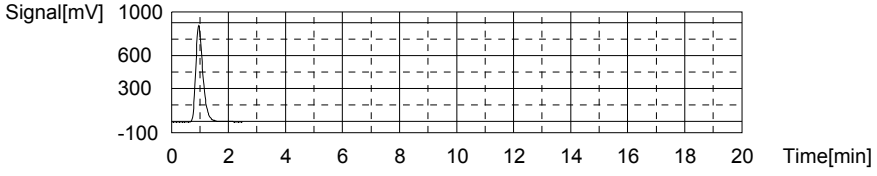
Mean Area 2211
Mean Conc. 51.84mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1519	44.81mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 6:24:22 PM

Mean Area 1519
Mean Conc. 44.81mg/L



Sample

Sample Name: L17071248-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

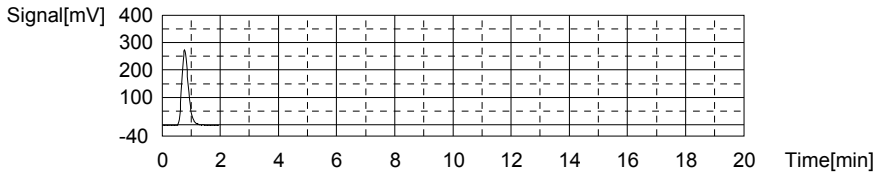
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.9079mg/L TC:9.723mg/L IC:8.815mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	428.4	9.723mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 6:31:47 PM

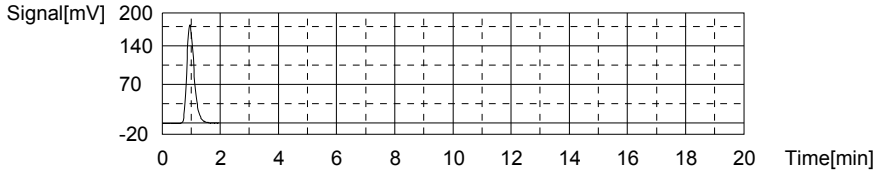
Mean Area 428.4
Mean Conc. 9.723mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	313.6	8.815mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 6:36:42 PM

Mean Area 313.6
Mean Conc. 8.815mg/L



Sample

Sample Name: L17071248-02
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

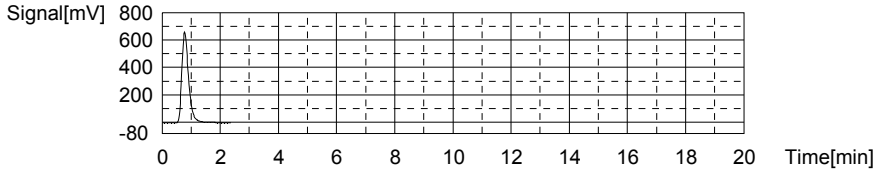
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.870mg/L TC:24.65mg/L IC:20.78mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1060	24.65mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 6:44:31 PM

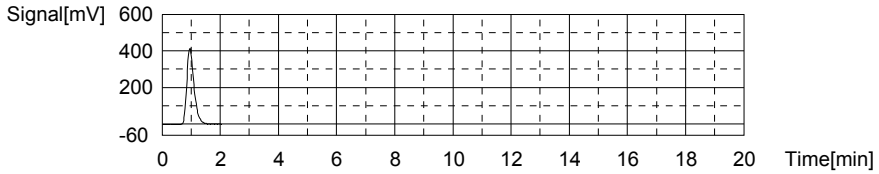
Mean Area 1060
Mean Conc. 24.65mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	714.1	20.78mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 6:49:33 PM

Mean Area 714.1
Mean Conc. 20.78mg/L



Sample

Sample Name: L17071248-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

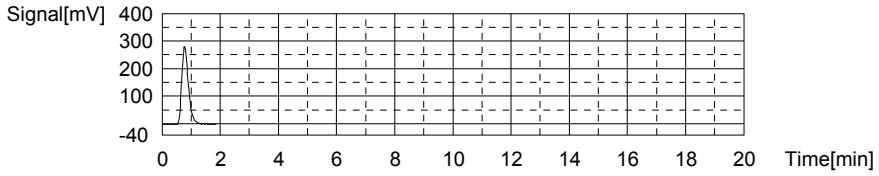
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.347mg/L TC:10.15mg/L IC:8.806mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	446.6	10.15mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 6:56:52 PM

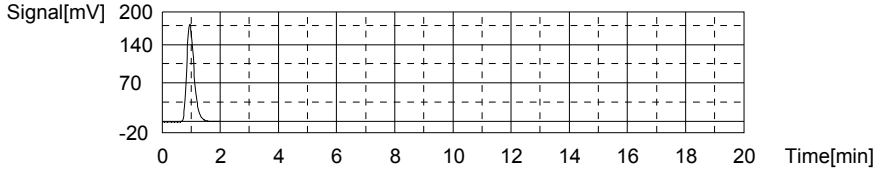
Mean Area 446.6
Mean Conc. 10.15mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	313.3	8.806mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 7:01:48 PM

Mean Area 313.3
Mean Conc. 8.806mg/L



Sample

Sample Name: L17071248-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

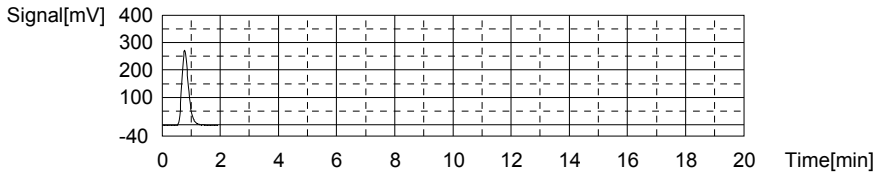
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.117mg/L TC:9.825mg/L IC:8.708mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	432.7	9.825mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:09:09 PM

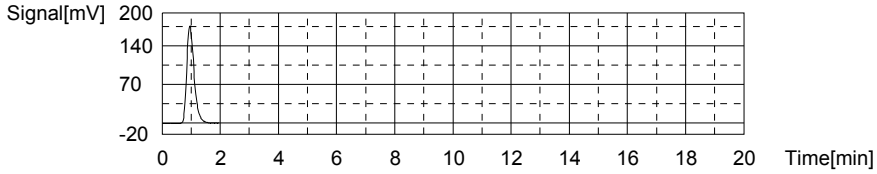
Mean Area 432.7
Mean Conc. 9.825mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	310.0	8.708mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 7:14:01 PM

Mean Area 310.0
Mean Conc. 8.708mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

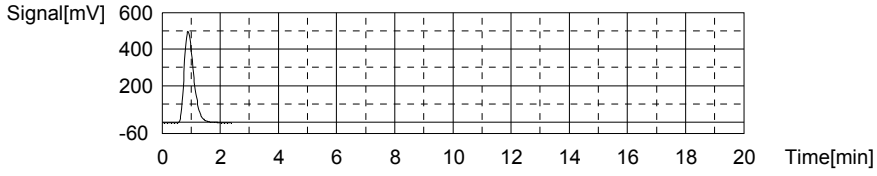
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.50mg/L TC:26.32mg/L IC:-0.1721mg/L

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_57	7/27/2017 7:21:52 PM

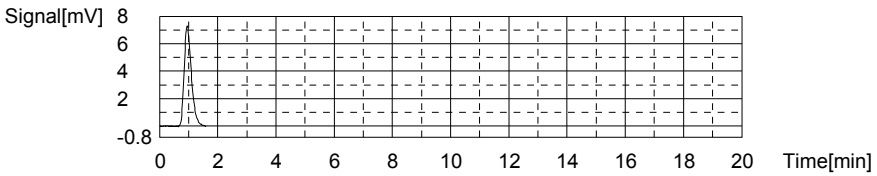
Mean Area 1131
Mean Conc. 26.32mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.65	-0.1721mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 7:26:20 PM

Mean Area 12.65
Mean Conc. -0.1721mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

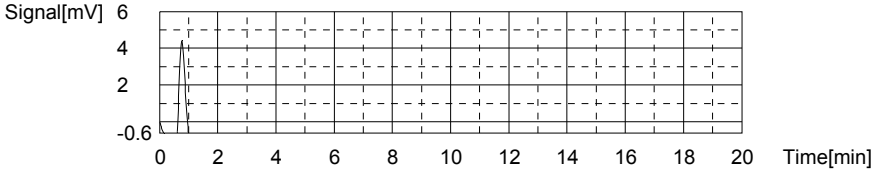
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.07628mg/L TC:-0.1699mg/L IC:-0.2462mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.673	-0.1699mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:31:24 PM

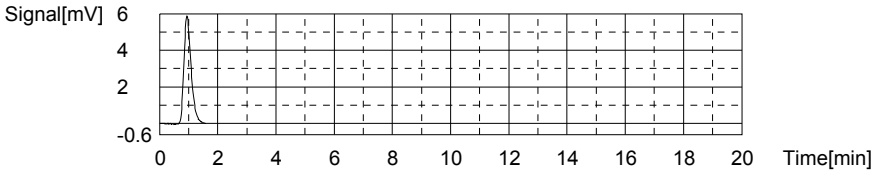
Mean Area 9.673
Mean Conc. -0.1699mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.17	-0.2462mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 7:35:24 PM

Mean Area 10.17
Mean Conc. -0.2462mg/L



Sample

Sample Name: L17071246-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

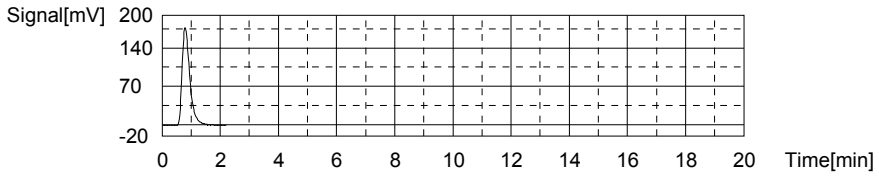
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.193mg/L TC:7.401mg/L IC:4.207mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	330.1	7.401mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:43:04 PM

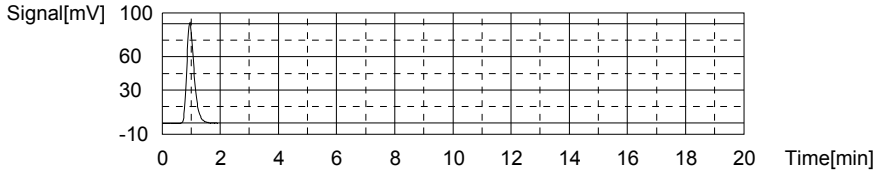
Mean Area 330.1
Mean Conc. 7.401mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	159.3	4.207mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 7:47:52 PM

Mean Area 159.3
Mean Conc. 4.207mg/L



Sample

Sample Name: L17071249-02
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

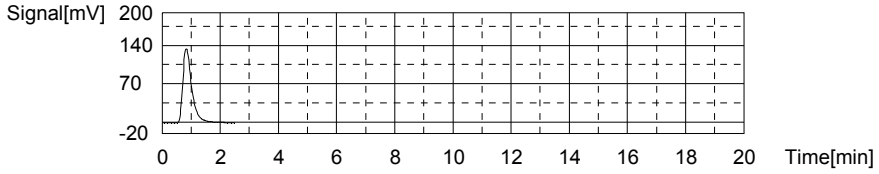
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.885mg/L TC:6.460mg/L IC:1.575mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	290.3	6.460mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 7:55:50 PM

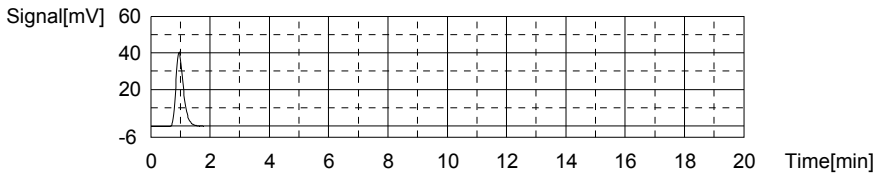
Mean Area 290.3
Mean Conc. 6.460mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	71.16	1.575mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 8:00:29 PM

Mean Area 71.16
Mean Conc. 1.575mg/L



Sample

Sample Name: L17071249-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

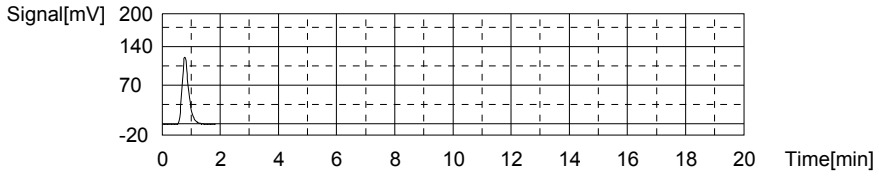
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.295mg/L TC:4.251mg/L IC:2.956mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	196.8	4.251mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 8:07:47 PM

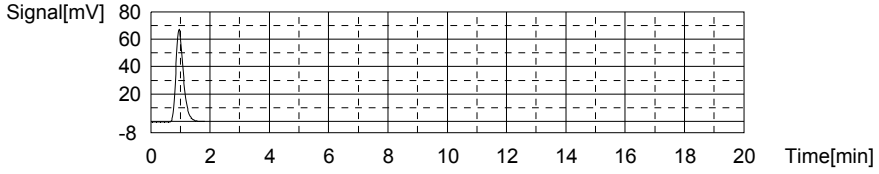
Mean Area 196.8
Mean Conc. 4.251mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	117.4	2.956mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 8:12:31 PM

Mean Area 117.4
Mean Conc. 2.956mg/L



Sample

Sample Name: L17071249-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

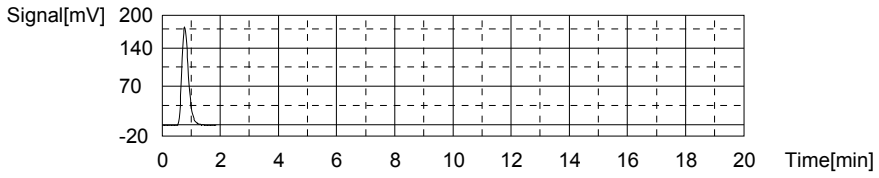
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.8785mg/L TC:6.373mg/L IC:5.494mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	286.6	6.373mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 8:19:50 PM

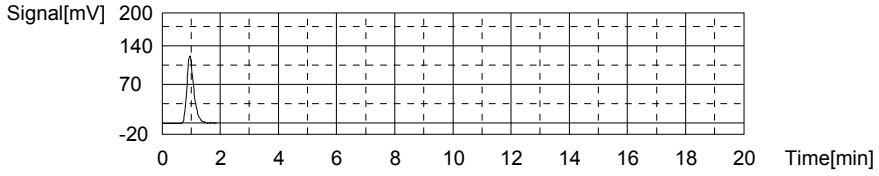
Mean Area 286.6
Mean Conc. 6.373mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	202.4	5.494mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 8:24:36 PM

Mean Area 202.4
Mean Conc. 5.494mg/L



Sample

Sample Name: L17071280-01 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

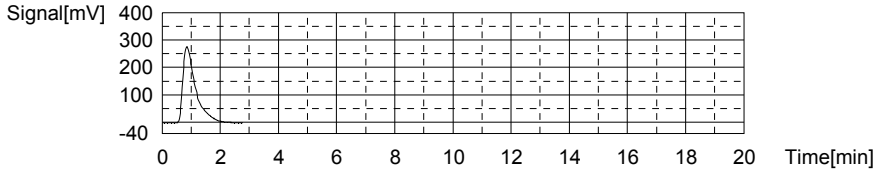
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:14.79mg/L TC:19.41mg/L IC:4.619mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	838.5	19.41mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 8:32:50 PM

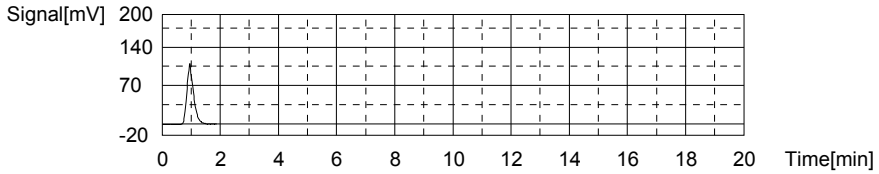
Mean Area 838.5
Mean Conc. 19.41mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	173.1	4.619mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 8:37:36 PM

Mean Area 173.1
Mean Conc. 4.619mg/L



Sample

Sample Name: WG623487-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

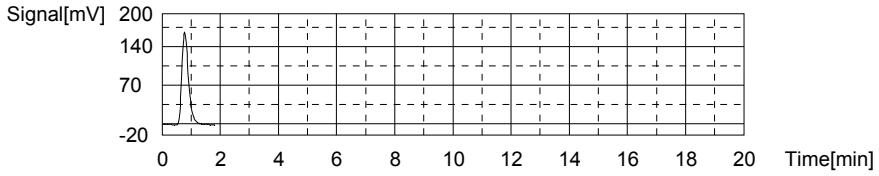
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.9309mg/L TC:5.903mg/L IC:4.972mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	266.7	5.903mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/27/2017 8:44:52 PM

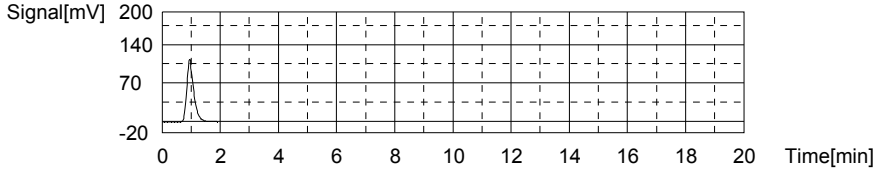
Mean Area 266.7
Mean Conc. 5.903mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	184.9	4.972mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 8:49:39 PM

Mean Area 184.9
Mean Conc. 4.972mg/L



Sample

Sample Name: WG623487-05 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

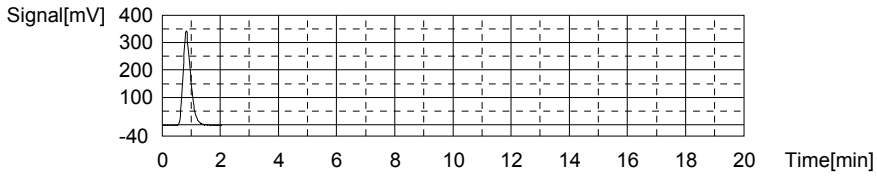
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:11.89mg/L TC:14.22mg/L IC:2.329mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	618.7	14.22mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 8:57:09 PM

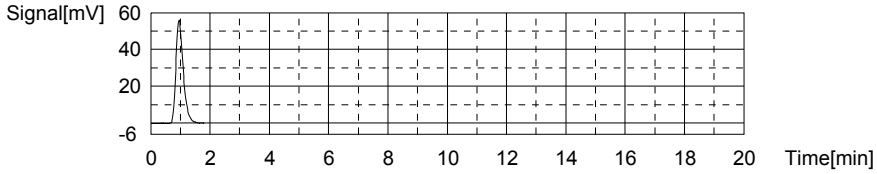
Mean Area 618.7
Mean Conc. 14.22mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	96.39	2.329mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 9:01:51 PM

Mean Area 96.39
Mean Conc. 2.329mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

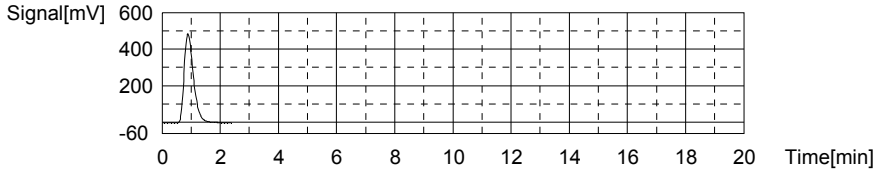
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.32mg/L TC:25.09mg/L IC:-0.2268mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1079	25.09mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/27/2017 9:09:43 PM

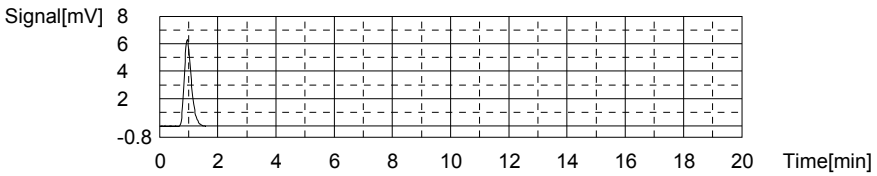
Mean Area 1079
Mean Conc. 25.09mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.82	-0.2268mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 9:14:13 PM

Mean Area 10.82
Mean Conc. -0.2268mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

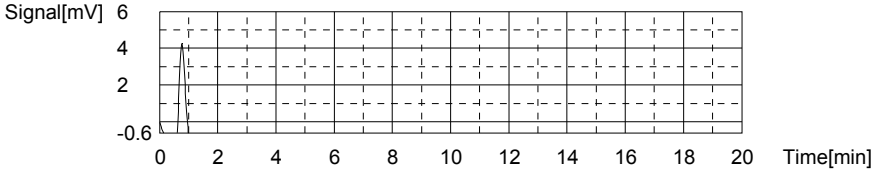
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.09012mg/L TC:-0.1770mg/L IC:-0.2671mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.374	-0.1770mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/27/2017 9:19:16 PM

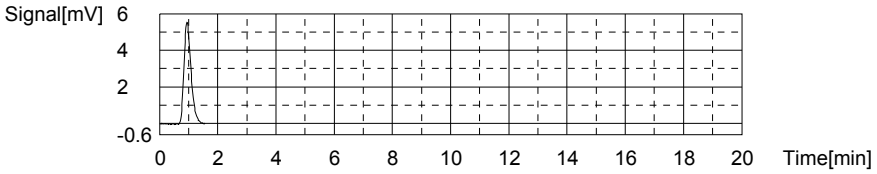
Mean Area 9.374
Mean Conc. -0.1770mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.470	-0.2671mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/27/2017 9:23:14 PM

Mean Area 9.470
Mean Conc. -0.2671mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

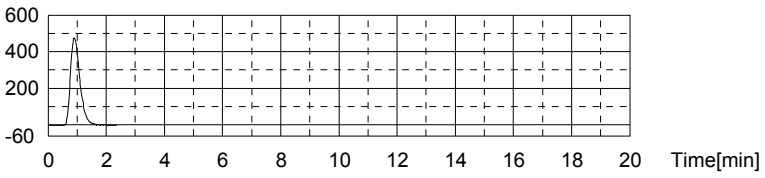
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.33mg/L TC:25.14mg/L IC:-0.1913mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1081	25.14mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/28/2017 7:13:56 AM

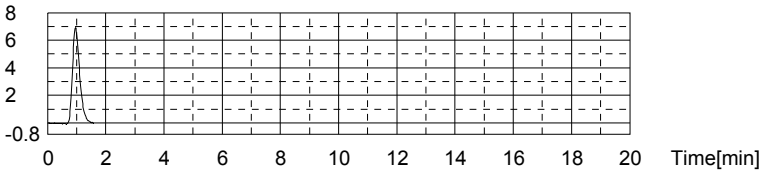
Mean Area 1081
Mean Conc. 25.14mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.01	-0.1913mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 7:18:24 AM

Mean Area 12.01
Mean Conc. -0.1913mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

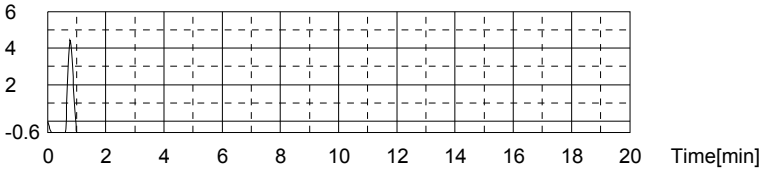
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.08801mg/L TC:-0.1682mg/L IC:-0.2562mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.747	-0.1682mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/28/2017 7:23:27 AM

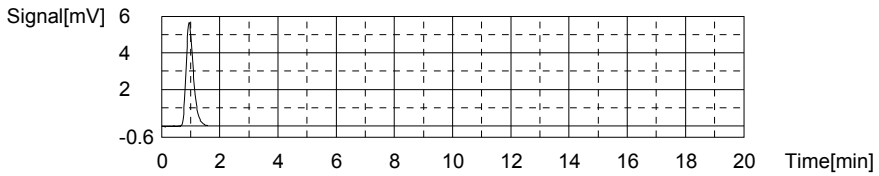
Mean Area 9.747
Mean Conc. -0.1682mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.836	-0.2562mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 7:27:24 AM

Mean Area 9.836
Mean Conc. -0.2562mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

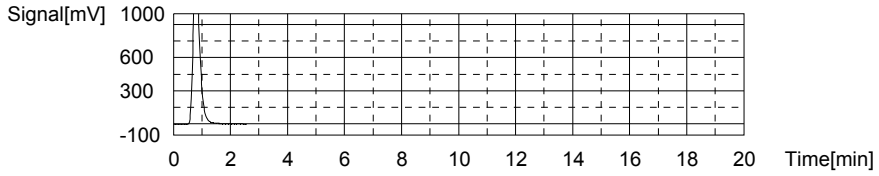
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.107mg/L TC:51.53mg/L IC:48.43mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2198	51.53mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/28/2017 7:35:27 AM

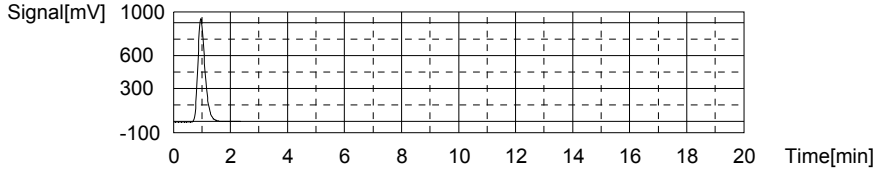
Mean Area 2198
Mean Conc. 51.53mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1640	48.43mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 7:40:51 AM

Mean Area 1640
Mean Conc. 48.43mg/L



Sample

Sample Name: L17071209-03 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

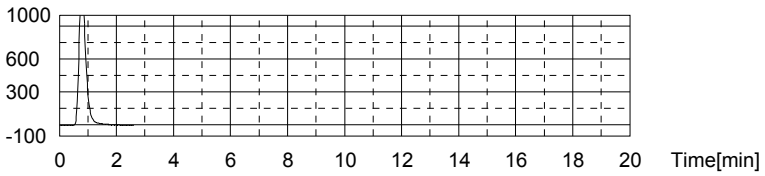
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.714mg/L TC:48.56mg/L IC:42.84mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2072	48.56mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/28/2017 7:48:57 AM

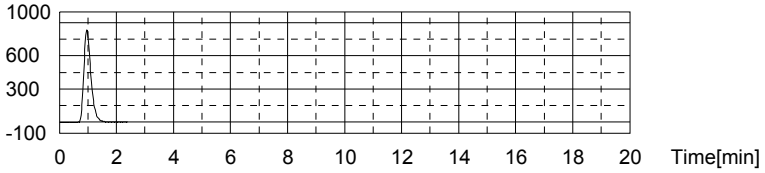
Mean Area 2072
Mean Conc. 48.56mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1453	42.84mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 7:54:24 AM

Mean Area 1453
Mean Conc. 42.84mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

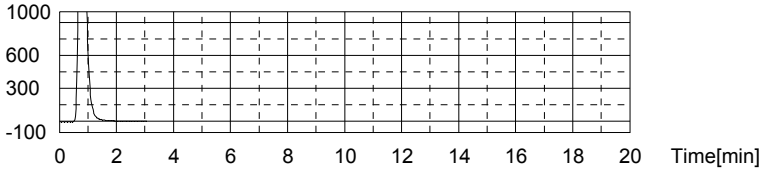
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-13.36mg/L TC:73.17mg/L IC:86.53mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3114	73.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/28/2017 8:02:57 AM

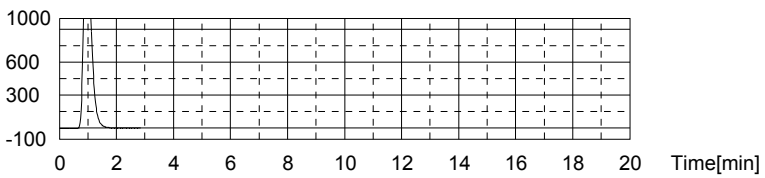
Mean Area 3114
Mean Conc. 73.17mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2916	86.53mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 8:09:04 AM

Mean Area 2916
Mean Conc. 86.53mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

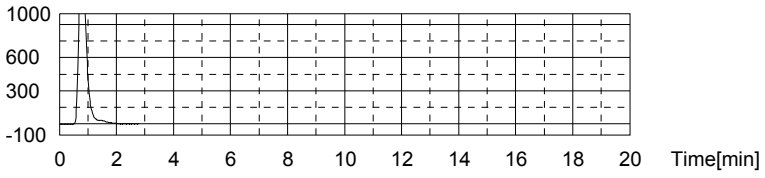
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.5411mg/L TC:62.50mg/L IC:61.95mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2662	62.50mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/28/2017 8:17:20 AM

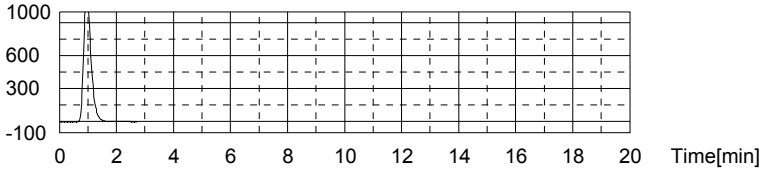
Mean Area 2662
Mean Conc. 62.50mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2093	61.95mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 8:23:15 AM

Mean Area 2093
Mean Conc. 61.95mg/L



Sample

Sample Name: L17071209-07 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

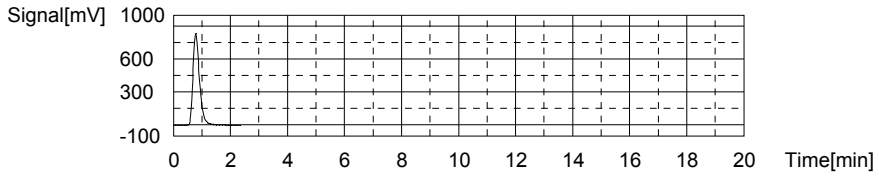
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.828mg/L TC:31.12mg/L IC:27.29mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1334	31.12mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/28/2017 8:31:05 AM

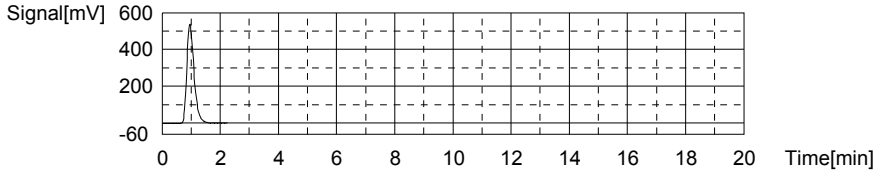
Mean Area 1334
Mean Conc. 31.12mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	932.3	27.29mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 8:36:18 AM

Mean Area 932.3
Mean Conc. 27.29mg/L



Sample

Sample Name: L17071209-02 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

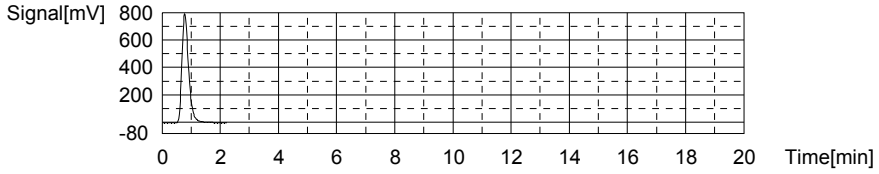
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.169mg/L TC:29.39mg/L IC:26.23mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1261	29.39mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/28/2017 8:46:25 AM

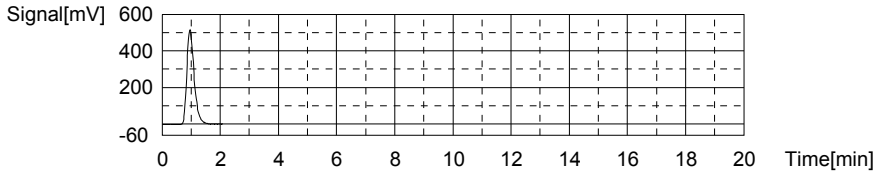
Mean Area 1261
Mean Conc. 29.39mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	896.6	26.23mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 8:51:34 AM

Mean Area 896.6
Mean Conc. 26.23mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

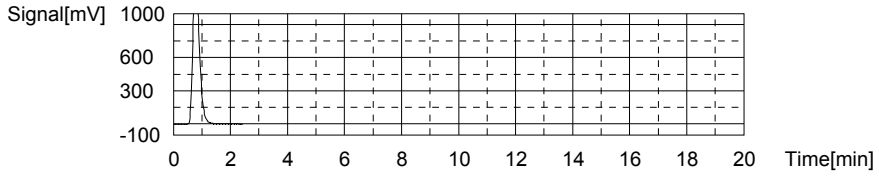
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.589mg/L TC:50.49mg/L IC:48.90mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2154	50.49mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/28/2017 8:59:28 AM

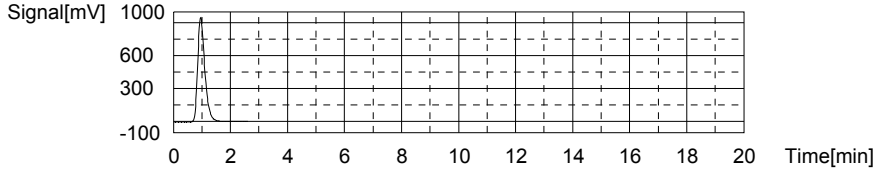
Mean Area 2154
Mean Conc. 50.49mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1656	48.90mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 9:05:11 AM

Mean Area 1656
Mean Conc. 48.90mg/L



Sample

Sample Name: L17071209-06 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

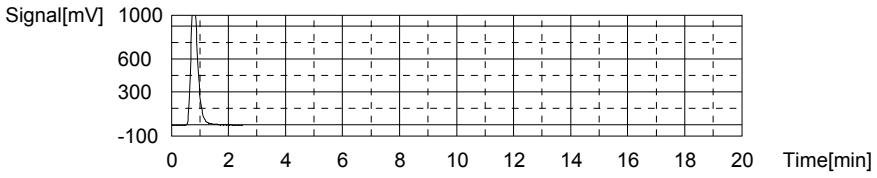
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.666mg/L TC:46.48mg/L IC:40.81mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1984	46.48mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/28/2017 9:13:10 AM

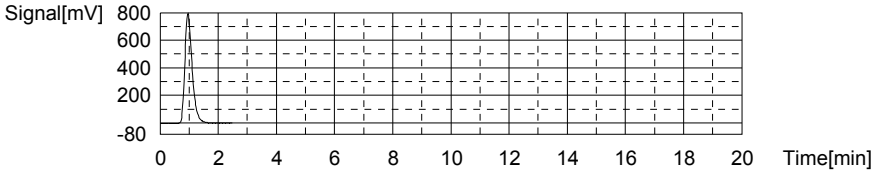
Mean Area 1984
Mean Conc. 46.48mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1385	40.81mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 9:18:43 AM

Mean Area 1385
Mean Conc. 40.81mg/L



Sample

Sample Name: L17071209-05 (20)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

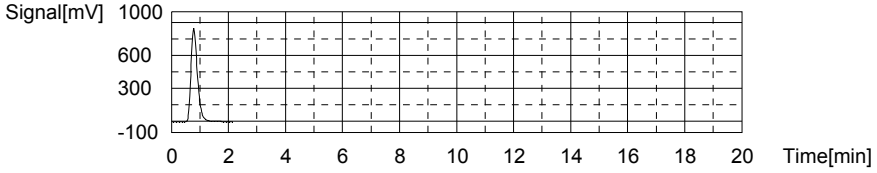
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.153mg/L TC:31.17mg/L IC:27.01mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1336	31.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_57	7/28/2017 9:33:53 AM

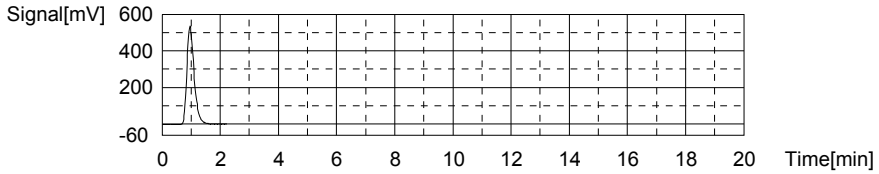
Mean Area 1336
Mean Conc. 31.17mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	923.0	27.01mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 9:39:08 AM

Mean Area 923.0
Mean Conc. 27.01mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

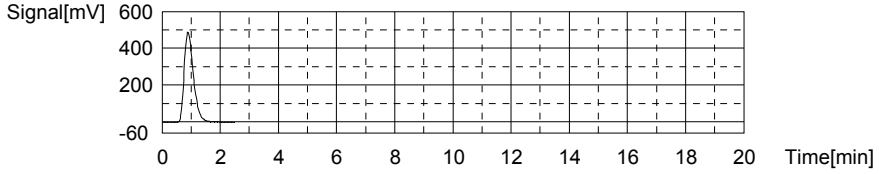
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.28mg/L TC:25.19mg/L IC:-0.08614mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1083	25.19mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	7/28/2017 9:47:06 AM

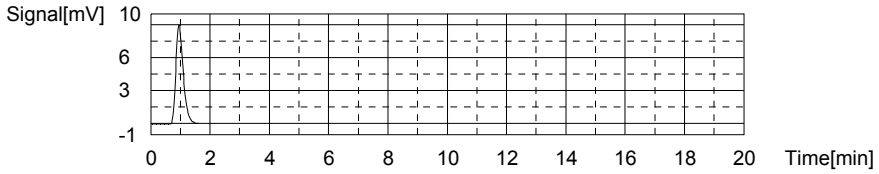
Mean Area 1083
Mean Conc. 25.19mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	15.53	-0.08614mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 9:51:39 AM

Mean Area 15.53
Mean Conc. -0.08614mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

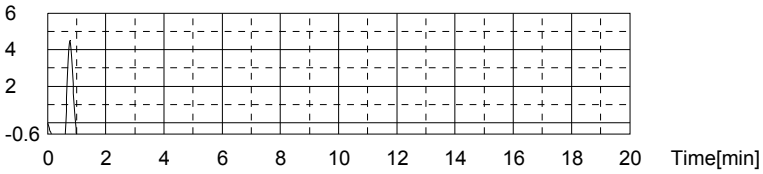
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.07250mg/L TC:-0.1689mg/L IC:-0.2414mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.715	-0.1689mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	7/28/2017 9:56:41 AM

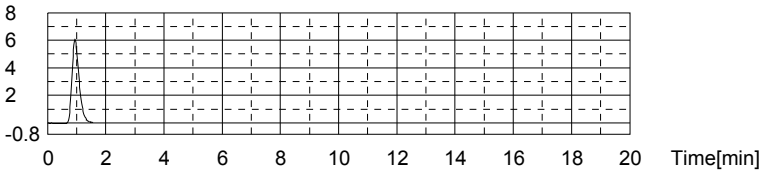
Mean Area 9.715
Mean Conc. -0.1689mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.33	-0.2414mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	7/28/2017 10:00:42 AM

Mean Area 10.33
Mean Conc. -0.2414mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
August 9, 2017

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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	

Microbac Laboratories Inc.
List of Valid Qualifiers
August 09, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
August 09, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

CHAIN OF CUSTODY

Name Of Lab Shipping To: MICROBAC (740) 373-4071 ATTN: STEPHANIE MOSSBURG

Project: AECOM
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No.
60256135.GWTPT
HRUMAR16

Job:
GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES

Prepared By:
Scott Beesinger

P.O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: AMMONIA-N	ORTHO-PHOSPHATE	TOTAL ORGANIC CARBON	PERCHLORATE						Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650-6460	Water	07/26/17 / 15:00		2	X		X							H2SO4	
LH18/24-SP650-6460	Water	07/26/17 / 15:00		2		X		X						NONE	

Additional Remarks: **Standard TAT on all parameters** Send results to Linda Raabe at linda.raabe@aecom.com or call at 210-253-7518

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/26/17	15:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

Microbac OVD
Received: 07/27/2017 11:05
By: BRENDA GREGORY 221000103854

Brenda Gregory

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC®

Cooler ID 3854

COOLER TEMP >6° C LOG

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

CBD 7/27/17

pH Exceptions

pH Lot # HC1601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

CBD 7/27/17

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

CBD 7/27/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17071280
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 07-AUG-2017

Samplenum	Container ID	Products
L17071280-01	941597	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	27-JUL-2017 12:31	CLS		
2	ANALYZ	W1	SEM	07-AUG-2017 15:48	JWR	BRG	
3	STORE	SEM	A1	08-AUG-2017 14:56	BRG	JWR	

Samplenum	Container ID	Products
L17071280-01	941598	826-SPE 827UL-SPE PO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	27-JUL-2017 12:31	CLS		
2	ANALYZ	W1	WET	27-JUL-2017 13:07	ADG	CLS	
3	STORE	DIG	A2	01-AUG-2017 08:11	BRG	ADG	

Samplenum	Container ID	Products
L17071280-01	941599	NO3 PO4 TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	F1	27-JUL-2017 12:31	CLS		<2
2	ANALYZ	F1	WET	27-JUL-2017 13:52	ADG	CLS	
3	STORE	DIG	A2	01-AUG-2017 08:11	BRG	ADG	

Samplenum	Container ID	Products
L17071280-01	941600	NH3 TOC NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	27-JUL-2017 12:31	CLS		<2
2	ANALYZ	W1	WET	31-JUL-2017 08:11	EPT	CLS	
3	STORE	WET	A1	01-AUG-2017 17:02	BRG	EPT	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L17071296

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on August 02 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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
LH18/24-SP650-6459 : all 3 vials have headspace >6mm. CLS Trip Blank : both vials have headspace >6mm.	Client notified, please proceed. ALS

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00112873	H	0.0		J4616882005	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)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	No

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP650-6459	L17071296-01	07/26/2017 15:00	07/27/2017 11:05
TRIP BLANK	L17071296-02	07/26/2017 00:01	07/27/2017 11:05

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

Microbac Laboratories
Case Narrative

Login Number: L17071296
Department: Volatiles
Analyst: Tiffany Bailey

METHOD

Preparation SW-846 5030B/5030C/5035A

Analysis SW-846 8260B

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: 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 MS/MSD results were not associated with this sample delivery group (SDG), due to insufficient volume of sample. The laboratory included an LCS and LCS duplicate in the preparation batch in lieu of the NELAC prescribed MS/MSD. Microbac Laboratories recommends site specific MS/MSD samples to avoid possible data qualifications.

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: 127972
Approved By: Anthony Canter

Microbac Laboratories
Case Narrative

Login Number: L17071296
Department: General Chromatography
Analyst: Craig Smith

METHOD

Analysis EPA300.0/SW846 9056

HOLDING TIMES

Sample Analysis: 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 MS/MSD results were not associated with this sample delivery group.

SAMPLES

Samples: Sample 01 was analyzed at a dilution only due to its pre-run screen result for CL which was 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: 127904
Approved By: Eric Lawson

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Anthony Canter
LRC Date:	2017-08-01 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Anthony Canter		Analyst I	2017-08-01 21:06:41

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Anthony Canter
LRC Date:	2017-08-01 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?	X				
Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Anthony Canter
LRC Date:	2017-08-01 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Anthony Canter
LRC Date:	2017-08-01 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Anthony Canter
LRC Date:	2017-08-01 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Anthony Canter
LRC Date:	2017-08-01 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG623569	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-28 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-07-28 16:01:47

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG623569	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-28 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG623569	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-28 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG623569	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-28 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG623569	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-28 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17071296
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG623569	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-07-28 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071296-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS6
Client ID:	LH18/24-SP650-6459	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	06/19/2017 17:50
Workgroup #:	WG623675	**Analyst:**	TMB	**Run Date:**	07/28/2017 14:59
Collect Date:	07/26/2017 15:00	**Dilution:**	1	**File ID:**	6M149069
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	6.12	J	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.410	J	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	117	70	120	
4-Bromofluorobenzene	93.4	75	120	
Dibromofluoromethane	110	85	115	
Toluene-d8	103	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071296-01	**PrePrep Method:**	N/A	**Instrument:**	IC1
Client ID:	LH18/24-SP650-6459	**Prep Method:**	9056	**Prep Date:**	07/27/2017 17:32
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	02/14/2017 15:22
Workgroup #:	WG623569	**Analyst:**	CAS	**Run Date:**	07/27/2017 21:29
Collect Date:	07/26/2017 15:00	**Dilution:**	5	**File ID:**	I1_072717-16
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	30.9		10.0	5.00	2.50

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071296-01	**PrePrep Method:**	N/A	**Instrument:**	IC1
Client ID:	LH18/24-SP650-6459	**Prep Method:**	9056	**Prep Date:**	07/27/2017 17:32
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	02/14/2017 15:22
Workgroup #:	WG623569	**Analyst:**	CAS	**Run Date:**	07/27/2017 21:47
Collect Date:	07/26/2017 15:00	**Dilution:**	50	**File ID:**	I1_072717-17
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	688		20.0	10.0	5.00

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071296-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS6
Client ID:	TRIP BLANK	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	06/19/2017 17:50
Workgroup #:	WG623675	**Analyst:**	TMB	**Run Date:**	07/28/2017 14:29
Collect Date:	07/26/2017 00:01	**Dilution:**	1	**File ID:**	6M149068
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	5.59	J	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.254	J	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.500	U	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	116	70	120	
4-Bromofluorobenzene	94.1	75	120	
Dibromofluoromethane	108	85	115	
Toluene-d8	102	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.1 Volatiles Data

2.1.1 Volatiles GCMS Data (8260)

2.1.1.1 Summary Data

Microbac Laboratories
Case Narrative

Login Number: L17071296
Department: Volatiles
Analyst: Tiffany Bailey

METHOD

Preparation SW-846 5030B/5030C/5035A

Analysis SW-846 8260B

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: 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 MS/MSD results were not associated with this sample delivery group (SDG), due to insufficient volume of sample. The laboratory included an LCS and LCS duplicate in the preparation batch in lieu of the NELAC prescribed MS/MSD. Microbac Laboratories recommends site specific MS/MSD samples to avoid possible data qualifications.

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: 127972
Approved By: Anthony Canter

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071296-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS6
Client ID:	LH18/24-SP650-6459	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	06/19/2017 17:50
Workgroup #:	WG623675	**Analyst:**	TMB	**Run Date:**	07/28/2017 14:59
Collect Date:	07/26/2017 15:00	**Dilution:**	1	**File ID:**	6M149069
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	6.12	J	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.410	J	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	117	70	120	
4-Bromofluorobenzene	93.4	75	120	
Dibromofluoromethane	110	85	115	
Toluene-d8	103	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071296-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS6
Client ID:	TRIP BLANK	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	06/19/2017 17:50
Workgroup #:	WG623675	**Analyst:**	TMB	**Run Date:**	07/28/2017 14:29
Collect Date:	07/26/2017 00:01	**Dilution:**	1	**File ID:**	6M149068
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	5.59	J	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.254	J	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.500	U	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	116	70	120	
4-Bromofluorobenzene	94.1	75	120	
Dibromofluoromethane	108	85	115	
Toluene-d8	102	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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

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

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(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 quantiation 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: HPMS6 Dataset: 061617
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54224

Internal Standard: STD82231 Surrogate Standard: STD82231
CCV: STD82307; STD8199 LCS: STD82370; STD82415 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618225; WG618258

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M148029	WG618224-01 50ng BFB STD 8260	NA	1	1	STD81972	06/16/17 11:55
6M148030	WG618224-02 50ug/L CCV STD 8260	NA	1	1	STD88307	06/16/17 12:20
6M148031	WG618224-02 50ug/L CCV STD 8260	NA	1	1	STD88307	06/16/17 12:51
6M148032	WG618224-01 50ng BFB STD 8260	NA	1	1	STD81972	06/16/17 13:42
6M148033	WG618224-02 50ug/L CCV STD 8260	NA	1	1	STD82307	06/16/17 14:06
6M148034	BFB CHECK FIL \#2	NA	1	1	STD81972	06/16/17 14:36
6M148035	BFB CHECK FIL \#2	NA	1	1	STD81972	06/16/17 14:49
6M148036	WG618258-01 50ng BFB STD 8260	NA	1	1	STD81972	06/16/17 15:02
6M148037	WG618258-02 5ug/L STD A9/FOO	NA	1	1	STD82199	06/16/17 15:28
6M148038	WG618258-03 20ug/L STD A9/FOO	NA	1	1	STD82199	06/16/17 15:58
6M148039	WG618258-04 50ug/L STD A9/FOO	NA	1	1	STD82199	06/16/17 16:28
6M148040	WG618258-05 100ug/L STD A9/FOO	NA	1	1	STD82199	06/16/17 16:57
6M148041	WG618258-06 200ug/L STD A9/FOO	NA	1	1	STD82199	06/16/17 17:27
6M148042	WG618258-07 300ug/L STD A9/FOO	NA	1	1	STD82199	06/16/17 17:57
6M148043	WG618258-08 400ug/L STD A9/FOO	NA	1	1	STD82199	06/16/17 18:27
6M148044	WG618258-09 500ug/L STD A9/FOO	NA	1	1	STD82199	06/16/17 18:57
6M148045	RINSE	NA	1	1		06/16/17 19:27
6M148046	RINSE	NA	1	1		06/16/17 19:58
6M148047	WG618258-10 100ug/L ALT SRC STD A9/F	NA	1	1	STD82415	06/16/17 20:29
6M148048	WG618224-02 50ug/L CCV STD	NA	1	1	STD82307	06/16/17 20:59
6M148049	WG618225-02 20ug/L LCS STD 624	NA	2	1	STD82370	06/16/17 21:30
6M148050	WG618225-03 20ug/L LCS STD 624	NA	2	1	STD82370	06/16/17 22:00
6M148051	RINSE	NA	2	1		06/16/17 22:31
6M148052	WG618225-01 VBLK0616 STD 624	NA	2	1		06/16/17 23:01
6M148053	L17060815-04 B 624-SPE	6	2	1		06/16/17 23:32
6M148054	L17060815-08 B 624-SPE	7	2	1		06/17/17 00:02
6M148055	RINSE	NA	2	1		06/17/17 00:32
6M148056	L17060911-01 A 624-SPE5	6	2	1		06/17/17 01:02
6M148057	L17060918-01 A 624-SPE	6	2	1		06/17/17 01:33
6M148058	L17060919-01 A 624-SPE	6	2	1		06/17/17 02:02
6M148059	L17060920-01 A 624-SPE	6	2	1		06/17/17 02:33
6M148060	L17060921-01 A 624-SPE	<2	2	1		06/17/17 03:03
6M148061	L17060924-01 A 624-SPE	6	2	1		06/17/17 03:33
6M148062	CCV	NA	1	1		06/17/17 04:04

Approved: June 19, 2017

Sarah Vandenberg

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS6 Dataset: 061617
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54224

Internal Standard: STD82231 Surrogate Standard: STD82231
CCV: STD82307; STD8199 LCS: STD82370; STD82415 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618225; WG618258

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M148063	RINSE	NA	1	1		06/17/17 04:35
6M148064	RINSE	NA	1	1		06/17/17 05:05
6M148065	RINSE	NA	1	1		06/17/17 05:36

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2	X			
File ID: 6M148030				
			11-dce was high, DNR.	
3	X			
File ID: 6M148031				
			11-dce was high, DNR.	
5	X			
File ID: 6M148033				
			11-dce was high, DNR.	

Approved: June 19, 2017
Sarah Vandenberg

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS6 Dataset: 061917
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID:

Internal Standard: STD82231 Surrogate Standard: STD82231
CCV: STD82436 LCS: STD82370 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618413

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M148066	RINSE	NA	1	1		06/19/17 09:30
6M148067	RINSE	NA	1	1		06/19/17 10:11
6M148068	WG618413-01 50ng BFB STD 8260	NA	1	1	STD81972	06/19/17 12:50
6M148069	WG618413-02 0.3ug/L STD 8260	NA	1	1	STD82436	06/19/17 13:17
6M148070	WG618413-03 0.4ug/L STD 8260	NA	1	1	STD82436	06/19/17 13:46
6M148071	WG618413-04 1ug/L STD 8260	NA	1	1	STD82436	06/19/17 14:17
6M148072	WG618413-05 2ug/L STD 8260	NA	1	1	STD82436	06/19/17 14:47
6M148073	WG618413-06 5ug/L STD 8260	NA	1	1	STD82436	06/19/17 15:21
6M148074	WG618413-07 20ug/L STD 8260	NA	1	1	STD82436	06/19/17 15:49
6M148075	WG618413-08 50ug/L STD 8260	NA	1	1	STD82436	06/19/17 16:19
6M148076	WG618413-09 100ug/L STD 8260	NA	1	1	STD82436	06/19/17 16:49
6M148077	WG618413-10 200ug/L STD 8260	NA	1	1	STD82436	06/19/17 17:20
6M148078	WG618413-11 300ug/L STD 8260	NA	1	1	STD82436	06/19/17 17:50
6M148079	RINSE	NA	1	1		06/19/17 18:19
6M148080	RINSE	NA	1	1		06/19/17 18:49
6M148081	WG618413-12 20ug/L ALT SRC STD 8260	NA	1	1	STD82370	06/19/17 19:19
6M148082	RINSE	NA	1	1		06/19/17 19:49

Approved: June 21, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS6 Dataset: 072817
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54271

Internal Standard: STD83113 Surrogate Standard: STD83113
CCV: STD83091 LCS: STD83115 MS/MSD: STD83115

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG623676; WG623776

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M149059	WG623672-01 50ng BFB STD 8260	NA	1	1	STD83010	07/28/17 10:07
6M149060	WG623672-02 50ug/L CCV STD 8260	NA	1	1	STD83091	07/28/17 10:32
6M149061	WG000000-01 100ug/L A9 CCV STD 8260	NA	1	1	STD82910	07/28/17 11:02
6M149062	WG623675-01 0728 BLANK STD 8260	NA	1	1		07/28/17 11:32
6M149063	L17070639-01 A 826-REF-BLK	<2	1	1		07/28/17 12:02
6M149064	L17070639-02 A 826-REF-BLK	<2	1	1		07/28/17 12:30
6M149065	L17070639-03 A 826-REF-BLK	<2	1	1		07/28/17 13:00
6M149066	L17070639-04 A 826-REF-BLK	<2	1	1		07/28/17 13:30
6M149067	L17070639-05 A 826-REF-BLK	<2	1	1		07/28/17 14:00
6M149068	L17071296-02 A TB 826-SPE	<2	1	1		07/28/17 14:29
6M149069	L17071296-01 A 826-SPE	<2	1	1		07/28/17 14:59
6M149070	WG623675-02 20ug/L LCS STD 8260	NA	1	1	STD83115	07/28/17 15:29
6M149071	L17071306-06 A MS 826-SPE	<2	1	1	STD83115	07/28/17 15:59
6M149072	L17071306-07 A MSD 826-SPE	<2	1	1	STD83115	07/28/17 16:29
6M149073	L17071209-04 C 1000X D2 826-SPE	<2	1	1000		07/28/17 16:58
6M149074	L17071306-01 A TB 826-SPE	<2	1	1		07/28/17 17:28
6M149075	L17071306-05 A RS 826-SPE	<2	1	1		07/28/17 17:58
6M149076	L17071306-02 A 826-SPE	<2	1	1		07/28/17 18:27
6M149077	L17071306-03 A 826-SPE	<2	1	1		07/28/17 18:57
6M149078	L17071306-04 A 826-SPE	<2	1	1		07/28/17 19:26
6M149079	L17071306-08 A 826-SPE	<2	1	1		07/28/17 19:56
6M149080	L17071374-01 A 826-BETX	<2	1	1		07/28/17 20:25
6M149081	L17071314-01 A 50X 826-TC	NA	17	50		07/28/17 20:55
6M149082	L17071314-02 A 50X 826-TC	NA	17	50		07/28/17 21:25
6M149083	RINSE	NA	1	1		07/28/17 21:55
6M149084	WG623776-02 20ug/L LCS STD 624	NA	2	1	STD83115	07/28/17 22:24
6M149085	WG623776-03 20ug/L LCS2 STD 624	NA	2	1	STD83115	07/28/17 22:54
6M149086	RINSE	NA	2	1		07/28/17 23:23
6M149087	WG623776-01 0728 BLANK STD 624	NA	2	1		07/28/17 23:53
6M149088	L17071304-01 B 500X D1 624-SPE	7	2	500		07/29/17 00:23
6M149089	L17071374-01 A 624-SPE	6	2	1		07/29/17 00:52
6M149090	L17071366-01 A 624-SPE	6	2	1		07/29/17 01:22
6M149091	L17071373-01 A 624-SPE	6	2	1		07/29/17 01:52
6M149092	L17071391-01 A 624-SPE	13	2	1		07/29/17 02:21

Approved: July 31, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS6 Dataset: 072817
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID: 54271

Internal Standard: STD83113 Surrogate Standard: STD83113
CCV: STD83091 LCS: STD83115 MS/MSD: STD83115

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG623676; WG623776

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M149093	CCV	NA	1	1		07/29/17 02:51
6M149094	RINSE	NA	1	1		07/29/17 03:20
6M149095	RINSE	NA	1	1		07/29/17 03:50
6M149096	RINSE	NA	1	1		07/29/17 04:21

Comments

Seq.	Rerun	Dil.	Reason	Analytes
3				
File ID: 6M149061				
	Not needed, DNR.			
23	X	500	Internal standard and surrogate standard failure	
File ID: 6M149081				
	L17071314-01 - Foamed.			
24	X	500	Internal standard and surrogate standard failure	
File ID: 6M149082				
	L17071314-02 - Foamed			

Approved: July 31, 2017

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Microbac Laboratories Inc.

Data Checklist

Date: 16-JUN-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 82832
Analytical Workgroups: WG618225

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	X
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
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	TMB
Secondary Reviewer	SAV
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:
19-JUN-2017
Tiffany Bailey

Secondary Reviewer:
19-JUN-2017
Sarah Vandenberg

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-19-2017 13:17:30

Microbac Laboratories Inc.

Data Checklist

Date: 19-JUN-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 82875
Analytical Workgroups: WG618413

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	X
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	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
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	TMB
Secondary Reviewer	MES
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:
21-JUN-2017
Tiffany Bailey

Secondary Reviewer:
21-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-21-2017 11:15:18

Microbac Laboratories Inc.

Data Checklist

Date: 28-JUL-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 83665
Analytical Workgroups: WG623675; WG623776

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	TMB
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	TMB
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:
31-JUL-2017
Tiffany Bailey

Secondary Reviewer:
31-JUL-2017
Ashley Cater

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-31-2017 13:11:38

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B AAB#: WG623675

Login Number: L17071296

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
LH18/24-SP650-6459	01	07/26/17					07/28/2017	2	14		07/28/17	2	14	
TRIP BLANK	02	07/26/17					07/28/2017	2.6	14		07/28/17	2.6	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5409788
Report generated 07/31/2017 12:53

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17071296
Instrument Id: HPMS6
Workgroup (AAB#): WG623675

Method: 8260
CAL ID: HPMS6-19-JUN-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17071296-01	1.00	01	117	110	93.4	103
L17071296-02	1.00	01	116	108	94.1	102
WG623675-01	1.00	01	113	106	95.6	101
WG623675-02	1.00	01	113	108	93.2	99.9

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	70	-	120
2 - Dibromofluoromethane	85	-	115
3 - 4-Bromofluorobenzene	75	-	120
4 - Toluene-d8	85	-	120

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 5409794
Report generated: 07/31/2017 12:53

METHOD BLANK SUMMARY

Login Number:	L17071296	**Work Group:**	WG623675
Blank File ID:	6M149062	**Blank Sample ID:**	WG623675-01
Prep Date:	07/28/17 11:32	**Instrument ID:**	HPMS6
Analyzed Date:	07/28/17 11:32	**Method:**	8260B
Analyst:	TMB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
TRIP BLANK	L17071296-02	6M149068	07/28/17 14:29	01
LH18/24-SP650-6459	L17071296-01	6M149069	07/28/17 14:59	01
LCS	WG623675-02	6M149070	07/28/17 15:29	01

Report Name: BLANK_SUMMARY
PDF File ID: 5410341
Report generated 07/31/2017 12:53

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17071296 Prep Date: 07/28/17 11:32 Sample ID: WG623675-01
Instrument ID: HPMS6 Run Date: 07/28/17 11:32 Prep Method: 5030B/5030C/503
File ID: 6M149062 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG623675 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS6-19-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	0.500	0.125	1	U
1,1-Dichloroethene	0.500	2.00	0.500	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	0.500	0.125	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chloroform	0.125	0.500	0.125	1	U
Ethylbenzene	0.250	1.00	0.250	1	U
Methylene chloride	0.250	1.00	0.250	1	U
m,p-Xylene	0.500	2.00	0.500	1	U
o-Xylene	0.250	1.00	0.250	1	U
Styrene	0.125	0.500	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Toluene	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	113	70 - 120	PASS
4-Bromofluorobenzene	95.6	75 - 120	PASS
Dibromofluoromethane	106	85 - 115	PASS
Toluene-d8	101	85 - 120	PASS

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5409789
31-JUL-2017 12:53

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17071296 Run Date: 07/28/2017 Sample ID: WG623675-02
Instrument ID: HPMS6 Run Time: 15:29 Prep Method: 5030B/5030C/503
File ID: 6M149070 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG623675 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD83115 Cal ID: HPMS6-19-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
1,1,1-Trichloroethane	20.0	22.3	112	65 - 130	
1,1,2-Trichloroethane	20.0	19.6	98.2	75 - 125	
1,1-Dichloroethane	20.0	20.8	104	70 - 135	
1,1-Dichloroethene	20.0	21.1	105	70 - 130	
1,2-Dichloroethane	20.0	23.0	115	70 - 130	
Acetone	20.0	20.7	104	40 - 140	
Benzene	20.0	19.7	98.5	80 - 120	
Carbon tetrachloride	20.0	23.0	115	65 - 140	
Chloroform	20.0	22.6	113	65 - 135	
Ethylbenzene	20.0	20.3	102	75 - 125	
Methylene chloride	20.0	20.0	99.9	55 - 140	
m,p-Xylene	40.0	40.9	102	75 - 130	
o-Xylene	20.0	20.6	103	80 - 120	
Styrene	20.0	21.0	105	65 - 135	
Tetrachloroethene	20.0	20.0	100	45 - 150	
Trichloroethene	20.0	19.6	97.9	70 - 125	
Toluene	20.0	19.7	98.3	75 - 120	
Vinyl chloride	20.0	24.5	122	50 - 145	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	113	70 - 120	PASS
4-Bromofluorobenzene	93.2	75 - 120	PASS
Dibromofluoromethane	108	85 - 115	PASS
Toluene-d8	99.9	85 - 120	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 5409790
Report generated: 07/31/2017 12:53

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17071296
Instrument: HPMS6
Analyst: TMB
Workgroup: WG618258

Tune ID: WG618258-01
Run Date: 06/16/2017
Run Time: 15:02
File ID: 6M148036
Cal ID: HPMS6-16-JUN-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	20.7	7716	PASS
75.0	95.0	30.0	60.0	52.8	19672	PASS
95.0	95.0	100	100	100	37261	PASS
96.0	95.0	5.00	9.00	6.84	2550	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	66.2	24674	PASS
175	174	5.00	9.00	7.35	1813	PASS
176	174	95.0	101	96.6	23826	PASS
177	176	5.00	9.00	7.21	1717	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG618258-02	STD	01	06/16/2017 15:28	
WG618258-03	STD	01	06/16/2017 15:58	
WG618258-04	STD	01	06/16/2017 16:28	
WG618258-05	STD-CCV	01	06/16/2017 16:57	
WG618258-06	STD	01	06/16/2017 17:27	
WG618258-07	STD	01	06/16/2017 17:57	
WG618258-08	STD	01	06/16/2017 18:27	
WG618258-09	STD	01	06/16/2017 18:57	
WG618258-10	SSCV	01	06/16/2017 20:29	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5409792
Report generated 07/31/2017 12:53

BFB

Login Number: L17071296
Instrument: HPMS6
Analyst: TMB
Workgroup: WG618413

Tune ID: WG618413-01
Run Date: 06/19/2017
Run Time: 12:50
File ID: 6M148068
Cal ID: HPMS6 -

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50.0	95.0	15.0	40.0	20.1	8730	PASS
75.0	95.0	30.0	60.0	52.0	22624	PASS
95.0	95.0	100	100	100	43506	PASS
96.0	95.0	5.00	9.00	6.70	2917	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	65.7	28589	PASS
175	174	5.00	9.00	7.10	2029	PASS
176	174	95.0	101	98.4	28136	PASS
177	176	5.00	9.00	7.25	2040	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG618413-02	STD	01	06/19/2017 13:17	
WG618413-03	STD	01	06/19/2017 13:46	
WG618413-04	STD	01	06/19/2017 14:17	
WG618413-05	STD	01	06/19/2017 14:47	
WG618413-06	STD	01	06/19/2017 15:21	
WG618413-07	STD	01	06/19/2017 15:49	
WG618413-08	STD-CCV	01	06/19/2017 16:19	
WG618413-09	STD	01	06/19/2017 16:49	
WG618413-10	STD	01	06/19/2017 17:20	
WG618413-11	STD	01	06/19/2017 17:50	
WG618413-12	SSCV	01	06/19/2017 19:19	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5409792
Report generated 07/31/2017 12:53

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17071296
Instrument: HPMS6
Analyst: TMB
Workgroup: WG623672

Tune ID: WG623672-01
Run Date: 07/28/2017
Run Time: 10:07
File ID: 6M149059
Cal ID: HPMS6-19-JUN-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	24.0	8557	PASS
75.0	95.0	30.0	60.0	58.1	20711	PASS
95.0	95.0	100	100	100	35666	PASS
96.0	95.0	5.00	9.00	7.21	2570	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	64.2	22908	PASS
175	174	5.00	9.00	7.05	1615	PASS
176	174	95.0	101	97.8	22397	PASS
177	176	5.00	9.00	6.74	1510	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG623672-02	CCV	01	07/28/2017 10:32	
WG623675-01	BLANK	01	07/28/2017 11:32	
L17071296-02	TRIP BLANK	01	07/28/2017 14:29	
L17071296-01	LH18/24-SP650-6459	01	07/28/2017 14:59	
WG623675-02	LCS	01	07/28/2017 15:29	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5409792
Report generated 07/31/2017 12:53

Calibration Table Report
Method: A9FOOWTR.M
Title: A9-FOO Water - IC: 061617 - HPMS6
Last Calibration: Mon Jun 19 16:17:47 2017
Curve: WG618258
Calibration Files

Compound	5 6M148037.D	20 6M148038.D	50 6M148039.D	100 6M148040.D	200 6M148041.D	300 6M148042.D	400 6M148043.D	500 6M148044.D	Avg	%RSD
Fluorobenzene	ISTD									
Acetonitrile	0.039	0.039	0.040	0.041	0.038	0.036	0.035	0.035	0.038	6.559
3-Chloro-1-propene	0.640	0.643	0.616	0.596	0.582	0.531	0.518	0.493	0.577	9.876
2-Chloro-1,3-butadiene	0.503	0.509	0.508	0.502	0.495	0.456	0.456	0.440	0.484	5.785
Ethyl Acetate	0.230	0.258	0.271	0.270	0.249	0.229	0.231	0.230	0.246	7.504
Methacrylonitrile	0.096	0.109	0.113	0.113	0.105	0.097	0.099	0.098	0.104	6.784
Isobutyl Alcohol	0.008	0.010	0.012	0.012	0.011	0.010	0.010	0.010	0.011	10.551
Methyl methacrylate	0.218	0.253	0.265	0.267	0.250	0.232	0.233	0.230	0.244	7.343
2-Nitropropane	0.058	0.068	0.076	0.078	0.076	0.072	0.073	0.073	0.072	8.738
Chlorobenzene-d5	ISTD									
1,4-Dichlorobenzene-d4	ISTD									
Cyclohexanone		0.020	0.023	0.024	0.022	0.021	0.023	0.024	0.022	7.113

Mon Jun 19 16:30:37 2017

Calibration Table Report
Method: 8260WTR.M
Title: 8260B/624_WATER SOP:MSV01 06-19-17 - HPMS6
Last Calibration: Tue Jun 20 11:31:03 2017
Curve: WG618413
Calibration Files

	Compound	0.3 6M148069.D	0.4 6M148070.D	1 6M148071.D	2 6M148072.D	5 6M148073.D	20 6M148074.D	50 6M148075.D	100 6M148076.D	200 6M148077.D	300 6M148078.D	Avg	%RSD	Linear	Quad
I	Fluorobenzene	ISTD													
T	Dichlorodifluoromethane			0.410	0.387	0.405	0.442	0.449	0.427	0.411		0.419	5.215		
P	Chloromethane			0.301	0.311	0.308	0.298	0.306	0.294	0.284		0.300	3.102		
C	Vinyl Chloride		0.279	0.277	0.257	0.258	0.261	0.267	0.260	0.256		0.264	3.358		
T	1,3-Butadiene					0.221	0.196	0.172	0.163	0.159	0.157	0.178	14.246		
T	Bromomethane			0.120	0.105	0.117	0.112	0.127	0.141			0.120	10.459		
T	Chloroethane			0.248	0.245	0.241	0.237	0.241	0.229	0.220		0.237	4.057		
T	Trichlorofluoromethane		0.482	0.514	0.477	0.489	0.468	0.474	0.450	0.448		0.475	4.521		
T	Diethyl ether			0.256	0.251	0.251	0.263	0.241	0.236		0.221	0.246	5.673		
T	Isoprene					0.449	0.457	0.450	0.424	0.414	0.401	0.432	5.250		
T	Acrolein				0.037	0.038	0.040	0.037	0.036		0.034	0.037	4.795		
T	1,1,2-Trichloro-1,2,2-Trifluoroet			0.239	0.242	0.238	0.234	0.237	0.225	0.225		0.234	2.931		
T	Acetone					0.071	0.073	0.072	0.066	0.065	0.058	0.068	8.303		
C	1,1-Dichloroethene		0.453	0.473	0.474	0.474	0.464	0.471	0.447	0.438		0.462	3.027		
T	Tert-Butyl Alcohol				0.025	0.025	0.026	0.024	0.024		0.023	0.025	4.754		
T	Dimethyl Sulfide					0.316	0.324	0.314	0.300	0.287	0.281	0.304	5.606		
T	Iodomethane			0.114	0.146	0.186	0.229	0.240	0.234	0.219	0.189	0.195	23.258	0.991	
T	Methyl acetate					0.191	0.191	0.189	0.182	0.175	0.170	0.183	4.741		
T	Methylene Chloride			0.338	0.322	0.310	0.290	0.291	0.275	0.266		0.299	8.565		
T	Carbon Disulfide			1.030	0.981	0.944	0.949	0.918	0.871	0.816	0.779	0.911	9.234		
T	Acrylonitrile			0.085	0.088	0.092	0.099	0.095	0.094		0.084	0.091	6.298		
T	Methyl Tert Butyl Ether			0.733	0.751	0.751	0.741	0.752	0.726	0.717		0.738	1.864		
T	trans-1,2-Dichloroethene		0.257	0.276	0.277	0.270	0.261	0.266	0.253	0.245		0.263	4.337		
T	n-Hexane					0.440	0.414	0.407	0.384	0.365	0.358	0.395	7.946		
T	Diisopropyl ether			1.117	1.089	1.094	1.129	1.028	1.004		0.933	1.056	6.732		
T	Vinyl Acetate					0.437	0.463	0.471	0.442	0.421	0.430	0.444	4.321		
P	1,1-Dichloroethane		0.572	0.567	0.593	0.583	0.558	0.565	0.539	0.519		0.562	4.244		
T	Ethyl-Tert-Butyl ether			0.918	0.917	0.932	0.984	0.910	0.893		0.852	0.915	4.361		
T	2-Butanone					0.103	0.111	0.109	0.103	0.101	0.098	0.104	4.675		
T	Propionitrile			0.033	0.034	0.034	0.037	0.033	0.033		0.031	0.033	4.934		
T	2,2-Dichloropropane		0.502	0.496	0.482	0.493	0.446	0.454	0.438	0.429		0.468	6.167		
T	cis-1,2-Dichloroethene		0.307	0.288	0.310	0.297	0.293	0.294	0.280	0.271		0.292	4.395		
C	Chloroform	0.746	0.730	0.636	0.600	0.562	0.516	0.522	0.499	0.484		0.588	16.586	0.999	
T	1-Bromopropane			0.033	0.041	0.048	0.051	0.049	0.047	0.046	0.045	0.045	12.576		
T	Bromochloromethane		0.101	0.146	0.159	0.153	0.155	0.156	0.146	0.145		0.145	12.697		
T	Tetrahydrofuran				0.074	0.072	0.078	0.071	0.069		0.066	0.072	5.453		
S	Dibromofluoromethane			0.242	0.256	0.263	0.260	0.262	0.250	0.245	0.240	0.252	3.609		
T	1,1,1-Trichloroethane		0.482	0.466	0.461	0.463	0.442	0.451	0.430	0.423		0.452	4.373		
T	Cyclohexane			0.558	0.549	0.548	0.540	0.529	0.502	0.483	0.476	0.523	6.085		
T	1,1-Dichloropropene			0.421	0.403	0.416	0.404	0.410	0.390	0.380		0.403	3.586		
T	Tert-Amyl-Methyl ether			0.774	0.758	0.766	0.822	0.754	0.745		0.713	0.762	4.316		
T	Carbon Tetrachloride		0.395	0.377	0.376	0.385	0.375	0.384	0.366	0.368		0.3782	2.4774		
S	1,2-Dichloroethane-d4				0.342	0.341	0.331	0.336	0.322	0.312	0.301	0.3263	4.7495		
T	Heptane											0	0		
T	1,2-Dichloroethane		0.392	0.422	0.416	0.422	0.403	0.41	0.391	0.38		0.4046	3.9377		
T	Benzene		1.386	1.309	1.239	1.238	1.137	1.138	1.073	1.004		1.1904	10.586		
T	Trichloroethene		0.248	0.269	0.262	0.26	0.253	0.257	0.244	0.237		0.2537	4.1142		
T	Methylcyclohexane					0.46	0.451	0.437	0.416	0.402	0.395	0.4266	6.1987		
C	1,2-Dichloropropane		0.343	0.349	0.326	0.334	0.32	0.324	0.309	0.298		0.3253	5.1388		
T	1,4-Dioxane					0.002	0.003	0.002	0.002		0.002	0.0023	7.5113		
T	Bromodichloromethane		0.397	0.412	0.409	0.408	0.406	0.417	0.399	0.389		0.4046	2.1958		
T	Dibromomethane		0.12	0.148	0.151	0.158	0.154	0.159	0.151	0.148		0.1486	8.2887		
T	2-Chloroethyl Vinyl Ether			0.149	0.147	0.154	0.17	0.172	0.164	0.16	0.154	0.1586	5.8891		
T	4-Methyl-2-Pentanone					0.087	0.094	0.096	0.093	0.089	0.085	0.0907	4.5201		
T	cis-1,3-Dichloropropene		0.448	0.484	0.485	0.484	0.478	0.495	0.475	0.456		0.4756	3.35		
T	Dimethyl Disulfide					0.244	0.27	0.274	0.267	0.26	0.256	0.2616	4.2142		
I	Chlorobenzene-d5	ISTD													
S	Toluene-d8			1.487	1.454	1.483	1.397	1.421	1.307	1.296	1.263	1.3886	6.3782		
C	Toluene		1.859	1.769	1.787	1.78	1.63	1.673	1.504	1.449		1.6815	8.6546		
T	Ethyl Methacrylate			0.447	0.456	0.471	0.498	0.502	0.471	0.464	0.454	0.4704	4.2666		
T	Paraldehyde											0	0		
T	trans-1,3-Dichloropropene			0.615	0.615	0.643	0.632	0.657	0.602	0.604		0.624	3.279		
T	1,1,2-Trichloroethane		0.293	0.329	0.324	0.328	0.31	0.319	0.293	0.289		0.3106	5.4218		
T	2-Hexanone					0.23	0.239	0.252	0.234	0.231	0.22	0.2342	4.5878		
T	1,3-Dichloropropane		0.587	0.639	0.625	0.635	0.598	0.62	0.565	0.563		0.604	5.0047		
T	Tetrachloroethene		0.419	0.389	0.372	0.374	0.35	0.362	0.322	0.321		0.3636	9.0458		
T	Dibromochloromethane		0.347	0.35	0.379	0.371	0.371	0.389	0.362	0.364		0.3665	3.8426		
T	1,2-Dibromoethane		0.284	0.304	0.309	0.304	0.29	0.304	0.283	0.285		0.2954	3.6615		
T	1-Chlorohexane		0.502	0.553	0.537	0.555	0.544	0.546	0.503	0.486	0.478	0.5227	5.8362		
P	Chlorobenzene		1.128	1.137	1.104	1.093	1.007	1.022	0.927	0.868		1.0359	9.5012		
T	1,1,1,2-Tetrachloroethane		0.395	0.377	0.375	0.381	0.363	0.371	0.34	0.325		0.3658	6.2439		
C	Ethylbenzene		0.564	0.569	0.582	0.592	0.553	0.559	0.502	0.48		0.5499	7.0671		
T	m-,p-Xylene		0.742	0.727	0.724	0.721	0.662	0.671	0.607	0.557		0.6764	9.7229		
T	o-Xylene			0.696	0.679	0.698	0.663	0.684	0.624	0.586		0.6613	6.2789		
T	Styrene		1.114	1.173	1.167	1.223	1.143	1.183	1.082	1.002		1.1358	6.0853		
P	Bromoform			0.208	0.207	0.208	0.212	0.226	0.217	0.215		0.2133	3.2223		
T	Isopropylbenzene		1.756	1.854	1.809	1.841	1.698	1.757	1.598	1.458		1.7212	7.8249		
I	1,4-Dichlorobenzene-d4	ISTD													
P	1,1,2,2-Tetrachloroethane		0.787	0.791	0.821	0.835	0.797	0.816	0.756	0.76		0.7955	3.5531		
S	p-Bromofluorobenzene			1.238	1.157	1.193	1.171	1.187	1.126	1.113	1.086	1.1589	4.2209		

T	1,2,3-Trichloropropane			0.207	0.208	0.224	0.22	0.223	0.21	0.214		0.2152	3.2725
T	trans-1,4-Dichloro-2-Butene			0.199	0.22	0.226	0.247	0.241	0.236	0.237	0.222	0.2284	6.6054
T	n-Propylbenzene		4.533	4.543	4.431	4.579	4.311	4.362	3.964	3.622		4.2931	7.7961
T	Bromobenzene	0.84	0.813	0.901	0.863	0.868	0.826	0.84	0.774	0.75		0.8304	5.6436
T	1,3,5-Trimethylbenzene		2.926	3.073	2.907	3.084	2.929	2.978	2.75	2.615		2.908	5.4316
T	2-Chlorotoluene		3.448	3.25	3.259	3.303	3.066	3.059	2.528	2.581		3.0618	11.021
T	4-Chlorotoluene		2.62	2.645	2.575	2.545	2.436	2.491	2.588	2.265		2.5206	4.9037
T	a-Methylstyrene					1.459	1.524	1.521	1.439	1.376	1.278	1.4329	6.5465
T	tert-Butylbenzene			0.515	0.554	0.564	0.536	0.54	0.496	0.48		0.5264	5.8351
T	1,2,4-Trimethylbenzene			3.176	3.145	3.238	3.046	3.062	2.828	2.666		3.023	6.7779
T	sec-Butylbenzene			3.684	3.657	3.702	3.447	3.466	3.188	3.003		3.4497	7.7642
T	p-Isopropyltoluene			2.992	2.836	2.984	2.821	2.851	2.659	2.522		2.8095	6.0217
T	1,3-Dichlorobenzene		1.625	1.672	1.623	1.674	1.564	1.578	1.451	1.381		1.571	6.6798
T	1,4-Dichlorobenzene	1.913	1.759	1.676	1.679	1.687	1.565	1.576	1.449	1.377		1.6311	9.8995
T	n-Butylbenzene			3.092	2.977	3.057	2.851	2.885	2.674	2.492		2.8611	7.5028
T	1,2-Dichlorobenzene	1.684	1.457	1.529	1.51	1.567	1.475	1.481	1.36	1.307		1.4856	7.4254
T	1,2-Dibromo-3-Chloropropane				0.166	0.154	0.153	0.162	0.153	0.159		0.1576	3.4851
T	1,2,4-Trichlorobenzene		1.224	1.145	1.137	1.126	1.075	1.065	0.985	0.945		1.0879	8.3172
T	Hexachlorobutadiene		0.408	0.418	0.414	0.406	0.381	0.383	0.365	0.358		0.3916	5.8898
T	Naphthalene		2.44	2.513	2.49	2.474	2.444	2.438	2.245	2.172		2.402	5.1609
T	1,2,3-Trichlorobenzene	1.091	1.141	1.086	1.029	1.026	0.986	0.973	0.906	0.872		1.0121	8.6924

Wed Jun 21 08:54:03 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17071296 Run Date: 06/19/2017 Sample ID: WG618413-12
Instrument ID: HPMS6 Run Time: 19:19 Method: 8260B
File ID: 6M148081 Analyst: TMB QC Key: DOD4
ICal Workgroup: WG618413 Cal ID: HPMS6 - 19-JUN-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	19.8	ug/L	0.457	1.00	20	
Chloroform	CCC	20.0	20.4	ug/L	0.510	1.90	20	
Ethylbenzene	CCC	20.0	20.3	ug/L	0.559	1.60	20	
Toluene	CCC	20.0	19.9	ug/L	1.67	0.600	20	
Vinyl Chloride	CCC	20.0	21.9	ug/L	0.290	9.70	20	
Chloromethane	SPCC	20.0	21.6	ug/L	0.325	8.20	20	
Chlorobenzene	SPCC	20.0	20.3	ug/L	1.05	1.60	20	
Bromoform	SPCC	20.0	18.8	ug/L	0.201	5.90	20	
1,1,2,2-Tetrachloroethane	SPCC	20.0	18.6	ug/L	0.742	6.80	20	
1,1-Dichloroethane	SPCC	20.0	19.4	ug/L	0.546	2.80	20	
1,1,1-Trichloroethane		20.0	19.6	ug/L	0.444	1.90	20	
1,1,2-Trichloroethane		20.0	20.0	ug/L	0.311	0.200	20	
1,2-Dichloroethane		20.0	19.5	ug/L	0.395	2.40	20	
Acetone		20.0	19.2	ug/L	0.0650	3.80	20	
Benzene		20.0	19.1	ug/L	1.14	4.40	20	
Carbon Tetrachloride		20.0	19.3	ug/L	0.364	3.70	20	
Methylene Chloride		20.0	19.3	ug/L	0.288	3.70	20	
m-,p-Xylene		40.0	40.3	ug/L	0.682	0.900	20	
o-Xylene		20.0	21.0	ug/L	0.695	5.10	20	
Styrene		20.0	20.9	ug/L	1.19	4.70	20	
Tetrachloroethene		20.0	19.2	ug/L	0.350	3.80	20	
Trichloroethene		20.0	20.1	ug/L	0.255	0.700	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5409791
Report generated 07/31/2017 12:53

Login Number: L17071296 Run Date: 07/28/2017 Sample ID: WG623672-02
Instrument ID: HPMS6 Run Time: 10:32 Method: 8260B
File ID: 6M149060 Analyst: TMB QC Key: DOD4
Workgroup (AAB#): WG623675 Cal ID: HPMS6 - 19-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	50.1	ug/L	0.326	0.130	20	
1,1-Dichloroethene	CCC	50.0	54.3	ug/L	0.502	8.65	20	
Chloroform	CCC	50.0	56.8	ug/L	0.565	13.7	20	
Ethylbenzene	CCC	50.0	51.1	ug/L	0.562	2.16	20	
Toluene	CCC	50.0	49.6	ug/L	1.67	0.717	20	
Vinyl Chloride	CCC	50.0	51.5	ug/L	0.272	3.08	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	44.2	ug/L	0.703	11.6	20	
Bromoform	SPCC	50.0	51.9	ug/L	0.222	3.89	20	
Chlorobenzene	SPCC	50.0	49.3	ug/L	1.02	1.43	20	
Chloromethane	SPCC	50.0	45.3	ug/L	0.272	9.47	20	
1,1-Dichloroethane	SPCC	50.0	52.6	ug/L	0.592	5.27	20	
Xylenes		150	152	ug/L	0.681	1.39	20	
1,1,1-Trichloroethane		50.0	55.6	ug/L	0.503	11.2	20	
1,1,2-Trichloroethane		50.0	48.4	ug/L	0.301	3.24	20	
1,2-Dichloroethane		50.0	56.0	ug/L	0.453	11.9	20	
Acetone		50.0	49.3	ug/L	0.0666	1.32	20	
Benzene		50.0	49.1	ug/L	1.17	1.76	20	
Carbon Tetrachloride		50.0	58.3	ug/L	0.441	16.7	20	
Methylene Chloride		50.0	49.6	ug/L	0.297	0.772	20	
m-,p-Xylene		100	101	ug/L	0.681	0.635	20	
o-Xylene		50.0	51.5	ug/L	0.681	2.90	20	
Styrene		50.0	52.1	ug/L	1.18	4.29	20	
Tetrachloroethene		50.0	51.5	ug/L	0.374	2.91	20	
Trichloroethene		50.0	51.6	ug/L	0.262	3.25	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5409793
Report generated 07/31/2017 12:53

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17071296
Instrument ID: HPMS6
Workgroup (AAB#): WG623675

ICAL CCV Number: WG618413-08
CAL ID: HPMS6-19-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG618413-08	NA	NA	262730	515411	766706
Upper Limit	NA	NA	525460	1030822	1533412
Lower Limit	NA	NA	131365	257706	383353
L17071296-01	1.00	01	262827	504707	743815
L17071296-02	1.00	01	257707	494023	737874
WG623675-01	1.00	01	265863	514862	774078
WG623675-02	1.00	01	288038	537060	775618

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

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5410342
Report generated 07/31/2017 12:53

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17071296
Instrument ID: HPMS6
Workgroup (AAB#): WG623675

ICAL CCV Number: WG618413-08
CAL ID: HPMS6-19-JUN-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG618413-08	NA	NA	18.15	15.12	11.25
Upper Limit	NA	NA	18.65	15.62	11.75
Lower Limit	NA	NA	17.65	14.62	10.75
L17071296-01	1.00	01	18.15	15.12	11.24
L17071296-02	1.00	01	18.15	15.12	11.24
WG623675-01	1.00	01	18.15	15.12	11.24
WG623675-02	1.00	01	18.15	15.12	11.24

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

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5410343
Report generated: 07/31/2017 12:53

2.2 General Chemistry Data

2.2.1 Method 9056

2.2.1.1 Summary Data

Microbac Laboratories
Case Narrative

Login Number: L17071296
Department: General Chromatography
Analyst: Craig Smith

METHOD

Analysis EPA300.0/SW846 9056

HOLDING TIMES

Sample Analysis: 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 MS/MSD results were not associated with this sample delivery group.

SAMPLES

Samples: Sample 01 was analyzed at a dilution only due to its pre-run screen result for CL which was 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: 127904
Approved By: Eric Lawson

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071296-01	**PrePrep Method:**	N/A	**Instrument:**	IC1
Client ID:	LH18/24-SP650-6459	**Prep Method:**	9056	**Prep Date:**	07/27/2017 17:32
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	02/14/2017 15:22
Workgroup #:	WG623569	**Analyst:**	CAS	**Run Date:**	07/27/2017 21:29
Collect Date:	07/26/2017 15:00	**Dilution:**	5	**File ID:**	I1_072717-16
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	30.9		10.0	5.00	2.50

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17071296-01	**PrePrep Method:**	N/A	**Instrument:**	IC1
Client ID:	LH18/24-SP650-6459	**Prep Method:**	9056	**Prep Date:**	07/27/2017 17:32
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	02/14/2017 15:22
Workgroup #:	WG623569	**Analyst:**	CAS	**Run Date:**	07/27/2017 21:47
Collect Date:	07/26/2017 15:00	**Dilution:**	50	**File ID:**	I1_072717-17
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	688		20.0	10.0	5.00

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L17071296
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.2.1.2 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 unkown samples.
Amount(ppm) = [(slope)(area count of unknown) + y-intercept](dilution)
(The slope is the amt/area also identified as the CF or calibration factor)

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC1 Dataset: 021417 ICAL IC1.SEQ

Analyst1: JWR Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 160804254

Eluent ID#: RGT39248

Workgroups: Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM

Analytical WG602639 (soils) Analytical WG602643 (waters)

Internal STD: NA Surrogate STD: NA Calibration STD STD77046 (02/14/2017)

CCV STD: STD77046 LCS STD: STD79166 MS/MSD STD: NA

Comments:

ICAL WG602634 : Alternate Source STD79166
Guard Column : Ionpac AG14A (4x50mm)
Dionex S/N 013738
Analytical Column : Ionpac AS14A (4x250mm)
Dionex S/N 010890
Cond Suppressor : AERS 500 (4mm)
Dionex S/N 170116007
System backpressure = 1588psi

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I1_021417-01	ELUENT	1	1		02/14/17 13:14
2	I1_021417-02	DI WATER	1	1		02/14/17 13:32
3	I1_021417-03	WG602634-01 STD	1	1	STD77046	02/14/17 13:50
4	I1_021417-04	WG602634-02 STD	1	1	STD77046	02/14/17 14:09
5	I1_021417-05	WG602634-03 STD	1	1	STD77046	02/14/17 14:27
6	I1_021417-06	WG602634-04 STD-CCV	1	1	STD77046	02/14/17 14:45
7	I1_021417-07	WG602634-05 STD	1	1	STD77046	02/14/17 15:04
8	I1_021417-08	WG602634-06 STD	1	1	STD77046	02/14/17 15:22
9	I1_021417-09	WG602634-07 SSCV	1	1	STD79166	02/14/17 15:40
10	I1_021417-10	LCRV @Level-6	1	1	STD79166	02/14/17 15:58
11	I1_021417-11	LCRV @Level-4	1	1	STD79166	02/14/17 16:17
12	I1_021417-12	LCRV @Level-2	1	1	STD79166	02/14/17 16:35
13	I1_021417-13	LCRV @Level-0	1	1		02/14/17 16:53
14	I1_021417-14	WG602639-01 ANION BLANK-SOIL	7	1		02/14/17 17:11
15	I1_021417-15	WG602639-02 ANION LCS-SOIL	7	1	STD79166	02/14/17 17:29
16	I1_021417-16	WG602639-03 ANION LCS2-SOIL	7	1	STD79166	02/14/17 17:48
17	I1_021417-17	L17010002-01 LOD (F,CL,Br,SO4)	7	1	STD79166	02/14/17 18:06
18	I1_021417-18	L17010002-01 LOD (NO2,NO3)	7	1	STD79166	02/14/17 18:24
19	I1_021417-19	L17010004-01 LOQ (F,CL,Br,SO4)	7	1	STD79166	02/14/17 18:42
20	I1_021417-20	L17010004-01 LOQ (NO2,NO3)	7	1	STD79166	02/14/17 19:00
21	I1_021417-21	WG602647-01 ANION CCV	1	1	STD77046	02/14/17 19:19
22	I1_021417-22	WG602647-02 ANION CCB	1	1		02/14/17 19:37
23	I1_021417-23	WG602643-01 ANION BLANK	1	1		02/14/17 19:55
24	I1_021417-24	WG602643-02 ANION LCS	1	1	STD79166	02/14/17 20:13
25	I1_021417-25	WG602643-03 ANION LCS2	1	1	STD79166	02/14/17 20:31
26	I1_021417-26	L17010001-01 LOD (F,CL,Br,SO4)	1	1	STD79166	02/14/17 20:50
27	I1_021417-27	L17010001-01 LOD (NO2,NO3)	1	1	STD79166	02/14/17 21:08
28	I1_021417-28	L17010003-01 LOQ (F,CL,Br,SO4)	1	1	STD79166	02/14/17 21:26
29	I1_021417-29	L17010003-01 LOQ (NO2,NO3)	1	1	STD79166	02/14/17 21:44
30	I1_021417-30	WG602647-03 ANION CCV	1	1	STD77046	02/14/17 22:02

Page: 1 Approved: 16-FEB-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC1 Dataset: 021417 ICAL IC1.SEQ

Analyst1: JWR Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 160804254

Eluent ID#: RGT39248

Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM

Workgroups: Analytical WG602639 (soils) Analytical WG602643 (waters)

Internal STD: NA Surrogate STD: NA STD77046 (02/14/2017)

CCV STD: STD77046 LCS STD: STD79166 NA

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
31	I1_021417-31	WG602647-04 ANION CCB	1	1		02/14/17 22:21
32	I1_021417-32	END	1	1		02/14/17 22:39

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 16-FEB-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC1 Dataset: 072717 IC1.SEQ

Analyst1: CAS Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254

Eluent ID#: RGT40778

Workgroups: Column 1 ID: AG14A 4-MM Column 2 ID: AS14A 4-MM

Analytical WG623569 (Waters)

Internal STD: NA Surrogate STD: NA Calibration STD STD77046 (14-FEB-2017

CCV STD: STD81395 LCS STD: STD81396 MS/MSD STD: STD81396

Comments: System Backpressure: 1679 psi

Samples L17071223-03 and L17071294 (-01,02) were analyzed at dilutions only due to their pre-run screen results for sulfate, which were greater than 200 ppm.

Sample L17071296-01 was analyzed at dilutions only due to its pre-run screen result for chloride, which was greater than 200 ppm.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I1_072717-01	ELUENT	1	1		07/27/17 16:56
2	I1_072717-02	DI WATER	1	1		07/27/17 17:14
3	I1_072717-03	WG623571-01 ANION CCV	1	1	STD81395	07/27/17 17:32
4	I1_072717-04	WG623571-02 ANION CCB	1	1		07/27/17 17:50
5	I1_072717-05	WG623569-01 ANION BLANK	1	1		07/27/17 18:09
6	I1_072717-06	WG623569-02 ANION LCS	1	1	STD81396	07/27/17 18:27
7	I1_072717-07	L17071223-03 (CL,SO4) 5x	2	5		07/27/17 18:45
8	I1_072717-08	L17071223-03 RR SO4 10x	2	10		07/27/17 19:03
9	I1_072717-09	L17071294-01 (CL,SO4) REF 5x	1	5		07/27/17 19:22
10	I1_072717-10	WG623569-04 DUP 1294-01 5x	2	5		07/27/17 19:40
11	I1_072717-11	WG623569-05 MS 1294-01 5x	2	5	STD81396	07/27/17 19:58
12	I1_072717-12	WG623569-06 MSD 1294-01 5x	2	5	STD81396	07/27/17 20:16
13	I1_072717-13	L17071294-02 (CL,SO4) 5x	2	5		07/27/17 20:35
14	I1_072717-14	WG623571-03 ANION CCV	1	1	STD81395	07/27/17 20:53
15	I1_072717-15	WG623571-04 ANION CCB	1	1		07/27/17 21:11
16	I1_072717-16	L17071296-01 (CL,SO4) 5x	1	5		07/27/17 21:29
17	I1_072717-17	L17071296-01 RR CL 50x	1	50		07/27/17 21:47
18	I1_072717-18	WG623571-05 ANION CCV	1	1	STD81395	07/27/17 22:06
19	I1_072717-19	WG623571-06 ANION CCB	1	1		07/27/17 22:24
20	I1_072717-20	END	1	1		07/27/17 22:42

Comments

Seq.	Rerun	Dil.	Reason	Analytes
11				
	Sample WG623569-05 MS 1294-01 5x had an MS %Rec below the advisory limit for sulfate. This was due to the parent sample's initial matrix, which contained an amount of sulfate greater than 10% of that of the MS spiking solution.			
12				
	Sample WG623569-06 MSD 1294-01 5x had an MSD %Rec below the advisory limit for sulfate. This was due to the parent sample's initial matrix, which contained an amount of sulfate greater than 10% of that of the MSD spiking solution.			

Page: 1 Approved: 28-JUL-17

Microbac Laboratories Inc.

Data Checklist

Date: 14-FEB-2017
Analyst: JWR
Analyst: NA
Method: 300/9056
Instrument: IC1
Curve Workgroup: WG602634
Runlog ID: 80458
Analytical Workgroups: L17010001(LOD),0003(LOQ)WATER L17010002(LOD),0004(LOQ)SOIL

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)	1588PSI
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	INTERNAL QC-ONLY
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	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	JWR
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	MES

Primary Reviewer:
15-FEB-2017
John Richards

Secondary Reviewer:
16-FEB-2017

CHECKLIST1 - Modified 03/05/2008
Generated: FEB-16-2017 09:06:52

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 27-JUL-2017
Analyst: CAS
Analyst: NA
Method: 300/9056
Instrument: IC1
Curve Workgroup: NA
Runlog ID: 83640
Analytical Workgroups: L17071223, L17071294, L17071296

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)	1679 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:
28-JUL-2017

Secondary Reviewer:
28-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-28-2017 12:05:28

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 9056 **AAB#:** WG623569

Login Number: L17071296

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
LH18/24-SP650-6459	01	07/26/17					07/27/2017	1.1	2		07/27/17	1.3	2	
LH18/24-SP650-6459	01	07/26/17					07/27/2017	1.1	2		07/27/17	1.3	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5408306
Report generated 07/28/2017 11:19

METHOD BLANK SUMMARY

Login Number: L17071296
Blank File ID: I1_072717-05
Prep Date: 07/27/17 17:32
Analyzed Date: 07/27/17 18:09
Analyst: CAS

Work Group: WG623569
Blank Sample ID: WG623569-01
Instrument ID: IC1
Method: 9056

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG623569-02	I1_072717-06	07/27/17 18:27	01
DUP	WG623569-04	I1_072717-10	07/27/17 19:40	DL01
LH18/24-SP650-6459	L17071296-01	I1_072717-16	07/27/17 21:29	DL01
LH18/24-SP650-6459	L17071296-01	I1_072717-17	07/27/17 21:47	DL02

Report Name: BLANK_SUMMARY
PDF File ID: 5408307
Report generated 07/28/2017 11:19

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17071296 Prep Date: 07/27/17 17:32 Sample ID: WG623569-01
Instrument ID: IC1 Run Date: 07/27/17 18:09 Prep Method: 9056
File ID: I1_072717-05 Analyst: CAS Method: 9056
Workgroup (AAB#): WG623569 Matrix: Water Units: mg/L
Contract #: Cal ID: IC1-14-FEB-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Chloride	0.100	0.400	0.100	1	U
Sulfate	0.500	2.00	0.500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5408308
28-JUL-2017 11:19

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17071296 **Run Date:** 07/27/2017 **Sample ID:** WG623569-02
Instrument ID: IC1 **Run Time:** 18:27 **Prep Method:** 9056
File ID: I1_072717-06 **Analyst:** CAS **Method:** 9056
Workgroup (AAB#): WG623569 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD81396 **Cal ID:** IC1-14-FEB-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Chloride	8.00	8.15	102	90 - 110	
Sulfate	40.0	41.2	103	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5408309
Report generated: 07/28/2017 11:19

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17071296
Analytical Method: 9056
ICAL Workgroup: WG602634
Instrument ID: IC1
Initial Calibration Date: 14-FEB-17 15:22
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Chloride		5.990	8.72		0.99800
Sulfate		7.877	10.2		0.99700

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5408432
Report generated 07/28/2017 11:58

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17071296
Analytical Method: 9056
Instrument ID: IC1
Initial Calibration Date: 14-FEB-17 15:22
Column ID: F

Analyte	WG602634-01			WG602634-02			WG602634-03		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloride	0.200	0.0310000000	6.452	1.00	0.154000000	6.494	4.00	0.648000000	6.173
Sulfate	1.00	0.116000000	8.621	5.00	0.579000000	8.636	20.0	2.44100000	8.193

INT_CAL - Modified 03/06/2008
PDF File ID: 5408432
Report generated 07/28/2017 11:58

Login Number: L17071296
Analytical Method: 9056
Instrument ID: IC1
Initial Calibration Date: 14-FEB-17 15:22
Column ID: F

Analyte	WG602634-04			WG602634-05			WG602634-06		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloride	8.00	1.34700000	5.939	12.0	2.10700000	5.695	24.0	4.62700000	5.187
Sulfate	40.0	5.15700000	7.756	60.0	8.13200000	7.378	120	17.9750000	6.676

INT_CAL - Modified 03/06/2008
PDF File ID: 5408432
Report generated 07/28/2017 11:58

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17071296 Run Date: 02/14/2017 Sample ID: WG602634-07
Instrument ID: IC1 Run Time: 15:40 Method: 9056
File ID: I1_021417-09 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG602634 Cal ID: IC1 - 14-FEB-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Chloride		8.00	8.12	mg/L	5.84	1.50	10	
Sulfate		40.0	40.6	mg/L	7.64	1.40	10	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5408433
Report generated 07/28/2017 11:58

Login Number: L17071296 Run Date: 07/27/2017 Sample ID: WG623571-02
Instrument ID: IC1 Run Time: 17:50 Method: 9056
File ID: I1_072717-04 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG623569 Cal ID: IC1 - 14-FEB-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.400	0.100	U
Sulfate	0.500	2.00	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: 5408311
Report generated 07/28/2017 11:19

Login Number: L17071296 Run Date: 07/27/2017 Sample ID: WG623571-04
Instrument ID: IC1 Run Time: 21:11 Method: 9056
File ID: I1_072717-15 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG623569 Cal ID: IC1 - 14-FEB-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.400	0.100	U
Sulfate	0.500	2.00	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: 5408311
Report generated 07/28/2017 11:19

Login Number: L17071296 Run Date: 07/27/2017 Sample ID: WG623571-06
Instrument ID: IC1 Run Time: 22:24 Method: 9056
File ID: I1_072717-19 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG623569 Cal ID: IC1 - 14-FEB-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Chloride	0.100	0.400	0.100	U
Sulfate	0.500	2.00	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: 5408311
Report generated 07/28/2017 11:19

Login Number: L17071296 Run Date: 07/27/2017 Sample ID: WG623571-01
Instrument ID: IC1 Run Time: 17:32 Method: 9056
File ID: I1_072717-03 Analyst: CAS QC Key: DOD4
Workgroup (AAB#): WG623569 Cal ID: IC1 - 14-FEB-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.10	mg/L	5.85	1.30	10	
Sulfate		40.0	40.8	mg/L	7.60	1.92	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5408310
Report generated 07/28/2017 11:19

Login Number: L17071296 Run Date: 07/27/2017 Sample ID: WG623571-03
Instrument ID: IC1 Run Time: 20:53 Method: 9056
File ID: I1_072717-14 Analyst: CAS QC Key: DOD4
Workgroup (AAB#): WG623569 Cal ID: IC1 - 14-FEB-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.16	mg/L	5.81	2.01	10	
Sulfate		40.0	41.3	mg/L	7.50	3.15	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5408310
Report generated 07/28/2017 11:19

Login Number: L17071296 Run Date: 07/27/2017 Sample ID: WG623571-05
Instrument ID: IC1 Run Time: 22:06 Method: 9056
File ID: I1_072717-18 Analyst: CAS QC Key: DOD4
Workgroup (AAB#): WG623569 Cal ID: IC1 - 14-FEB-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.19	mg/L	5.78	2.34	10	
Sulfate		40.0	41.3	mg/L	7.49	3.19	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5408310
Report generated 07/28/2017 11:19

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
August 2, 2017

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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	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

Microbac Laboratories Inc.
List of Valid Qualifiers
August 02, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
August 02, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

CHAIN OF CUSTODY

Name Of Lab Shipping To: MICROBAC (740) 373-4071 ATTN: STEPHANIE MOSSBURG

Project: AECOM
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. 60256135.GWTPT HRUMAR16

Job: GROUNDWATER TREATMENT PLANT BI-WEEKLY SAMPLES

Prepared By: Scott Beesinger

P.O Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: VOC	Analyses: CHLORIDE, SULFATE	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650-6459	Water	07/26/17 / 15:00		3	3		HCL	
LH18/24-SP650-6459	Water	07/26/17 / 15:00		1		1	NONE	
Trip Blank	Water	07/26/17		2	2		HCL	

Additional Remarks: STANDARD TAT ON ALL PARAMETERS. EMAIL RESULTS TO linda.raabe@aecom.com

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/26/17	15:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks

Microbac OVD
Received: 07/27/2017 11:05
By: BRENDA GREGORY
221000103853

Brenda Gregory

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC®

COOLER TEMP >6° C LOG

Cooler ID 3853

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

CHD 7/27/17

pH Exceptions

pH Lot # HC1601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

CHD 7/27/17

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

CHD 7/27/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17071296
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 07-AUG-2017

Samplenum	Container ID	Products
L17071296-01	941667	826-SPE 826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	27-JUL-2017 14:22	BRG		
2	ANALYZ	L1	ORG4	27-JUL-2017 15:27	JST	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	27-JUL-2017 14:22	BRG		
2	ANALYZ	L1	ORG4	27-JUL-2017 15:27	JST	CLS	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	27-JUL-2017 14:22	BRG		
2	ANALYZ	L1	ORG4	27-JUL-2017 15:27	JST	CLS	

Samplenum	Container ID	Products
L17071296-01	941668	826-SPE 9056

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	27-JUL-2017 14:22	BRG		
2	PREP	W1	SEM	27-JUL-2017 15:21	CAS	CLS	

Samplenum	Container ID	Products
L17071296-02	941669	826-SPE 826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	27-JUL-2017 14:22	BRG		
2	ANALYZ	L1	ORG4	27-JUL-2017 15:27	JST	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	27-JUL-2017 14:22	BRG		
2	ANALYZ	L1	ORG4	27-JUL-2017 15:27	JST	CLS	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L17080162

Linda Raabe
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

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:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. 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, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on August 17 2017

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114647	I	4.0		1ZW056F52210009882	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)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	Yes

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
LH18/24-SP650-6461-GRAB	L17080162-01	08/02/2017 15:00	08/03/2017 09:53
TRIP BLANK	L17080162-02	08/02/2017 15:00	08/03/2017 09:53

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

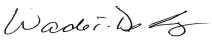
Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG624425	**Reviewer Name:**	Wade DeLong
LRC Date:	2017-08-04 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Wade DeLong		Chemist I	2017-08-04 18:37:18

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG624425	**Reviewer Name:**	Wade DeLong
LRC Date:	2017-08-04 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?	X				
Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG624425	**Reviewer Name:**	Wade DeLong
LRC Date:	2017-08-04 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG624425	**Reviewer Name:**	Wade DeLong
LRC Date:	2017-08-04 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG624425	**Reviewer Name:**	Wade DeLong
LRC Date:	2017-08-04 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG624425	**Reviewer Name:**	Wade DeLong
LRC Date:	2017-08-04 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG624329	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2017-08-08 19:19:30

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG624329	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?	X				
Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG624329	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG624329	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG624329	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG624329	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-08-08 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG624529	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Kerri Buck	Kerri K Buck		2017-08-17 14:25:09

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG624529	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports	X				
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG624529	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG624529	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?					
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					ER#1
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?	X				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG624529	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG624529	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

ER#1 - Due to continuing calibration blank failure for selenium on 09-Aug-2017 at 11:06, client sample 01 along with the batch QA/QC samples was reanalyzed on a later calibration which was compliant for selenium.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG624914	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Kerri Buck	Kerri K Buck		2017-08-17 14:29:14

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG624914	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports	X				
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG624914	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG624914	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?					
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?	X				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG624914	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG624914	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-08-17 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG624404	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-11 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-08-11 14:22:35

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG624404	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-11 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?	X				
Were % moisture (or solids) reported for all soil and sediment samples?	X				
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):	X				
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG624404	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-11 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	X				
Were analytical duplicates analyzed at the appropriate frequency?	X				
Were RPDs or relative standard deviations within the laboratory QC limits?	X				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG624404	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-11 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?			X		
Raw data (NELAC Section 5.5.10)			X		
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions			X		
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG624404	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-11 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)	X				
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17080162
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG624404	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-08-11 00:00:00		

the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/26/2017 19:15
Workgroup #:	WG624425	**Analyst:**	JDS	**Run Date:**	08/03/2017 19:20
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	11M20167
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	14.3		10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.253	J	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	103	70	120	
4-Bromofluorobenzene	109	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	105	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	3510C	**Prep Date:**	08/03/2017 15:30
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	07/31/2017 13:33
Workgroup #:	WG624757	**Analyst:**	LJH	**Run Date:**	08/04/2017 18:14
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	15M21779
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	20.2	J	2.00	1.00	0.500

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	110	20	129	

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	3510C	**Prep Date:**	08/03/2017 15:30
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	07/31/2017 13:33
Workgroup #:	WG624757	**Analyst:**	LJH	**Run Date:**	08/08/2017 13:03
Collect Date:	08/02/2017 15:00	**Dilution:**	5	**File ID:**	15M21805
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	23.5		10.0	5.00	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	98.2	20	129	

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO3
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	3015A	**Prep Date:**	08/04/2017 08:54
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	08/09/2017 14:56
Workgroup #:	WG625078	**Analyst:**	JYH	**Run Date:**	08/09/2017 17:01
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	T3.080917.170132
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Selenium, Total	7782-49-2	0.0100	U	0.0200	0.0100	0.00500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	3015A	**Prep Date:**	08/08/2017 07:50
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	08/10/2017 13:52
Workgroup #:	WG624996	**Analyst:**	JYH	**Run Date:**	08/10/2017 14:47
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	NI.081017.144748
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Barium, Total	7440-39-3	0.165		0.00600	0.00300	0.00150
Lead, Total	7439-92-1	0.00100	U	0.00200	0.00100	0.000500
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	06/05/2017 10:10
Workgroup #:	WG624404	**Analyst:**	SDC	**Run Date:**	08/03/2017 12:45
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	00.1708031245-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Hexavalent	18540-29-9	0.0100	U	0.0200	0.0100	0.00500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	TRIP BLANK	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/26/2017 19:15
Workgroup #:	WG624425	**Analyst:**	JDS	**Run Date:**	08/03/2017 18:51
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	11M20166
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	3.58	J	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.500	U	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	100	70	120	
4-Bromofluorobenzene	105	75	120	
Dibromofluoromethane	99.3	85	115	
Toluene-d8	106	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

2.1 Volatiles Data

2.1.1 Volatiles GCMS Data (8260)

2.1.1.1 Summary Data

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/26/2017 19:15
Workgroup #:	WG624425	**Analyst:**	JDS	**Run Date:**	08/03/2017 19:20
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	11M20167
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	14.3		10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.253	J	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	103	70	120	
4-Bromofluorobenzene	109	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	105	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	TRIP BLANK	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	07/26/2017 19:15
Workgroup #:	WG624425	**Analyst:**	JDS	**Run Date:**	08/03/2017 18:51
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	11M20166
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	0.500	U	1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	0.500	U	1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	0.250	U	0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	1.00	U	2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	0.500	U	1.00	0.500	0.250
Acetone	67-64-1	3.58	J	10.0	5.00	2.50
Benzene	71-43-2	0.250	U	0.500	0.250	0.125
Carbon tetrachloride	56-23-5	0.500	U	1.00	0.500	0.250
Chloroform	67-66-3	0.250	U	0.500	0.250	0.125
Ethylbenzene	100-41-4	0.500	U	1.00	0.500	0.250
Methylene chloride	75-09-2	0.500	U	1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.00	U	2.00	1.00	0.500
o-Xylene	95-47-6	0.500	U	1.00	0.500	0.250
Styrene	100-42-5	0.250	U	0.500	0.250	0.125
Tetrachloroethene	127-18-4	0.500	U	1.00	0.500	0.250
Trichloroethene	79-01-6	0.500	U	1.00	0.500	0.250
Toluene	108-88-3	0.500	U	1.00	0.500	0.250
Vinyl chloride	75-01-4	0.500	U	1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	100	70	120	
4-Bromofluorobenzene	105	75	120	
Dibromofluoromethane	99.3	85	115	
Toluene-d8	106	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

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)]

where:	Example
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)]

where:	**Example**
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)]

where:	**Example**
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

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

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(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 quantiation 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®

TCLP Volatile

Analyst(s): BLB
Date: 8-2-17
Filter Lot #: 98140927

Agitator Speed 30 ± 2 rpm ☑

Balance ID: BAL020
pH Probe ID: T5
Temp probe ID: ☒ 1025 ☐ 1023

Analyst / Date		Analyst / Date	
BLB 8-2-17		BLB 8-3-17	
Time On	Temp On °C	Time Off	Temp Off °C
15:37	23.1	803	22.3

ZHE	Sample #	Pressure √	PSI ON	PSI OFF	Method	Fluid #	Matrix*	%Solid	Size Reduction Yes	Size Reduction No	Int. Wt. (g)	Fluid Vol. (mL)
A												
B												
C												
D												
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
O	08-0102-01	✓	10	10	1311	F,-259	S	100		✓	25.03	500
P	08-0119-02	✓	1	1	1	1	1	1		✓	25.02	500
Q												
R												
S												
NA	FBLK-1	NA	NA	NA	1311	F,-259	NA	NA	NA	NA	40	40

BLB 8-3-17

*Matrix Code = (S-solid) (SS-sand, soil or sludge) (P-paint) (O-organic) (W-water or waste)

Comments: NA

Peer Review By:

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 062217
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Method: 624 SOP: MSV10 Rev: 15
Maintenance Log ID:

Internal Standard: STD82340 Surrogate Standard: STD82339
CCV: STD82436 LCS: STD82448 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618911 WG618912

Comments: Alt. Src. failed high for Acrolein. All reported samples requiring Acrolein were ND.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M19216	WG618910-01 BFB 50ng 8260	NA	1	1	STD82467	06/22/17 11:03
11M19217	WG618910-02 50ug/L CCV 8260	NA	1	1	STD82436	06/22/17 11:27
11M19218	WG618910-02 50ug/L CCV 8260	NA	1	1	STD82436	06/22/17 12:03
11M19219	WG618912-01 5ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 12:32
11M19220	WG618912-02 20ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 13:02
11M19221	WG618912-03 50ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 13:31
11M19222	WG618912-04 100ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 14:01
11M19223	WG618912-05 200ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 14:31
11M19224	WG618912-06 300ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 14:59
11M19225	WG618912-07 400ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 15:29
11M19226	WG618912-08 500ug/L ICAL 826-A9	NA	1	1	STD82519	06/22/17 15:58
11M19227	RINSE	NA	1	1		06/22/17 16:27
11M19228	WG618912-09 100ug/L ICV/ALT 826-A9	NA	1	1	STD82415	06/22/17 16:57
11M19229	WG618911-01 BLANK 8260	NA	1	1		06/22/17 17:27
11M19230	WG618911-02 20ug/L LCS 8260	NA	1	1	STD82448	06/22/17 17:56
11M19231	WG618911-03 20ug/L LCS2 8260	NA	1	1	STD82448	06/22/17 18:26
11M19232	L17061104-01 A 826-BETX	<2	1	1		06/22/17 18:55
11M19233	L17061103-12 A TB 826-SPE	<2	1	1		06/22/17 19:25
11M19234	L17061103-01 A 826-SPE	<2	1	1		06/22/17 19:54
11M19235	L17061103-03 A 826-SPE	<2	1	1		06/22/17 20:23
11M19236	L17061103-05 A 826-SPE	<2	1	1		06/22/17 20:53
11M19237	L17061103-07 A 826-SPE	<2	1	1		06/22/17 21:22
11M19238	L17061103-09 A 826-SPE	<2	1	1		06/22/17 21:51
11M19239	L17061103-11 A 826-SPE	<2	1	1		06/22/17 22:20
11M19240	RINSE	NA	1	1		06/22/17 22:49
11M19241	WG618911-04 BLANK2 624	NA	2	1		06/22/17 23:18
11M19242	L17061150-01 A 624	<2	2	1		06/22/17 23:48
11M19243	L17061154-01 A 624-SPE	7	2	1		06/23/17 00:17
11M19244	L17061152-01 A 624-SPE2	6	2	1		06/23/17 00:46
11M19245	CCV	NA	2	1		06/23/17 01:15
11M19246	RINSE	NA	2	1		06/23/17 01:45
11M19247	RINSE	NA	2	1		06/23/17 02:14

Approved: June 23, 2017
Sarah Vandenberg

Page: 1

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 062217
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Method: 624 SOP: MSV10 Rev: 15
Maintenance Log ID:

Internal Standard: STD82340 Surrogate Standard: STD82339
CCV: STD82436 LCS: STD82448 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG618911 WG618912

Comments: Alt. Src. failed high for Acrolein. All reported samples requiring Acrolein were ND.

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2	X		Check Standard Failure	
File ID: 11M19217				
WG618910-02 CCV multiple cmpds. failed low. RR				

Approved: June 23, 2017
Sarah Vandenberg

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 072617
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: STD82922 Surrogate Standard: STD82921
CCV: STD83088 LCS: STD83061 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG623156

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M20015	WG623156-01 50ng BFB 8260	NA	1	1	STD83010	07/26/17 11:07
11M20016	RINSE	NA	1	1		07/26/17 11:56
11M20017	RINSE	NA	1	1		07/26/17 12:25
11M20018	WG623156-02 0.3ug/L CCV 8260	NA	1	1	STD83088	07/26/17 12:54
11M20019	WG623156-03 0.4ug/L CCV 8260	NA	1	1	STD83088	07/26/17 13:23
11M20020	WG623156-04 1ug/L CCV 8260	NA	1	1	STD83088	07/26/17 13:53
11M20021	WG623156-05 2ug/L CCV 8260	NA	1	1	STD83088	07/26/17 14:22
11M20022	WG623156-06 5ug/L CCV 8260	NA	1	1	STD83088	07/26/17 14:52
11M20023	WG623156-07 20ug/L CCV 8260	NA	1	1	STD83088	07/26/17 15:21
11M20024	WG623156-08 50ug/L CCV 8260	NA	1	1	STD83088	07/26/17 15:50
11M20025	WG623156-09 100ug/L CCV 8260	NA	1	1	STD83088	07/26/17 16:19
11M20026	WG623156-10 200ug/L CCV 8260	NA	1	1	STD83088	07/26/17 16:48
11M20027	WG623156-11 300ug/L CCV 8260	NA	1	1	STD83088	07/26/17 17:18
11M20028	RINSE	NA	1	1		07/26/17 17:47
11M20029	RINSE	NA	1	1		07/26/17 18:17
11M20030	WG623156-04 1ug/L CCV 8260	NA	1	1	STD83088	07/26/17 18:46
11M20031	WG623156-03 .4ug/L CCV 8260	NA	1	1	STD83088	07/26/17 19:15
11M20032	RINSE	NA	1	1		07/26/17 19:45
11M20033	WG623156-12 50ug/L ALT SRC 8260	NA	1	1	STD83061	07/26/17 20:14

Comments

Seq.	Rerun	Dil.	Reason	Analytes
5	X			
File ID: 11M20019				
			WG623156-03 0.4ug/L cmpds. with no 2° ion present. RR	
6	X			
File ID: 11M20020				
			WG623156-04 1.0 ug/L cmpds. with no 2° ion present. RR	
19	X			
File ID: 11M20033				
			WG623156-12 mult low failing cmpds. in Alt. Src. RR	

Approved: July 31, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 072817
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: STD82922 Surrogate Standard: STD82921
CCV: STD83088 LCS: STD83124 MS/MSD: STD83124

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG623746

Comments: Alt. Src. failed low for methyl acetate

1365-01,04,06,08 cannot run less dilute due to their sample matrix.

07-1161-03 weighed out on 7/26/17. Extraction QC weighed out on 7/28/17, along with 1161-01,02,04. Insufficent vilume to reweigh 1161-03 on 7/28/17

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M20046	WG623744-01 50ng BFB 8260	NA	1	1	STD83010	07/28/17 14:40
11M20047	WG623744-02 50ug/L CCV 8260	NA	1	1	STD83088	07/28/17 15:04
11M20048	WG623156-12 50ug/L ALT SRC 8260	NA	1	1	STD83115	07/28/17 15:49
11M20049	WG000000-01 100ug/kg CCV 8260	NA	1	1	STD00000	07/28/17 16:31
11M20050	WG623746-01 BLANK 100X 8260	NA	7	50		07/28/17 17:00
11M20051	WG623746-02 20ug/L LCS100X 8260	NA	7	50	STD83124	07/28/17 17:30
11M20052	L17071365-06 A MS 100X 826-SPE	NA	7	50	STD83124	07/28/17 18:00
11M20053	L17071365-08 A MSD 100X 826-SPE	NA	7	50	STD83124	07/28/17 18:29
11M20054	RINSE	NA	7	1		07/28/17 18:58
11M20055	L17071365-01 A REF 100X 826-SPE	NA	7	50		07/28/17 19:27
11M20056	L17071365-04 A 100X 826-SPE	NA	7	50		07/28/17 19:57
11M20057	L17071161-02 500X 826-TC	NA	17	50		07/28/17 20:26
11M20058	L17071161-04 1000X 826-TC	NA	17	100		07/28/17 20:55
11M20059	L17071161-03 2500X 826-TC	NA	17	500		07/28/17 21:25
11M20060	L17071161-03 5000X 826-TC	NA	17	250		07/28/17 21:54
11M20061	L17071161-01 500X 826-TC	NA	17	50		07/28/17 22:23
11M20062	CCV	NA	1	1		07/28/17 22:52
11M20063	RINSE	NA	1	1		07/28/17 23:21
11M20064	RINSE	NA	1	1		07/28/17 23:51
11M20065	RINSE	NA	1	1		07/29/17 00:20
11M20066	RINSE	NA	1	1		07/29/17 00:49
11M20067	RINSE	NA	1	1		07/29/17 01:18
11M20068	RINSE	NA	1	1		07/29/17 01:47
11M20069	RINSE	NA	1	1		07/29/17 02:17
11M20070	RINSE	NA	1	1		07/29/17 02:46
11M20071	RINSE	NA	1	1		07/29/17 03:15
11M20072	RINSE	NA	1	1		07/29/17 03:44
11M20073	RINSE	NA	1	1		07/29/17 04:14
11M20074	RINSE	NA	1	1		07/29/17 04:43
11M20075	RINSE	NA	1	1		07/29/17 05:13

Approved: July 31, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 072817
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: STD82922 Surrogate Standard: STD82921
CCV: STD83088 LCS: STD83124 MS/MSD: STD83124

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG623746

Comments: Alt. Src. failed low for methyl acetate

1365-01,04,06,08 cannot run less dilute due to their sample matrix.

07-1161-03 weighed out on 7/26/17. Extraction QC weighed out on 7/28/17, along with 1161-01,02,04. Insufficent vilume to reweigh 1161-03 on 7/28/17

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M20076	RINSE	NA	1	1		07/29/17 05:42

Comments

Seq.	Rerun	Dil.	Reason	Analytes
1			Check Standard Failure	
File ID: 11M20047				
	WG623744-02 CCV failed low for 12-DB-3-CP			
12	X	500	Analyzed too dilute	
File ID: 11M20058				
	L17071161-04 Samle ran too dilute. Will be reported as D1 for PCE			
13			Surrogate standard failure	
File ID: 11M20059				
	L17071161-03 high failing surrogate caused by sample matrix interference			
14			Surrogate standard failure	
File ID: 11M20060				
	L17071161-03 high failing surrogate caused by sample matrix interference			
15			Surrogate standard failure	
File ID: 11M20061				
	L17071161-01 high failing surrogate caused by sample matrix interference			

Approved: July 31, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 080317
Analyst1: JDS Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MS01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID:

Internal Standard: STD83922 Surrogate Standard: STD83921
CCV: STD83152 LCS: STD83192 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG624425

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M20158	WG624424-01 50ng BFB 8260	NA	1	1	STD83010	08/03/17 14:52
11M20159	WG624424-02 50ug/L CCV 8260	NA	1	1	STD83152	08/03/17 15:17
11M20160	WG000000-01 100ug/L CCV 8260	NA	1	1	STD00000	08/03/17 15:55
11M20161	WG624425-01 BLANK 8260	NA	1	1		08/03/17 16:24
11M20162	L17071367-03 B 826-SPE	7	1	1		08/03/17 16:53
11M20163	WG624425-02 20ug/L LCS 8260	NA	1	1	STD83192	08/03/17 17:23
11M20164	WG624425-03 20ug/L LCS2 8260	NA	1	1	STD83192	08/03/17 17:52
11M20165	L17080175-01 A 826-SPE2	<2	1	1		08/03/17 18:21
11M20166	L17080162-02 A TB 826-SPE	<2	1	1		08/03/17 18:51
11M20167	L17080162-01 A 826-SPE	<2	1	1		08/03/17 19:20
11M20168	L17080113-01 A 250X 826-SPE	<2	1	250		08/03/17 19:49
11M20169	L17080113-02 A 50X 826-SPE	9	1	50		08/03/17 20:18
11M20170	L17071367-02 B 10X D1 826-SPE	6	1	10		08/03/17 20:48
11M20171	L17071367-04 B 500X D1 826-SPE	<2	1	500		08/03/17 21:17
11M20172	L17071367-05 B 5X D1 826-SPE	<2	1	5		08/03/17 21:46
11M20173	L17071367-06 B 20X D1 826-SPE	<2	1	20		08/03/17 22:15
11M20174	L17080033-01 B 20X D1 826-BETX	<2	1	20		08/03/17 22:44
11M20175	RINSE	NA	1	1		08/03/17 23:13
11M20176	WG624210-01 A FBLK 10X 826-TC	NA	17	10		08/03/17 23:42
11M20177	L17080102-01 A 10X 826-TC	NA	17	10		08/04/17 00:11
11M20178	L17080119-01 A 10X 826-TC	NA	17	10		08/04/17 00:40
11M20179	CCV	NA	1	1		08/04/17 01:08
11M20180	RINSE	NA	1	1		08/04/17 01:37
11M20181	RINSE	NA	1	1		08/04/17 02:06

Comments

Seq.	Rerun	Dil.	Reason	Analytes
3				
File ID: 11M20160				
Not needed, DNR.				
11	X	1000	Over Calibration Range	D. ether
File ID: 11M20168				
12	X	5	Analyzed too dilute	

Approved: August 04, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 080317
Analyst1: JDS Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MS01 Rev: 25/0
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1
Maintenance Log ID:

Internal Standard: STD83922 Surrogate Standard: STD83921
CCV: STD83152 LCS: STD83192 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG624425

Comments:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
File ID: 11M20169				
	L17080113-02			
14	X	5000	Over Calibration Range	TCE
File ID: 11M20171				
	L17071367-04			
16	X	250	Over Calibration Range	TCE
File ID: 11M20173				
	L17071367-06			
17	X	50	Over Calibration Range	BEN, TOL
File ID: 11M20174				
	L17080033-01			
20	X	10	Carry-over contamination	
File ID: 11M20177				
	DNR.			
21	X	10	Carry-over contamination	
File ID: 11M20178				
	DNR.			

Approved: August 04, 2017

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Microbac Laboratories Inc.

Data Checklist

Date: 22-JUN-2017
Analyst: JDS
Analyst: NA
Method: 8260/624
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82939
Analytical Workgroups: WG618911

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	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	JDS
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
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	SAV
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:
23-JUN-2017

Secondary Reviewer:
23-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-23-2017 13:08:29

Microbac Laboratories Inc.

Data Checklist

Date: 26-JUL-2017
Analyst: JDS
Analyst: NA
Method: 8260B
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 83671
Analytical Workgroups: WG623156

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	NA
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	NA
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	NA
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	NA
TCL Hits	X
Spectra of TCL Hits	JDS
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	NA
Manual Integrations	NA
Case Narrative	NA
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:
31-JUL-2017

Secondary Reviewer:
31-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-31-2017 14:46:46

Microbac Laboratories Inc.

Data Checklist

Date: 28-JUL-2017
Analyst: JDS
Analyst: NA
Method: 8260B
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 83672
Analytical Workgroups: WG623746

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	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	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:
31-JUL-2017

Secondary Reviewer:
31-JUL-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-02-2017 17:08:58

Microbac Laboratories Inc.

Data Checklist

Date: 03-AUG-2017
Analyst: JDS
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 83776
Analytical Workgroups: WG624425

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	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	TMB
Surrogates	X
Internal Standards Criteria	X
Library Searches	X
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	TMB
Secondary Reviewer	WTD
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:
04-AUG-2017
Tiffany Bailey

Secondary Reviewer:
04-AUG-2017
Wade D

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-04-2017 14:24:38

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B **AAB#:** WG624425

Login Number: L17080162

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
LH18/24-SP650-6461-GRAB	01	08/02/17					08/03/2017	1.8	14		08/03/17	1.8	14	
TRIP BLANK	02	08/02/17					08/03/2017	1.8	14		08/03/17	1.8	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5417664
Report generated 08/04/2017 11:42

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17080162
Instrument Id: HPMS11
Workgroup (AAB#): WG624425

Method: 8260
CAL ID: HPMS11-26-JUL-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17080162-01	1.00	01	103	101	109	105
L17080162-02	1.00	01	100	99.3	105	106
WG624425-01	1.00	01	97.9	98.4	109	107
WG624425-02	1.00	01	99.0	99.7	101	102
WG624425-03	1.00	01	99.2	101	103	102

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	70	-	120
2 - Dibromofluoromethane	85	-	115
3 - 4-Bromofluorobenzene	75	-	120
4 - Toluene-d8	85	-	120

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 5417671
Report generated: 08/04/2017 11:42

METHOD BLANK SUMMARY

Login Number: L17080162
Blank File ID: 11M20161
Prep Date: 08/03/17 16:24
Analyzed Date: 08/03/17 16:24
Analyst: JDS

Work Group: WG624425
Blank Sample ID: WG624425-01
Instrument ID: HPMS11
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG624425-02	11M20163	08/03/17 17:23	01
LCS2	WG624425-03	11M20164	08/03/17 17:52	01
TRIP BLANK	L17080162-02	11M20166	08/03/17 18:51	01
LH18/24-SP650-6461-GRAB	L17080162-01	11M20167	08/03/17 19:20	01

Report Name: BLANK_SUMMARY
PDF File ID: 5418158
Report generated 08/04/2017 14:35

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17080162 Prep Date: 08/03/17 16:24 Sample ID: WG624425-01
Instrument ID: HPMS11 Run Date: 08/03/17 16:24 Prep Method: 5030B/5030C/503
File ID: 11M20161 Analyst: JDS Method: 8260B
Workgroup (AAB#): WG624425 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS11-26-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	0.500	0.125	1	U
1,1-Dichloroethene	0.500	2.00	0.500	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	0.500	0.125	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chloroform	0.125	0.500	0.125	1	U
Ethylbenzene	0.250	1.00	0.250	1	U
Methylene chloride	0.250	1.00	0.250	1	U
m,p-Xylene	0.500	2.00	0.500	1	U
o-Xylene	0.250	1.00	0.250	1	U
Styrene	0.125	0.500	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Toluene	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U

Surrogates	% Recovery	Surrogate Limits			Qualifier
1,2-Dichloroethane-d4	97.9	70	-	120	PASS
4-Bromofluorobenzene	109	75	-	120	PASS
Dibromofluoromethane	98.4	85	-	115	PASS
Toluene-d8	107	85	-	120	PASS

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5417665
04-AUG-2017 11:42

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17080162 Analyst: JDS Prep Method: 5030B/5030C/503
Instrument ID: HPMS11 Matrix: Water Method: 8260B
Workgroup (AAB#): WG624425 Units: ug/L
QC Key: DOD4 Lot #: STD83192

Sample ID: WG624425-02 LCS File ID: 11M20163 Run Date: 08/03/2017 17:23
Sample ID: WG624425-03 LCS2 File ID: 11M20164 Run Date: 08/03/2017 17:52

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	21.3	107	20.0	21.6	108	1.30	65 - 130	30	
1,1,2-Trichloroethane	20.0	20.3	101	20.0	20.5	103	1.25	75 - 125	30	
1,1-Dichloroethane	20.0	20.5	103	20.0	20.7	103	0.731	70 - 135	30	
1,1-Dichloroethene	20.0	20.7	104	20.0	21.4	107	3.27	70 - 130	30	
1,2-Dichloroethane	20.0	20.5	103	20.0	21.0	105	2.34	70 - 130	30	
Acetone	20.0	19.4	96.9	20.0	19.9	99.7	2.79	40 - 140	30	
Benzene	20.0	20.0	99.8	20.0	20.4	102	1.95	80 - 120	30	
Carbon tetrachloride	20.0	21.4	107	20.0	21.9	109	2.22	65 - 140	30	
Chloroform	20.0	20.8	104	20.0	21.4	107	3.23	65 - 135	30	
Ethylbenzene	20.0	20.6	103	20.0	21.1	105	2.10	75 - 125	30	
m,p-Xylene	40.0	40.4	101	40.0	41.5	104	2.63	75 - 130	30	
Methylene chloride	20.0	19.2	95.8	20.0	19.9	99.7	4.05	55 - 140	30	
o-Xylene	20.0	20.8	104	20.0	21.7	108	4.00	80 - 120	30	
Styrene	20.0	22.0	110	20.0	22.6	113	2.67	65 - 135	30	
Tetrachloroethene	20.0	20.0	99.9	20.0	20.6	103	3.21	45 - 150	30	
Toluene	20.0	19.7	98.7	20.0	20.2	101	2.28	75 - 120	30	
Trichloroethene	20.0	20.3	102	20.0	20.3	102	0.0454	70 - 125	30	
Vinyl chloride	20.0	16.8	84.1	20.0	17.5	87.5	3.98	50 - 145	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,2-Dichloroethane-d4	99.0	99.2	70 - 120	PASS
Dibromofluoromethane	99.7	101	85 - 115	PASS
4-Bromofluorobenzene	101	103	75 - 120	PASS
Toluene-d8	102	102	85 - 120	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5417666
Report generated: 08/04/2017 11:42

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17080162
Instrument: HPMS11
Analyst: JDS
Workgroup: WG618910

Tune ID: WG618910-01
Run Date: 06/22/2017
Run Time: 11:03
File ID: 11M19216
Cal ID: HPMS11-20-JUN-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	18.6	11528	PASS
75.0	95.0	30.0	60.0	50.7	31472	PASS
95.0	95.0	100	100	100	62029	PASS
96.0	95.0	5.00	9.00	6.75	4187	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	76.9	47690	PASS
175	174	5.00	9.00	7.92	3778	PASS
176	174	95.0	101	96.2	45858	PASS
177	176	5.00	9.00	6.64	3043	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG618912-01	STD	01	06/22/2017 12:32	
WG618912-02	STD	01	06/22/2017 13:02	
WG618912-03	STD	01	06/22/2017 13:31	
WG618912-04	STD-CCV	01	06/22/2017 14:01	
WG618912-05	STD	01	06/22/2017 14:31	
WG618912-06	STD	01	06/22/2017 14:59	
WG618912-07	STD	01	06/22/2017 15:29	
WG618912-08	STD	01	06/22/2017 15:58	
WG618912-09	STD	01	06/22/2017 16:57	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5417669
Report generated 08/04/2017 11:42

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17080162
Instrument: HPMS11
Analyst: JDS
Workgroup: WG623156

Tune ID: WG623156-01
Run Date: 07/26/2017
Run Time: 11:07
File ID: 11M20015
Cal ID: HPMS11-26-JUL-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	20.7	12022	PASS
75.0	95.0	30.0	60.0	50.1	29048	PASS
95.0	95.0	100	100	100	58032	PASS
96.0	95.0	5.00	9.00	7.08	4109	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	74.2	43061	PASS
175	174	5.00	9.00	8.27	3560	PASS
176	174	95.0	101	96.6	41578	PASS
177	176	5.00	9.00	6.88	2862	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG623156-02	STD	01	07/26/2017 12:54	
WG623156-05	STD	01	07/26/2017 14:22	
WG623156-06	STD	01	07/26/2017 14:52	
WG623156-07	STD	01	07/26/2017 15:21	
WG623156-08	STD-CCV	01	07/26/2017 15:50	
WG623156-09	STD	01	07/26/2017 16:19	
WG623156-10	STD	01	07/26/2017 16:48	
WG623156-11	STD	01	07/26/2017 17:18	
WG623156-04	STD	01	07/26/2017 18:46	
WG623156-03	STD	01	07/26/2017 19:15	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5417669
Report generated 08/04/2017 11:42

BFB

Login Number: L17080162
Instrument: HPMS11
Analyst: JDS
Workgroup: WG623744

Tune ID: WG623744-01
Run Date: 07/28/2017
Run Time: 14:40
File ID: 11M20046
Cal ID: HPMS11-26-JUL-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	21.3	12010	PASS
75.0	95.0	30.0	60.0	52.8	29837	PASS
95.0	95.0	100	100	100	56464	PASS
96.0	95.0	5.00	9.00	6.74	3807	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	70.0	39506	PASS
175	174	5.00	9.00	8.06	3183	PASS
176	174	95.0	101	97.6	38541	PASS
177	176	5.00	9.00	7.24	2790	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG623156-12	SSCV	01	07/28/2017 15:49	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5417669
Report generated 08/04/2017 11:42

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17080162
Instrument: HPMS11
Analyst: JDS
Workgroup: WG624424

Tune ID: WG624424-01
Run Date: 08/03/2017
Run Time: 14:52
File ID: 11M20158
Cal ID: HPMS11-26-JUL-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	22.8	12019	PASS
75.0	95.0	30.0	60.0	55.1	29061	PASS
95.0	95.0	100	100	100	52722	PASS
96.0	95.0	5.00	9.00	7.17	3781	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	74.7	39357	PASS
175	174	5.00	9.00	8.23	3239	PASS
176	174	95.0	101	97.3	38288	PASS
177	176	5.00	9.00	7.16	2741	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG624424-02	CCV	01	08/03/2017 15:17	
WG624425-01	BLANK	01	08/03/2017 16:24	
WG624425-02	LCS	01	08/03/2017 17:23	
WG624425-03	LCS2	01	08/03/2017 17:52	
L17080162-02	TRIP BLANK	01	08/03/2017 18:51	
L17080162-01	LH18/24-SP650-6461-GRAB	01	08/03/2017 19:20	
WG624210-01	FBLK1	DL01	08/03/2017 23:42	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5417669
Report generated 08/04/2017 11:42

Calibration Table Report
Method: A9FOOWT.M
Title: Appendix IX (SOP:OVL MSV01) Water 062217 HPMS11
Last Calibration: Fri Jun 23 09:50:47 2017
Curve: WG618912
Calibration Files

	Compound	5 11M19219.D	20 11M19220.D	50 11M19221.D	100 11M19222.D	200 11M19223.D	300 11M19224.D	400 11M19225.D	500 11M19226.D	Avg	%RSD	Linear	Quadratic
I	Fluorobenzene	ISTD											
T	Acetonitrile	0.036	0.036	0.034	0.036	0.037	0.037	0.035	0.035	0.036	3.083		
T	3-Chloro-1-propene	0.486	0.499	0.493	0.472	0.427	0.395	0.358		0.447	12.268		
T	2-Chloro-1,3-butadiene	0.394	0.417	0.416	0.399	0.375	0.350	0.322	0.294	0.371	12.213		
T	Methacrylonitrile	0.171	0.182	0.179	0.183	0.177	0.170	0.155	0.149	0.171	7.403		
T	Isobutyl Alcohol		0.006	0.006	0.008	0.010	0.011	0.011	0.012	0.009	25.809	0.993	
T	1-Butanol			0.001	0.003	0.004	0.005	0.005	0.005	0.004	42.424	0.996	
T	Cyclohexanone			0.009	0.010	0.011	0.011	0.010	0.010	0.010	6.640		
T	2-Nitropropane			0.074	0.078	0.081	0.080	0.075	0.075	0.077	3.841		
T	Ethyl Acetate	0.239	0.260	0.249	0.254	0.242	0.225	0.203	0.193	0.233	10.353		
T	Methyl methacrylate	0.230	0.251	0.246	0.247	0.236	0.221	0.200	0.188	0.227	10.105		
I	Chlorobenzene-d5	ISTD											
I	1,4-Dichlorobenzene-d4	ISTD											

Fri Jun 23 10:01:47 2017

Calibration Table Report
Method: 8260W.M
Title: 8260B/624 (SOP: OVL MSV01) Water 072617 HPMS11
Last Calibration: Thu Jul 27 11:18:12 2017
Curve: WG623156
Calibration Files

		0.3	0.4	1	2	5	20	50	100	200	300				
		11M20018.D	11M20031.D	11M20030.D	11M20021.D	11M20022.D	11M20023.D	11M20024.D	11M20025.D	11M20026.D	11M20027.D				
	Compound											Avg	%RSD	Linear	Quadratic
I	Fluorobenzene	ISTD													
T	Dichlorodifluoromethane			0.416	0.356	0.362	0.449	0.422	0.411	0.345		0.394	10.062		
P	Chloromethane			0.622	0.500	0.490	0.477	0.398	0.379			0.478	18.194	0.994	
C	Vinyl Chloride		0.462	0.463	0.402	0.404	0.393	0.419	0.402			0.421	7.045		
T	1,3-Butadiene				0.337	0.316	0.360	0.287	0.258			0.311	12.915		
T	Bromomethane			0.196	0.245	0.246	0.239	0.216	0.228	0.215		0.227	8.111		
T	Chloroethane			0.227	0.233	0.232	0.256	0.248	0.252	0.229		0.239	4.998		
T	Trichlorofluoromethane		0.507	0.514	0.469	0.491	0.525	0.503	0.504	0.443		0.494	5.337		
T	Diethyl ether			0.280	0.287	0.284	0.275	0.270	0.256		0.245	0.271	5.627		
T	Isoprene		0.472	0.474	0.447	0.426	0.524	0.461	0.471	0.434		0.464	6.547		
T	Acrolein			0.040	0.048	0.046	0.049	0.049	0.049		0.050	0.047	7.267		
T	1,1,2-Trichloro-1,2,2-Trifluoroet			0.261	0.248	0.250	0.257	0.259	0.271	0.247		0.256	3.312		
T	Acetone				0.126	0.106	0.099	0.086	0.081	0.081	0.081	0.094	18.307	0.999	
C	1,1-Dichloroethene		0.466	0.464	0.462	0.452	0.497	0.478	0.477	0.416		0.464	5.127		
T	Tert-Butyl Alcohol			0.030	0.030	0.032	0.032	0.031	0.029		0.031	0.031	4.352		
T	Dimethyl Sulfide		0.324	0.371	0.359	0.365	0.419	0.380	0.373	0.345		0.367	7.457		
T	Iodomethane			0.346	0.108	0.172	0.277	0.307	0.315			0.254	36.641		1.000
T	Methyl acetate				0.266	0.274	0.296	0.270	0.261	0.254		0.270	5.340		
T	Methylene Chloride			0.324	0.338	0.338	0.341	0.317	0.317	0.281		0.322	6.473		
T	Carbon Disulfide			1.404	0.845	0.884	0.982	0.838	0.785			0.956	23.921	0.994	
T	Acrylonitrile			0.103	0.109	0.112	0.118	0.119	0.117		0.110	0.113	5.259		
T	Methyl Tert Butyl Ether		0.883	0.878	0.857	0.890	0.944	0.865	0.819	0.709		0.856	8.035		
T	trans-1,2-Dichloroethene		0.293	0.296	0.271	0.278	0.300	0.291	0.289	0.258		0.284	5.061		
T	n-Hexane				0.385	0.373	0.482	0.427	0.445	0.416		0.421	9.465		
T	Diisopropyl ether			1.121	1.114	1.088	1.012	0.978	0.861		0.761	0.991	13.799		
T	Vinyl Acetate				0.397	0.411	0.494	0.459	0.463	0.422		0.441	8.403		
P	1,1-Dichloroethane		0.534	0.593	0.574	0.585	0.627	0.595	0.584	0.489		0.573	7.428		
T	Ethyl-Tert-Butyl ether			1.058	1.051	1.037	0.964	0.924	0.814		0.720	0.938	13.801		
T	2-Butanone				0.137	0.147	0.158	0.141	0.136	0.132	0.133	0.141	6.692		
T	Propionitrile				0.041	0.043	0.045	0.043	0.041		0.042	0.043	3.761		
T	2,2-Dichloropropane			0.432	0.475	0.456	0.509	0.488	0.506	0.439		0.472	6.578		
T	cis-1,2-Dichloroethene		0.314	0.300	0.318	0.325	0.347	0.333	0.331	0.290		0.320	5.767		
C	Chloroform	0.536	0.487	0.540	0.537	0.570	0.592	0.548	0.529	0.446		0.532	8.133		
T	1-Bromopropane				0.049	0.045	0.058	0.054	0.056	0.056	0.054	0.053	8.352		
T	Bromochloromethane		0.195	0.163	0.167	0.184	0.200	0.187	0.189	0.174		0.182	7.227		
T	Tetrahydrofuran			0.090	0.090	0.093	0.098	0.092	0.087		0.089	0.091	3.785		
S	Dibromofluoromethane				0.247	0.271	0.254	0.276	0.283	0.260	0.257	0.264	4.953		
T	1,1,1-Trichloroethane		0.406	0.477	0.452	0.468	0.503	0.483	0.480	0.415		0.461	7.417		
T	Cyclohexane		0.676	0.628	0.497	0.519	0.607	0.533	0.534	0.484		0.560	12.267		
T	1,1-Dichloropropene		0.423	0.407	0.377	0.393	0.421	0.407	0.410	0.354		0.399	5.903		
T	Carbon Tetrachloride		0.318	0.372	0.364	0.392	0.433	0.422	0.430	0.373		0.388	10.171		
T	Tert-Amyl-Methyl ether			0.930	0.902	0.887	0.835	0.801	0.698		0.621	0.810	14.029		
S	1,2-Dichloroethane-d4				0.378	0.360	0.338	0.351	0.353	0.318	0.311	0.344	6.889		
T	1,2-Dichloroethane		0.425	0.439	0.449	0.474	0.483	0.445	0.427	0.367		0.439	8.043		
T	Benzene		1.336	1.306	1.261	1.245	1.266	1.123	1.022			1.223	9.061		
T	Trichloroethene		0.336	0.288	0.279	0.281	0.297	0.288	0.287	0.254		0.289	7.889		
T	Methylcyclohexane		0.607	0.592	0.461	0.463	0.536	0.475	0.474	0.429		0.505	13.026		
C	1,2-Dichloropropane		0.262	0.322	0.315	0.335	0.361	0.344	0.345	0.300		0.323	9.657		
T	1,4-Dioxane				0.002	0.003	0.003	0.003	0.003		0.003	0.003	12.252		
T	Bromodichloromethane		0.367	0.381	0.386	0.417	0.451	0.429	0.423	0.364		0.402	7.941		
T	Dibromomethane		0.148	0.171	0.171	0.180	0.205	0.193	0.192	0.175		0.179	9.810		
T	2-Chloroethyl Vinyl Ether			0.179	0.172	0.182	0.215	0.206	0.199	0.191	0.182	0.191	7.823		
T	4-Methyl-2-Pentanone					0.108	0.130	0.123	0.114	0.116	0.113	0.117	6.638		
T	cis-1,3-Dichloropropene		0.391	0.442	0.437	0.455	0.515	0.490	0.478	0.407		0.452	9.220		
T	Dimethyl Disulfide				0.215	0.244	0.308	0.292	0.295	0.277	0.257	0.270	12.152		

I	Chlorobenzene-d5	ISTD												
S	Toluene-d8				1.434	1.390	1.176	1.294	1.270	1.094		1.276	10.009	
C	Toluene		1.903	1.819	1.712	1.787	1.777	1.550	1.387			1.705	10.417	
T	Ethyl Methacrylate			0.448	0.458	0.490	0.597	0.549	0.520	0.494	0.450	0.501	10.490	
T	trans-1,3-Dichloropropene			0.567	0.546	0.584	0.646	0.623	0.600	0.527		0.585	7.177	
T	1,1,2-Trichloroethane		0.262	0.335	0.377	0.370	0.397	0.375	0.354	0.322		0.349	12.226	
T	2-Hexanone					0.286	0.311	0.295	0.268	0.271	0.256	0.281	7.116	
T	1,3-Dichloropropane		0.562	0.586	0.658	0.660	0.695	0.641	0.599	0.523		0.615	9.341	
T	Tetrachloroethene		0.311	0.312	0.300	0.315	0.328	0.320	0.324	0.294		0.313	3.652	
T	Dibromochloromethane		0.291	0.338	0.372	0.376	0.434	0.431	0.416	0.379		0.380	12.818	
T	1,2-Dibromoethane		0.346	0.293	0.348	0.340	0.377	0.360	0.345	0.320		0.341	7.404	
T	1-Chlorohexane		0.646	0.620	0.501	0.492	0.613	0.546	0.546	0.503	0.440	0.545	12.653	
P	Chlorobenzene		1.120	1.176	1.076	1.120	1.125	1.037	0.950			1.086	6.814	
T	1,1,1,2-Tetrachloroethane		0.374	0.359	0.368	0.403	0.443	0.431	0.421	0.374		0.397	8.105	
C	Ethylbenzene			0.566	0.563	0.591	0.620	0.598	0.586	0.503		0.575	6.510	
T	m-,p-Xylene		0.723	0.734	0.699	0.716	0.74	0.664	0.602			0.69691	7.04621	
T	o-Xylene		0.686	0.735	0.701	0.710	0.750	0.710	0.679	0.572		0.693	7.812	
T	Styrene		0.993	1.032	1.028	1.114	1.242	1.170	1.070	0.854		1.063	11.047	
P	Bromoform			0.200	0.213	0.247	0.289	0.304	0.286	0.270		0.258	15.342	0.998
T	Isopropylbenzene		1.854	1.865	1.738	1.758	1.862	1.671	1.467			1.745	8.204	
I	1,4-Dichlorobenzene-d4	ISTD												
P	1,1,2,2-Tetrachloroethane		0.703	0.874	0.963	0.972	1.051	1.068	0.961	0.878		0.934	12.455	
S	p-Bromofluorobenzene				1.130	1.196	1.033	1.095	1.146	1.055	0.983	1.091	6.693	
T	1,2,3-Trichloropropane			0.256	0.255	0.297	0.307	0.299	0.282	0.273		0.281	7.415	
T	trans-1,4-Dichloro-2-Butene			0.231	0.219	0.275	0.322	0.298	0.303	0.319	0.269	0.279	13.787	
T	n-Propylbenzene		5.070	4.897	4.335	4.542	4.606	4.025	3.543			4.431	11.761	
T	Bromobenzene	0.741	0.868	1.000	0.834	0.916	0.998	0.953	0.928	0.810		0.894	9.837	
T	1,3,5-Trimethylbenzene		3.237	3.431	2.950	3.196	3.266	2.966	2.695			3.106	7.987	
T	2-Chlorotoluene		3.187	3.581	3.218	3.202	3.179	2.880	2.602			3.121	9.813	
T	4-Chlorotoluene		2.787	3.066	2.549	2.627	2.659	2.399	2.110			2.599	11.534	
T	a-Methylstyrene					1.437	1.771	1.568	1.512	1.332		1.524	10.769	
T	tert-Butylbenzene			0.669	0.597	0.622	0.693	0.682	0.692	0.621		0.654	6.039	
T	1,2,4-Trimethylbenzene			3.536	3.124	3.327	3.403	3.057	2.726			3.195	9.075	
T	sec-Butylbenzene			4.222	3.727	3.921	4.041	3.662	3.228			3.800	9.138	
T	p-Isopropyltoluene			3.379	2.951	3.114	3.282	3.041	2.756			3.087	7.296	
T	1,3-Dichlorobenzene		1.887	1.937	1.603	1.717	1.791	1.726	1.597	1.332		1.699	11.258	
T	1,4-Dichlorobenzene		2.005	2.059	1.677	1.705	1.780	1.709	1.582			1.788	9.916	
T	n-Butylbenzene			3.168	2.702	2.912	3.199	2.986	2.728			2.949	7.158	
T	1,2-Dichlorobenzene	1.569	1.695	1.599	1.608	1.719	1.768	1.707	1.548	1.302		1.613	8.591	
T	1,2-Dibromo-3-Chloropropane				0.132	0.169	0.194	0.208	0.196	0.207		0.184	15.892	0.999
T	1,2,4-Trichlorobenzene		1.417	1.397	1.162	1.168	1.271	1.279	1.267	1.168		1.266	7.896	
T	Hexachlorobutadiene		0.620	0.588	0.510	0.596	0.621	0.647	0.709	0.675		0.621	9.699	
T	Naphthalene		2.767	3.036	2.794	2.967	3.115	2.877	2.482			2.863	7.321	
T	1,2,3-Trichlorobenzene	0.744	1.048	1.275	1.101	1.171	1.244	1.259	1.241	1.160		1.138	14.609	

Fri Jul 28 14:13:41 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17080162 Run Date: 07/28/2017 Sample ID: WG623156-12
Instrument ID: HPMS11 Run Time: 15:49 Method: 8260B
File ID: 11M20048 Analyst: JDS QC Key: DOD4
ICal Workgroup: WG623156 Cal ID: HPMS11 - 26-JUL-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	47.5	ug/L	0.440	5.10	20	
Chloroform	CCC	50.0	47.1	ug/L	0.501	5.80	20	
Ethylbenzene	CCC	50.0	47.9	ug/L	0.551	4.30	20	
Toluene	CCC	50.0	42.2	ug/L	1.44	15.5	20	
Vinyl Chloride	CCC	50.0	40.7	ug/L	0.342	18.7	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	44.3	ug/L	0.828	11.3	20	
Chloromethane	SPCC	50.0	54.1	ug/L	0.429	8.20	20	
Bromoform	SPCC	50.0	41.2	ug/L	0.229	17.6	20	
Chlorobenzene	SPCC	50.0	44.2	ug/L	0.961	11.5	20	
1,1-Dichloroethane	SPCC	50.0	46.1	ug/L	0.528	7.90	20	
1,1,1-Trichloroethane		50.0	48.5	ug/L	0.447	3.10	20	
1,1,2-Trichloroethane		50.0	45.2	ug/L	0.316	9.60	20	
1,2-Dichloroethane		50.0	44.8	ug/L	0.393	10.4	20	
Acetone		50.0	44.0	ug/L	0.0738	12.0	20	
Benzene		50.0	42.6	ug/L	1.04	14.8	20	
Carbon Tetrachloride		50.0	49.7	ug/L	0.386	0.600	20	
Methylene Chloride		50.0	44.5	ug/L	0.287	10.9	20	
m-,p-Xylene		100	88.4	ug/L	0.616	11.6	20	
o-Xylene		50.0	47.9	ug/L	0.664	4.20	20	
Styrene		50.0	50.4	ug/L	1.07	0.800	20	
Tetrachloroethene		50.0	47.2	ug/L	0.296	5.50	20	
Trichloroethene		50.0	45.9	ug/L	0.265	8.10	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5417667
Report generated 08/04/2017 11:42

Login Number: L17080162 Run Date: 08/03/2017 Sample ID: WG624424-02
Instrument ID: HPMS11 Run Time: 15:17 Method: 8260B
File ID: 11M20159 Analyst: JDS QC Key: DOD4
Workgroup (AAB#): WG624425 Cal ID: HPMS11 - 26-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	50.9	ug/L	0.329	1.75	20	
1,1-Dichloroethene	CCC	50.0	49.6	ug/L	0.460	0.853	20	
Chloroform	CCC	50.0	49.7	ug/L	0.528	0.664	20	
Ethylbenzene	CCC	50.0	49.3	ug/L	0.568	1.33	20	
Toluene	CCC	50.0	43.2	ug/L	1.47	13.6	20	
Vinyl Chloride	CCC	50.0	40.2	ug/L	0.339	19.5	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	48.1	ug/L	0.898	3.80	20	
Bromoform	SPCC	50.0	45.6	ug/L	0.254	8.82	20	
Chlorobenzene	SPCC	50.0	44.4	ug/L	0.964	11.3	20	
Chloromethane	SPCC	50.0	41.7	ug/L	0.332	16.7	20	
1,1-Dichloroethane	SPCC	50.0	49.4	ug/L	0.566	1.16	20	
Xylenes		150	139	ug/L	0.649	7.51	20	
1,1,1-Trichloroethane		50.0	50.4	ug/L	0.465	0.834	20	
1,1,2-Trichloroethane		50.0	47.2	ug/L	0.330	5.59	20	
1,2-Dichloroethane		50.0	47.6	ug/L	0.418	4.80	20	
Acetone		50.0	44.9	ug/L	0.0754	10.1	20	
Benzene		50.0	44.4	ug/L	1.08	11.3	20	
Carbon Tetrachloride		50.0	52.4	ug/L	0.407	4.88	20	
Methylene Chloride		50.0	46.7	ug/L	0.301	6.69	20	
m-,p-Xylene		100	90.6	ug/L	0.631	9.44	20	
o-Xylene		50.0	48.2	ug/L	0.668	3.64	20	
Styrene		50.0	51.5	ug/L	1.10	3.05	20	
Tetrachloroethene		50.0	48.7	ug/L	0.305	2.58	20	
Trichloroethene		50.0	47.5	ug/L	0.274	5.03	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5417670
Report generated 08/04/2017 11:42

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17080162
Instrument ID: HPMS11
Workgroup (AAB#): WG624425

ICAL CCV Number: WG623156-08
CAL ID: HPMS11-26-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG623156-08	NA	NA	152155	308215	431586
Upper Limit	NA	NA	304310	616430	863172
Lower Limit	NA	NA	76078	154108	215793
L17080162-01	1.00	01	114460	253704	363557
L17080162-02	1.00	01	111917	241653	350270
WG624425-01	1.00	01	114109	248365	363013
WG624425-02	1.00	01	126638	263784	370244
WG624425-03	1.00	01	122996	261923	367521

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

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5418163
Report generated 08/04/2017 14:36

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17080162
Instrument ID: HPMS11
Workgroup (AAB#): WG624425

ICAL CCV Number: WG623156-08
CAL ID: HPMS11-26-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG623156-08	NA	NA	16.92	14.1	10.47
Upper Limit	NA	NA	17.42	14.6	10.97
Lower Limit	NA	NA	16.42	13.6	9.97
L17080162-01	1.00	01	16.92	14.1	10.47
L17080162-02	1.00	01	16.92	14.1	10.47
WG624425-01	1.00	01	16.92	14.1	10.47
WG624425-02	1.00	01	16.92	14.1	10.47
WG624425-03	1.00	01	16.92	14.1	10.47

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

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5418164
Report generated: 08/04/2017 14:36

2.2 Semivolatiles Data

2.2.1 GC/MS Semivolatiles Data (827 Dioxane)

2.2.1.1 Summary Data

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	3510C	**Prep Date:**	08/03/2017 15:30
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	07/31/2017 13:33
Workgroup #:	WG624757	**Analyst:**	LJH	**Run Date:**	08/04/2017 18:14
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	15M21779
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	20.2	J	2.00	1.00	0.500

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	110	20	129	

J	Estimated value ; the analyte concentration was greater than the highest standard

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	3510C	**Prep Date:**	08/03/2017 15:30
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	07/31/2017 13:33
Workgroup #:	WG624757	**Analyst:**	LJH	**Run Date:**	08/08/2017 13:03
Collect Date:	08/02/2017 15:00	**Dilution:**	5	**File ID:**	15M21805
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	23.5		10.0	5.00	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	98.2	20	129	

2.2.1.2 QC Summary Data

Example 8270 Calculations

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

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

where:	Example
Ax = Area of the characteristic ion for the compound being measured:	1261197
Cis = Concentration of the specific internal standard (ug/mL)	40
Ais = Area of the characteristic ion of the specific internal standard	608044
Cx = Concentration of the compound in the standard being measured (ug/mL)	50
RF = Calculated Response Factor	**1.65935**

2.0 Calculating the concentration (C) of a compound in water using the data from the prep log and quantitation report: *

Cx = [(Ax) (Cis) (Vf) (D)] / [(Ais) (RF) (Vi)]

where:	Example
Ax = Area of the characteristic ion for the compound being measured	367250
Cis = Concentration of the specific internal standard (ug/mL)	40
Vf = Final volume of sample extract from prep log (mL)	1
D = Dilution factor for sample as a multiplier (10x = 10)	1
Ais = Area of the characteristic ion of the specific internal standard	511641
RF = Average RF from the ICAL	1.65935
Vi = Initial volume of sample extracted from prep log (mL)	1021
Cx = Concentration of the compound in the sample being measured (ug/mL)	0.016947
Cx = Concentration of the compound in the sample being measured (ug/L)	**16.947**

3.0 Calculating the concentration (C) of a compound in soil using the data from the prep log and quantitation report: *

Cx = [(Ax) (Cis) (Vf) (D)] / [(Ais) (RF) (Wi)]

where:	Example
Ax = Area of the characteristic ion for the compound being measured	367250
Cis = Concentration of the specific internal standard (ug/mL)	40
Vf = Final volume of sample extract from prep log (mL)	1
D = Dilution factor for sample as a multiplier (10x = 10)	1
Ais = Area of the characteristic ion of the specific internal standard	511641
RF = Average RF from the ICAL	1.65935
Wi = Initial weight of sample extracted (g) from prep log	30
Cx = Concentration of the compound in the sample being measured (ug/g)	0.576763
Cx = Concentration of the compound in the sample being measured (ug/kg)	**576.7627**

Dry weight correction:

Percent solids (PCT_S)	50
Cd = (Cx) (100)/PCT_S	**1153.525** ug/kg

* 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 plot

b = intercept from curve plot

Step 2: Calculate y from Quantitation Report

y = 16790/784838 = 0.02139

Step 3: Solve for x

x = (y - b)/m = [(0.02139 -(- 0.0435)]/ 0.0783 = 0.829

Step 4: Solve for analyte concentration Cx

Cx = Cis (x) = (25.0)(0.829) = 20.72 ug/L

Example Spreadsheet Calculation:

Slope from curve, m:	0.0783	
Intercept from curve, b:	-0.0435	
Area of analyte, Ax:	16790	
Area of Internal Standard , Ais:	784484	
Concentration of IS, Cis	25.00	ug/L
Response Ratio (y) :	0.021403	
Amount Ratio:	0.828897	
Concentration (Cx):	20.72241	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

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

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(Amount ratio)

Example Spreadsheet Calculation:

Value of A from plot:	**0.0259**	
Value of B from plot:	**0.0596**	
Value of C from plot:	**-0.0165**	
Area of analyte from quantitation report:	**203233**	
Area of IS from quantiation report:	**1425653**	
Response ratio, y:	**0.142554**	
C - y:	**-0.15905**	
Root 1 - Computed amount ratio , X1:	**-3.88278**	
Root 2 - Computed amount ratio , X2:	**1.581623**	use this solution
Concentration of IS, Cis:	**40.00**	
Concentration of analyte, Cx:	**63.26**	ug/L

Microbac Laboratories Inc.
Continuous Sample Extract Log

Workgroup: WG624329
Analyst: JDH
Spike Analyst: JDH
Method: 3510C
Run Date: 08/03/2017 15:30
SOP: EXB01 Revison 20
Spike Witness: JLD
Surr Solution: STD80323

TIME ON: 17:00 OFF: 11:35 ON: _____ OFF: _____
METHYLENE CHLORIDE Lot #: COA19844
Na2SO4, Anhydrous, Granular Lot #: COA19759
1:1 H2SO4 Lot #: RGT40290

	SAMPLE #	Type	Reference	Prod	pH	Init Amnt	Surr Amnt	Spike Amnt	Spike Sol	Final Vol	Color
1	L17071386-04	SAMP		827-DIOXANE	<2	910 mL	.05 mL			1 mL	Transparent
2	L17071387-01	SAMP		827-DIOXANE	<2	1000 mL	.05 mL			1 mL	Transparent
3	L17080162-01	SAMP		827-DIOXANE	<2	1000 mL	.05 mL			1 mL	Transparent
4	WG624329-01	BLANK		827-DIOXANE	<2	1000 mL	.05 mL			1 mL	Transparent
5	WG624329-02	LCS		827-DIOXANE	<2	1000 mL	.05 mL	.05 mL	STD77209	1 mL	Transparent
6	WG624329-03	LCS2		827-DIOXANE	<2	1000 mL	.05 mL	.05 mL	STD77209	1 mL	Transparent

Due to insufficient sample volume, this preparation batch failed to include the method prescribed MS and MSD.
pH 0-3 Lot#230515
TV1P5,6

L17071386-04	RE-EXT IN HOLD
L17071387-01	RE-EXT IN HOLD

Analyst: Justin Hesson

Reviewer: Jessica DeLong

EXTRACT - Modified 01/23/2009
PDF ID: 5418578
Report generated: 08/07/2017 08:52

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 073117
Analyst1: LJH Analyst2: NA
Method: 8270C/D SOP: MSS01 Rev: 28

Maintenance Log ID: Syringe Filter Lot#:
Eluent ID#:

Workgroups: Column 1 ID: RXI-5MS Column 2 ID: NA
WG623800 (ICAL), WG623822
Internal STD: STD83112 Surrogate STD: NA Calibration STD
CCV STD: STD83050 LCS STD: MS/MSD STD:

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	15M21678	BAKE OUT	1	1		07/31/17 09:27
2	15M21679	WG623800-01 5PPM DFTPP STD	1	1	STD80383	07/31/17 09:47
3	15M21680	WG623800-01 5PPM DFTPP STD	1	1	STD80383	07/31/17 10:04
4	15M21681	WG623800-01 5PPM DFTPP STD	1	1	STD80383	07/31/17 10:35
5	15M21682	WG623800-01 5PPM DFTPP STD	1	1	STD80383	07/31/17 10:55
6	15M21683	WG623800-01 5PPM DFTPP STD	1	1	STD80383	07/31/17 11:21
7	15M21684	WG623800-02 5PPM DIOXANE STD	1	1	STD83050	07/31/17 11:39
8	15M21685	WG623800-03 10PPM DIOXANE STD	1	1	STD83050	07/31/17 12:02
9	15M21686	WG623800-04 7.5PPM DIOXANE STD	1	1	STD83050	07/31/17 12:25
10	15M21687	WG623800-05 2.5PPM DIOXANE STD	1	1	STD83050	07/31/17 12:48
11	15M21688	WG623800-06 1PPM DIOXANE STD	1	1	STD83050	07/31/17 13:10
12	15M21689	WG623800-07 0.4PPM DIOXANE STD	1	1	STD83050	07/31/17 13:33
13	15M21690	WG623800-08 5PPM ALT DIOXANE STD	1	1	STD83128	07/31/17 14:06
14	15M21691	WG623453-01 BLANK 827-DIOXANE	1	1		07/31/17 14:35
15	15M21692	WG623453-02 LCS 827-DIOXANE	1	1		07/31/17 14:58
16	15M21693	L17071270-05 827-DIOXANE	1	1		07/31/17 15:21
17	15M21694	L17071232-01 827-DIOXANE	1	1		07/31/17 15:43
18	15M21695	L17071232-02 827-DIOXANE	1	1		07/31/17 16:06
19	15M21696	L17071232-03 REF 827-DIOXANE	1	1		07/31/17 16:29
20	15M21697	L17071232-04 MS 827-DIOXANE	1	1		07/31/17 16:51
21	15M21698	L17071232-05 MSD 827-DIOXANE	1	1		07/31/17 17:14
22	15M21699	L17071232-06 827-DIOXANE	1	1		07/31/17 17:37
23	15M21700	L17071270-02 827-DIOXANE	1	1		07/31/17 18:00
24	15M21701	L17071270-03 827-DIOXANE	1	1		07/31/17 18:23
25	15M21702	L17071283-02 827-DIOXANE	1	1		07/31/17 18:45
26	15M21703	L17071283-03 827-DIOXANE	1	1		07/31/17 19:08
27	15M21704	L17071283-01 827-DIOXANE	1	1		07/31/17 19:31
28	15M21705	BAKE OUT	1	1		07/31/17 19:54
29	15M21706	BAKE OUT	1	1		07/31/17 20:16
30	15M21707	BAKE OUT	1	1		07/31/17 20:39

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 01-AUG-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 073117
Analyst1: LJH Analyst2: NA
Method: 8270C/D SOP: MSS01 Rev: 28

Maintenance Log ID: Syringe Filter Lot#:
Eluent ID#:

Workgroups: Column 1 ID: RXI-5MS Column 2 ID: NA
WG623800 (ICAL), WG623822
Internal STD: STD83112 Surrogate STD: NA
CCV STD: STD83050 LCS STD:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
	WG623800-01 5PPM DFTPP STD ion failure, RR, NR.			
3				
	WG623800-01 5PPM DFTPP STD Ion failure, change liner, RR, NR.			
4				
	WG623800-01 5PPM DFTPP STD Ion failure, RR, NR.			
5				
	WG623800-01 5PPM DFTPP STD Ion failure, quick tune, RR, NR.			
19	X	2		
	L17071232-03 REF			
20	X	2	Over Calibration Range	1,4-Dioxane
	L17071232-04 MS 827-DIOXANE			
21	X	2		
	L17071232-05 MSD			
22	X	2	Over Calibration Range	1,4-Dioxane
	L17071232-06 827-DIOXANE			
23	X	20	Over Calibration Range	1,4-Dioxane
	L17071270-02 827-DIOXANE			
24	X	20	Over Calibration Range	1,4-Dioxane
	L17071270-03 827-DIOXANE			
25	X	10	Over Calibration Range	1,4-Dioxane
	L17071283-02 827-DIOXANE			
26	X	2	Over Calibration Range	1,4-Dioxane
	L17071283-03 827-DIOXANE			
27	X	10	Over Calibration Range	1,4-Dioxane
	L17071283-01 827-DIOXANE			

Page: 2 Approved: 01-AUG-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 080417
Analyst1: LJH Analyst2: NA
Method: 8270C/D SOP: MSS01 Rev: 28

Maintenance Log ID: Syringe Filter Lot#:
Eluent ID#:

Column 1 ID: RXI-5MS Column 2 ID: NA

Workgroups: WG624757
Internal STD: STD83112 Surrogate STD: NA Calibration STD
CCV STD: STD83050 LCS STD: MS/MSD STD:

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	15M21769	BAKE OUT	1	1		08/04/17 09:19
2	15M21770	WG624535-01 5PPM DFTPP STD	1	1	STD80383	08/04/17 14:58
3	15M21771	WG624535-01 5PPM DFTPP STD	1	1	STD80383	08/04/17 15:23
4	15M21772	WG624535-01 5PPM DFTPP STD	1	1	STD80383	08/04/17 15:42
5	15M21773	WG624535-01 5PPM DFTPP STD	1	1	STD80383	08/04/17 15:59
6	15M21774	WG624535-02 5PPM DIOXANE STD	1	1	STD83050	08/04/17 16:17
7	15M21775	WG624329-01 BLANK 827-DIOXANE	1	1		08/04/17 16:43
8	15M21776	WG624329-02 LCS 827-DIOXANE	1	1		08/04/17 17:06
9	15M21777	WG624329-03 LCS2 827-DIOXANE	1	1		08/04/17 17:28
10	15M21778	L17071387-01 2X 827-DIOXANE	1	2		08/04/17 17:51
11	15M21779	L17080162-01 827-DIOXANE	1	1		08/04/17 18:14
12	15M21780	L17071386-04 10X 827-DIOXANE	1	10		08/04/17 18:37
13	15M21781	L17071386-04 20X 827-DIOXANE	1	20		08/04/17 19:00
14	15M21782	BAKE OUT	1	1		08/04/17 19:22
15	15M21783	BAKE OUT	1	1		08/04/17 19:45
16	15M21784	BAKE OUT	1	1		08/04/17 20:08

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
	WG624535-01 5PPM DFTPP STD Ion failure, RR, NR.			
3				
	WG624535-01 5PPM DFTPP STD Ion failure, RR, NR, changed liner.			
4				
	WG624535-01 5PPM DFTPP STD Ion failure, RR, NR.			
11	X	5	Over Calibration Range	1,4-Dioxane
	L17080162-01 827-DIOXANE			
12				
	L17071386-04 10X 827-DIOXANE RR, initial run and the re-extract run do not match.			
13				
	L17071386-04 20X 827-DIOXANE RR, the initial run and the re-extract do not match. Not reported.			

Page: 1 Approved: 07-AUG-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 080817
Analyst1: LJH Analyst2: NA
Method: 8270C/D SOP: MSS01 Rev: 28

Maintenance Log ID: Syringe Filter Lot#:
Eluent ID#:
Column 1 ID: RXI-5MS Column 2 ID: NA
Workgroups: WG624757
Internal STD: STD83112 Surrogate STD: NA Calibration STD
CCV STD: STD83050 LCS STD: MS/MSD STD:

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	15M21797	BAKE OUT	1	1		08/08/17 09:28
2	15M21798	WG624953-01 5PPM DFTPP STD	1	1	STD80383	08/08/17 09:47
3	15M21799	WG624953-01 5PPM DFTPP STD	1	1	STD80383	08/08/17 10:09
4	15M21800	WG624953-01 5PPM DFTPP STD	1	1	STD80383	08/08/17 10:50
5	15M21801	WG624953-01 5PPM DFTPP STD	1	1	STD80383	08/08/17 11:22
6	15M21802	WG624953-01 5PPM DFTPP STD	1	1	STD80383	08/08/17 11:47
7	15M21803	WG624953-01 5PPM DFTPP STD	1	1	STD80383	08/08/17 12:23
8	15M21804	WG624953-02 5PPM DIOXANE STD	1	1	STD83050	08/08/17 12:40
9	15M21805	L17080162-01 5X 827-DIOXANE	1	5		08/08/17 13:03
10	15M21806	L17071386-04 2X 827-DIOXANE	1	2		08/08/17 13:26

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
	WG624953-01 5PPM DFTPP STD Ion failure, RR, NR.			
3				
	WG624953-01 5PPM DFTPP STD Ion failure, RR, NR. Changed liner.			
4				
	WG624953-01 5PPM DFTPP STD Benzidine >2%, RR, NR.			
5				
	WG624953-01 5PPM DFTPP STDIon failure, Quick tune X2, RR, NR.			
6				
	WG624953-01 5PPM DFTPP STD Ion failure, quick tune, Tune, RR, NR.			
9				
	L17080162-01 5X 827-DIOXANE was run at a dilution based on the initial run.			
10				
	L17071386-04 2X 827-DIOXANE was run at a dilution based on the initial run. Results are 10x less than the initial run/ first extraction.			

Page: 1 Approved: 08-AUG-17

Microbac Laboratories Inc.

Data Checklist

Date: 31-JUL-2017
Analyst: LJH
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: WG623800
Runlog ID: 83693
Analytical Workgroups: L17071232, -1270, -1283

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	X
Endrin/DDT breakdown (8081/MS)	X
Pentachlorophenol/benzidine tailing (MS)	X
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	X
Average RF	X
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (MS)	X
Continuing calibration blank (CCB) (IC)	NA
Special standards	NA
Blanks	X
TCL hits	X
Surrogate recoveries	X
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	X
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	X
Surrogate recoveries	X
Internal standard areas (MS)	X
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	
Check for completeness	X
Primary Reviewer	LJH
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	MES

Primary Reviewer: 01-AUG-2017
Secondary Reviewer: 01-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-01-2017 13:50:28

Microbac Laboratories Inc.

Data Checklist

Date: 04-AUG-2017
Analyst: LJH
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: NA
Runlog ID: 83803
Analytical Workgroups: L17071386, L17071387, L17080162

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	X
Endrin/DDT breakdown (8081/MS)	X
Pentachlorophenol/benzidine tailing (MS)	X
Eluent check (IC)/system pressure (HPLC)	NA
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)	X
Continuing calibration blank (CCB) (IC)	NA
Special standards	NA
Blanks	X
TCL hits	X
Surrogate recoveries	X
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	X
MS/MSD/Sample duplicates	NA
Recoveries	NA
%RPD	NA
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	X
Surrogate recoveries	X
Internal standard areas (MS)	X
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	
Check for completeness	X
Primary Reviewer	LJH
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: 07-AUG-2017

Secondary Reviewer: 07-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-07-2017 14:02:27

Microbac Laboratories Inc.

Data Checklist

Date: 08-AUG-2017
Analyst: LJH
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: NA
Runlog ID: 83837
Analytical Workgroups: L17071386, L17080162

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	X
Endrin/DDT breakdown (8081/MS)	X
Pentachlorophenol/benzidine tailing (MS)	X
Eluent check (IC)/system pressure (HPLC)	NA
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)	X
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	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	X
Surrogate recoveries	X
Internal standard areas (MS)	X
Library searches (MS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	X
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	LJH
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: 08-AUG-2017
Secondary Reviewer: 08-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-08-2017 14:50:36

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8270D **AAB#:** WG624757

Login Number: L17080162

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
LH18/24-SP650-6461-GRAB	01	08/02/17					08/03/2017	1	7		08/04/17	1.1	40	
LH18/24-SP650-6461-GRAB	01	08/02/17					08/03/2017	1	7		08/08/17	4.9	40	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5419093
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17080162
Instrument Id: HPMS15
Workgroup (AAB#): WG624757

Method: 827-DIOXANE
CAL ID: HPMS15-31-JUL-17
Matrix: Water

Sample Number	Dilution	Tag	1
L17080162-01	1.00	01	110
L17080162-01	5.00	DL01	98.2
WG624329-01	1.00	01	43.1
WG624329-02	1.00	01	50.4
WG624329-03	1.00	01	53.4

Surrogates	Surrogate Limits
1 - 1,4-Dioxane-d8	20 - 129

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 5419102
Report generated: 08/08/2017 15:01

METHOD BLANK SUMMARY

Login Number:	L17080162	**Work Group:**	WG624757
Blank File ID:	15M21775	**Blank Sample ID:**	WG624329-01
Prep Date:	08/03/17 15:30	**Instrument ID:**	HPMS15
Analyzed Date:	08/04/17 16:43	**Method:**	8270D
Analyst:	LJH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG624329-02	15M21776	08/04/17 17:06	01
LCS2	WG624329-03	15M21777	08/04/17 17:28	01
LH18/24-SP650-6461-GRAB	L17080162-01	15M21779	08/04/17 18:14	01
LH18/24-SP650-6461-GRAB	L17080162-01	15M21805	08/08/17 13:03	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5419094
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17080162 Prep Date: 08/03/17 15:30 Sample ID: WG624329-01
Instrument ID: HPMS15 Run Date: 08/04/17 16:43 Prep Method: 3510C
File ID: 15M21775 Analyst: LJH Method: 8270D
Workgroup (AAB#): WG624757 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS15-31-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
1,4-Dioxane	0.500	2.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,4-Dioxane-d8	43.1	20 - 129	PASS

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5419095
08-AUG-2017 15:01

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17080162 Analyst: LJH Prep Method: 3510C
Instrument ID: HPMS15 Matrix: Water Method: 8270D
Workgroup (AAB#): WG624757 Units: ug/L
QC Key: DOD4 Lot #: STD77209

Sample ID: WG624329-02 LCS File ID: 15M21776 Run Date: 08/04/2017 17:06
Sample ID: WG624329-03 LCS2 File ID: 15M21777 Run Date: 08/04/2017 17:28

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,4-Dioxane	5.00	2.68	53.6	5.00	2.87	57.3	6.70	30 - 104	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,4-Dioxane-d8	50.4	53.4	20 - 129	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5419096
Report generated: 08/08/2017 15:01

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17080162
Instrument: HPMS15
Analyst: LJH
Workgroup: WG623800

Tune ID: WG623800-01
Run Date: 07/31/2017
Run Time: 11:21
File ID: 15M21683
Cal ID: HPMS15-31-JUL-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	39.5	35944	PASS
68.0	69.0	0	2.00	1.87	669	PASS
69.0	198	0	100	39.3	35714	PASS
70.0	69.0	0	2.00	1.95	695	PASS
127	198	40.0	60.0	52.9	48075	PASS
197	198	0	1.00	0.637	579	PASS
198	198	100	100	100	90901	PASS
199	198	5.00	9.00	6.69	6079	PASS
275	198	10.0	30.0	27.4	24875	PASS
365	198	1.00	100	3.15	2860	PASS
441	443	0.0100	100	76.5	12216	PASS
442	198	40.0	100	91.6	83288	PASS
443	442	17.0	23.0	19.2	15968	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG623800-02	STD-CCV	01	07/31/2017 11:39	
WG623800-03	STD	01	07/31/2017 12:02	
WG623800-04	STD	01	07/31/2017 12:25	
WG623800-05	STD	01	07/31/2017 12:48	
WG623800-06	STD	01	07/31/2017 13:10	
WG623800-07	STD	01	07/31/2017 13:33	
WG623800-08	SSCV	01	07/31/2017 14:06	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5419099
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17080162
Instrument: HPMS15
Analyst: LJH
Workgroup: WG624535

Tune ID: WG624535-01
Run Date: 08/04/2017
Run Time: 15:59
File ID: 15M21773
Cal ID: HPMS15-31-JUL-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	38.5	39407	PASS
68.0	69.0	0	2.00	1.60	630	PASS
69.0	198	0	100	38.4	39378	PASS
70.0	69.0	0	2.00	0.449	177	PASS
127	198	40.0	60.0	51.8	53037	PASS
197	198	0	1.00	0.441	452	PASS
198	198	100	100	100	102448	PASS
199	198	5.00	9.00	6.60	6766	PASS
275	198	10.0	30.0	26.1	26781	PASS
365	198	1.00	100	3.11	3189	PASS
441	443	0.0100	100	74.0	12446	PASS
442	198	40.0	100	86.1	88192	PASS
443	442	17.0	23.0	19.1	16809	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG624535-02	CCV	01	08/04/2017 16:17	
WG624329-01	BLANK	01	08/04/2017 16:43	
WG624329-02	LCS	01	08/04/2017 17:06	
WG624329-03	LCS2	01	08/04/2017 17:28	
L17080162-01	LH18/24-SP650-6461-GRAB	01	08/04/2017 18:14	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5419099
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17080162
Instrument: HPMS15
Analyst: LJH
Workgroup: WG624953

Tune ID: WG624953-01
Run Date: 08/08/2017
Run Time: 12:23
File ID: 15M21803
Cal ID: HPMS15-31-JUL-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	51.9	35249	PASS
68.0	69.0	0	2.00	1.73	552	PASS
69.0	198	0	100	46.9	31872	PASS
70.0	69.0	0	2.00	0	0	PASS
127	198	40.0	60.0	54.7	37171	PASS
197	198	0	1.00	0.925	628	PASS
198	198	100	100	100	67917	PASS
199	198	5.00	9.00	6.95	4719	PASS
275	198	10.0	30.0	26.2	17782	PASS
365	198	1.00	100	2.98	2021	PASS
441	443	0.0100	100	78.4	9272	PASS
442	198	40.0	100	86.9	59024	PASS
443	442	17.0	23.0	20.0	11821	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG624953-02	CCV	01	08/08/2017 12:40	
L17080162-01	LH18/24-SP650-6461-GRAB	DL01	08/08/2017 13:03	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5419099
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17080162
Analytical Method: 8270D
ICAL Workgroup: WG623800

Instrument ID: HPMS15
Initial Calibration Date: 31-JUL-17 13:33
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
1,4-Dioxane		0.4114	9.93		

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5419097
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17080162
Analytical Method: 8270D
Instrument ID: HPMS15
Initial Calibration Date: 31-JUL-17 13:33
Column ID: F

Analyte	WG623800-02			WG623800-03			WG623800-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,4-Dioxane	5.00	92448.0000	0.3640	10.0	188919.000	0.4040	7.50	162720.000	0.4054

INT_CAL - Modified 03/06/2008
PDF File ID: 5419097
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17080162
Analytical Method: 8270D
Instrument ID: HPMS15
Initial Calibration Date: 31-JUL-17 13:33
Column ID: F

Analyte	WG623800-05			WG623800-06			WG623800-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,4-Dioxane	2.50	51925.0000	0.3780	1.00	19491.0000	0.4442	0.400	8532.00000	0.4729

INT_CAL - Modified 03/06/2008
PDF File ID: 5419097
Report generated 08/08/2017 15:01

Method Path : C:\msdchem\1\methods\
Method File : DIOXANE_D8.M
Title : OVD MSS01 SIM 1,4-dioxane ICAL 073117
Last Update : Mon Jul 31 14:02:08 2017
Response Via : Initial Calibration
Curve: WG623800
Calibration Files
10 =15M21685.D 7.5 =15M21686.D 5 =15M21684.D 2.5 =15M21687.D 1 =15M21688.D
0.4 =15M21689.D

	Compound	10	7.5	5	2.5	1	0.4	Avg	%RSD
1) I	1,4-Dichlorobenzen...	----------ISTD----------							
2)	1,4-Dioxane	0.404	0.406	0.364	0.378	0.444	0.473	0.411	9.93
3) S	1,4-Dioxane-d8	0.509	0.512	0.457	0.470	0.547	0.562	0.510	8.09
4) S	Nitrobenzene-d5	1.280	1.273	1.134	1.142	1.206	1.178	1.202	5.27
5) S	2-Fluorobiphenyl	2.889	2.906	2.611	2.679	2.934	2.979	2.833	5.31
6) S	p-Terphenyl-d14	3.185	3.224	2.910	2.999	3.249	3.274	3.140	4.76

(#) = Out of Range

DIOXANE_D8.M Mon Jul 31 14:44:44 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17080162 Run Date: 07/31/2017 Sample ID: WG623800-08
Instrument ID: HPMS15 Run Time: 14:06 Method: 8270D
File ID: 15M21690 Analyst: LJH QC Key: DOD4
ICal Workgroup: WG623800 Cal ID: HPMS15 - 31-JUL-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,4-Dioxane		5000	4660	ug/L	0.384	6.80	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5419098
Report generated 08/08/2017 15:01

Login Number: L17080162 Run Date: 08/04/2017 Sample ID: WG624535-02
Instrument ID: HPMS15 Run Time: 16:17 Method: 8270D
File ID: 15M21774 Analyst: LJH QC Key: DOD4
Workgroup (AAB#): WG624757 Cal ID: HPMS15 - 31-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,4-Dioxane		5000	4050	ug/L	0.334	18.9	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5419100
Report generated 08/08/2017 15:01

Login Number: L17080162 Run Date: 08/08/2017 Sample ID: WG624953-02
Instrument ID: HPMS15 Run Time: 12:40 Method: 8270D
File ID: 15M21804 Analyst: LJH QC Key: DOD4
Workgroup (AAB#): WG624757 Cal ID: HPMS15 - 31-JUL-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,4-Dioxane		5000	4730	ug/L	0.389	5.38	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5419100
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17080162
Instrument ID: HPMS15
Workgroup (AAB#): WG624757

ICAL CCV Number: WG623800-02
CAL ID: HPMS15-31-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG623800-02	NA	NA	50799
Upper Limit	NA	NA	101598
Lower Limit	NA	NA	25400
L17080162-01	1.00	01	57783
L17080162-01	5.00	DL01	48653
WG624329-01	1.00	01	55751
WG624329-02	1.00	01	58324
WG624329-03	1.00	01	74604

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5419101
Report generated 08/08/2017 15:01

Microbac Laboratories Inc.

INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17080162
Instrument ID: HPMS15
Workgroup (AAB#): WG624757

ICAL CCV Number: WG623800-02
CAL ID: HPMS15-31-JUL-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG623800-02	NA	NA	7.09
Upper Limit	NA	NA	7.59
Lower Limit	NA	NA	6.59
L17080162-01	1.00	01	7.11
L17080162-01	5.00	DL01	7.098
WG624329-01	1.00	01	7.113
WG624329-02	1.00	01	7.11
WG624329-03	1.00	01	7.11

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5419103
Report generated: 08/08/2017 15:01

2.3 Metals Data

2.3.1 Metals I C P Data

2.3.1.1 Summary Data

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO3
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	3015A	**Prep Date:**	08/04/2017 08:54
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	08/09/2017 14:56
Workgroup #:	WG625078	**Analyst:**	JYH	**Run Date:**	08/09/2017 17:01
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	T3.080917.170132
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Selenium, Total	7782-49-2	0.0100	U	0.0200	0.0100	0.00500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.3.1.2 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:	**Example:**
Cs = Concentration computed by the data system in ug/mL (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial volume (mL)	50
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cs = Concentration computed by the data system (mg/L) (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial weight (g)	1
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cx = Concentration calculated as received (wet basis)	5
Px = Percent solids of sample (%wt)	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:	**Example:**
Cs = Concentration computed by the data system in ug/mL (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial volume (mL)	50
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cs = Concentration computed by the data system (mg/L) (ppm)	0.1
Vf = Final volume (mL)	50
Vi = Initial weight (g)	1
D = Dilution factor as a multiplier (10X = 10)	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:	**Example:**
Cx = Concentration calculated as received (wet basis)	5
Px = Percent solids of sample (%wt)	80
$Cdry$ = Concentration calculated as dry weight (mg/kg)	6.25

Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup:	WG624529	SOP:	ME407 Revison 19
Analyst:	ERP	Spike Solution:	STD83126
Spike Analyst:	ERP	Spike Witness:	VC
Run Date:	08/04/2017 08:54	HNO3 Lot #:	COA19798
Method:	3015A	HCL Lot #:	COA19849
Balance:	BAL019	40 & 50 ML. DIGESTION TU	COA19886
Instrument:	MW-4	ICP FILTERS LOT#r7ha2443	RGT40684
Instrument Start:	08/04/2017 09:24		

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG624529-02	BLANK	1	40 mL	50 mL	205.539 g	205.533 g		
2	WG624437-01	FBLK1	17	5 mL	50 mL	205.543 g	205.525 g		
3	WG624529-03	LCS	1	40 mL	50 mL	211.375 g	211.366 g	5 mL	
4	L17080132-01	SAMP	1	40 mL	50 mL	205.565 g	205.554 g		08/11/17
5	L17080132-02	SAMP	1	40 mL	50 mL	207.307 g	207.291 g		08/11/17
6	L17080132-03	SAMP	1	40 mL	50 mL	205.12 g	205.107 g		08/11/17
7	L17080132-04	SAMP	1	40 mL	50 mL	206.736 g	206.722 g		08/11/17
8	L17080142-01	SAMP	1	40 mL	50 mL	204.19 g	204.175 g		08/10/17
9	L17080142-02	SAMP	1	40 mL	50 mL	202.823 g	202.817 g		08/10/17
10	L17080142-03	SAMP	1	40 mL	50 mL	203.642 g	203.635 g		08/10/17
11	L17080142-04	SAMP	1	40 mL	50 mL	206.159 g	206.147 g		08/10/17
12	L17080142-05	SAMP	1	40 mL	50 mL	203.608 g	203.596 g		08/10/17
13	L17080142-06	SAMP	1	40 mL	50 mL	205.739 g	205.719 g		08/10/17
14	L17080142-07	SAMP	1	40 mL	50 mL	203.56 g	203.551 g		08/10/17
15	L17080142-08	SAMP	1	40 mL	50 mL	206.038 g	206.014 g		08/10/17
16	L17080145-02	SAMP	17	5 mL	50 mL	205.289 g	205.262 g		08/09/17
17	L17080146-02	SAMP	1	40 mL	50 mL	204.974 g	204.96 g		08/10/17
18	L17080153-01	SAMP	1	40 mL	50 mL	205.368 g	205.35 g		08/10/17
19	L17080153-02	SAMP	1	40 mL	50 mL	204.03 g	204.017 g		08/10/17
20	WG624529-01	REF	1	40 mL	50 mL	206.229 g	206.216 g		
21	L17080161-01	RS01	1	40 mL	50 mL	206.229 g	206.216 g		08/14/17
22	WG624529-04	MS	1	40 mL	50 mL	211.489 g	211.479 g	5 mL	
23	L17080161-02	MS01	1	40 mL	50 mL	211.489 g	211.479 g	5 mL	08/14/17
24	WG624529-05	MSD	1	40 mL	50 mL	209.919 g	209.907 g	5 mL	
25	L17080161-03	SD01	1	40 mL	50 mL	209.919 g	209.907 g	5 mL	08/14/17
26	L17080162-01	SAMP	1	40 mL	50 mL	204.981 g	204.971 g		08/14/17
27	L17080163-01	SAMP	1	40 mL	50 mL	205.242 g	205.226 g		08/14/17

L17080132-01	filtered digestate
L17080132-02	filtered digestate
L17080132-03	filtered digestate
L17080132-04	filtered digestate
L17080142-02	filtered digestate
L17080142-05	filtered digestate
L17080142-07	filtered digestate

MW_DIG - Modified 09/30/2009
PDF ID: 5416719
Report generated: 08/04/2017 09:59

Microbac Laboratories Inc.
Microwave Digestion Log

Analyst: Erin Potter

SOP:
Spike Solution:
Reviewer: Josh Collins
Spike Witness:

Method:
Balance:
Instrument:
Instrument Start:

MW_DIG - Modified 09/30/2009
PDF ID: 5416719
Report generated: 08/04/2017 09:59

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO3 Dataset: 080917T3.1R.TXT
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82800 ICV Std: STD82799 Post Spike: STD80131
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT37691
CCV: STD82801 LLCCV: Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 625298,624177,625080,625078,625088

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T3.080917.144043	WG625299-01	Calibration Point		1		08/09/17 14:40
2	T3.080917.144440	WG625299-02	Calibration Point		1		08/09/17 14:44
3	T3.080917.144837	WG625299-03	Calibration Point		1		08/09/17 14:48
4	T3.080917.145234	WG625299-04	Calibration Point		1		08/09/17 14:52
5	T3.080917.145611	WG625299-05	Calibration Point		1		08/09/17 14:56
6	T3.080917.145947	WG625299-06	Initial Calibration Verification		1		08/09/17 14:59
7	T3.080917.150324	WG625299-07	Initial Calib Blank		1		08/09/17 15:03
8	T3.080917.150723	WG625299-08	Low Level Initial Calibration V		1		08/09/17 15:07
9	T3.080917.151119	WG625299-09	Interference Check		1		08/09/17 15:11
10	T3.080917.151512	WG625299-10	Interference Check		1		08/09/17 15:15
11	T3.080917.151853	WG625299-11	CCV		1		08/09/17 15:18
12	T3.080917.152229	WG625299-12	CCB		1		08/09/17 15:22
13	T3.080917.152627	WG625067-01	Method/Prep Blank	40/50	1		08/09/17 15:26
14	T3.080917.153024	L17080002-29	VICKI / JI	40/50	1		08/09/17 15:30
15	T3.080917.153403	L17080002-30	VICKI / JI	40/50	1		08/09/17 15:34
16	T3.080917.153743	L17080002-31	VICKI / JI	40/50	1		08/09/17 15:37
17	T3.080917.154123	L17080002-32	VICKI / JI	40/50	1		08/09/17 15:41
18	T3.080917.154504	WG623970-02	Method/Prep Blank	40/50	1		08/09/17 15:45
19	T3.080917.154901	WG625299-13	CCV		1		08/09/17 15:49
20	T3.080917.155239	WG625299-14	CCB		1		08/09/17 15:52
21	T3.080917.155636	WG623970-03	Laboratory Control S	40/50	1		08/09/17 15:56
22	T3.080917.160017	WG623816-01	Fluid Blank 1		1		08/09/17 16:00
23	T3.080917.160415	WG623816-02	Fluid Blank 2		1		08/09/17 16:04
24	T3.080917.160813	L17071282-14	D099-544	5/50	1		08/09/17 16:08
25	T3.080917.161203	WG624177-03	Serial Dilution		5	L17071282-14	08/09/17 16:12
26	T3.080917.161559	WG624547-02	Method/Prep Blank	40/50	1		08/09/17 16:15
27	T3.080917.161956	WG624547-03	Laboratory Control S	40/50	1		08/09/17 16:19
28	T3.080917.162336	L17070948-07	P270-775	40/50	2		08/09/17 16:23
29	T3.080917.162732	WG625080-03	Serial Dilution		10	L17070948-07	08/09/17 16:27
30	T3.080917.163127	WG625080-03	Serial Dilution		50	L17070948-07	08/09/17 16:31
31	T3.080917.163523	WG625299-15	CCV		1		08/09/17 16:35
32	T3.080917.163858	WG625299-16	CCB		1		08/09/17 16:38
33	T3.080917.164245	WG624529-02	Method/Prep Blank	40/50	1		08/09/17 16:42
34	T3.080917.164642	WG624529-03	Laboratory Control S	40/50	1		08/09/17 16:46

Page: 1 Approved: August 11, 2017

Kim K Buck

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO3 Dataset: 080917T3.1R.TXT
Analyst1: JYH Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD82800 ICV Std: STD82799 Post Spike: STD80131
ICSA: STD82633 ICSAB: STD82371 Int. Std: RGT37691
CCV: STD82801 LLCCV: Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 625298,624177,625080,625078,625088

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T3.080917.165022	WG624529-01	Reference Sample		1	L17080161-01	08/09/17 16:50
36	T3.080917.165414	WG624529-04	Matrix Spike	40/50	1	L17080161-01	08/09/17 16:54
37	T3.080917.165754	WG624529-05	Matrix Spike Duplica	40/50	1	L17080161-01	08/09/17 16:57
38	T3.080917.170132	L17080162-01	LH18/24-SP650-6461-GRAB	40/50	1		08/09/17 17:01
39	T3.080917.170534	L17080163-01	LH18/24-SP140-7461-GRAB	40/50	1		08/09/17 17:05
40	T3.080917.170927	WG625078-01	Post Digestion Spike		1	L17080163-01	08/09/17 17:09
41	T3.080917.171307	WG625078-02	Serial Dilution		5	L17080163-01	08/09/17 17:13
42	T3.080917.171701	WG625299-17	CCV		1		08/09/17 17:17
43	T3.080917.172036	WG625299-18	CCB		1		08/09/17 17:20
44	T3.080917.172435	WG625299-19	Low Level Continuing Calibra		1		08/09/17 17:24
45	T3.080917.172832	WG624814-02	Method/Prep Blank	40/50	1		08/09/17 17:28
46	T3.080917.173228	WG624814-03	Laboratory Control S	40/50	1		08/09/17 17:32
47	T3.080917.173608	L17080332-02	1802-134 W1		1	WG624814-01	08/09/17 17:36
48	T3.080917.174002	WG624814-04	Matrix Spike	40/50	1	L17080332-02	08/09/17 17:40
49	T3.080917.174340	WG624814-05	Matrix Spike Duplica	40/50	1	L17080332-02	08/09/17 17:43
50	T3.080917.174720	L17080285-01	41512-B01-WQ-W0004	40/50	1		08/09/17 17:47
51	T3.080917.175118	L17080285-02	44201-R01-WQ-W0012	40/50	1		08/09/17 17:51
52	T3.080917.175516	WG625088-01	Post Digestion Spike		1	L17080285-02	08/09/17 17:55
53	T3.080917.175858	WG625088-02	Serial Dilution		5	L17080285-02	08/09/17 17:58
54	T3.080917.180255	WG625299-20	CCV		1		08/09/17 18:02
55	T3.080917.180632	WG625299-21	CCB		1		08/09/17 18:06
56	T3.080917.181031	L17080285-03	44302-F01-WQ-W0009	40/50	1		08/09/17 18:10
57	T3.080917.181429	L17080285-04	81304-W04-WQ-W0016	40/50	1		08/09/17 18:14
58	T3.080917.181826	WG625299-22	Low Level Continuing Calibra		1		08/09/17 18:18
59	T3.080917.182221	WG624177-03	Serial Dilution		5	L17071282-14	08/09/17 18:22
60	T3.080917.182616	WG625299-23	CCV		1		08/09/17 18:26
61	T3.080917.182951	WG625299-24	CCB		1		08/09/17 18:29

Page: 2 Approved: August 11, 2017

Kristi K Buck

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 09-AUG-2017
Analyst: JYH
Analyst: NA
Method: 6010B/6010C/200.7
Instrument: ICP-THERMO3
Curve Workgroup: 625299
Runlog ID: 83883
Analytical Workgroups: 625298,624177,625080,625078,625088

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	002,1282,948,162,163,285
Client Forms	X
Level X	
Level 3	
Level 4	002,1282,948,162,163,285
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	KKB
Comments	

Primary Reviewer:
10-AUG-2017

Secondary Reviewer:
11-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-11-2017 09:12:49

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C AAB#: WG625078

Login Number: L17080162

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
LH18/24-SP650-6461-GRAB	01	08/02/17					08/04/2017	1.7	180		08/09/17	7.1	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5425735
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C AAB#: WG625078

Login Number: L17080162

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
LH18/24-SP650-6461-GRAB	01	08/02/17					08/04/2017	1.7	180		08/09/17	6.8	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5424283
Report generated 08/09/2017 13:53

METHOD BLANK SUMMARY

Login Number:	L17080162	**Work Group:**	WG625078
Blank File ID:	T3.080917.164245	**Blank Sample ID:**	WG624529-02
Prep Date:	08/04/17 08:54	**Instrument ID:**	ICP-THERMO3
Analyzed Date:	08/09/17 16:42	**Method:**	6010C
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG624529-03	T3.080917.164642	08/09/17 16:46	01
LH18/24-SP650-6461-GRAB	L17080162-01	T3.080917.170132	08/09/17 17:01	01

Report Name: BLANK_SUMMARY
PDF File ID: 5425736
Report generated 08/10/2017 12:02

METHOD BLANK SUMMARY

Login Number:	L17080162	Work Group:	WG625078
Blank File ID:	T4.080917.102609	Blank Sample ID:	WG624529-02
Prep Date:	08/04/17 08:54	Instrument ID:	ICP-THERMO4
Analyzed Date:	08/09/17 10:26	Method:	6010C
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG624529-03	T4.080917.102955	08/09/17 10:29	01
LH18/24-SP650-6461-GRAB	L17080162-01	T4.080917.104757	08/09/17 10:47	01

Report Name: BLANK_SUMMARY
PDF File ID: 5424284
Report generated 08/09/2017 13:56

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17080162 Prep Date: 08/04/17 08:54 Sample ID: WG624529-02
Instrument ID: ICP-THERMO3 Run Date: 08/09/17 16:42 Prep Method: 3015A
File ID: T3.080917.164245 Analyst: JYH Method: 6010C
Workgroup (AAB#): WG625078 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-TH-09-AUG-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Selenium, Total	0.00500	0.0200	0.00500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5425737
10-AUG-2017 12:02

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17080162 Prep Date: 08/04/17 08:54 Sample ID: WG624529-02
Instrument ID: ICP-THERMO4 Run Date: 08/09/17 10:26 Prep Method: 3015A
File ID: T4.080917.102609 Analyst: JYH Method: 6010C
Workgroup (AAB#): WG625078 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-TH-09-AUG-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Selenium, Total	0.0100	0.0200	0.0100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5424285
09-AUG-2017 13:56

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17080162 **Run Date:** 08/09/2017 **Sample ID:** WG624529-03
Instrument ID: ICP-THERMO3 **Run Time:** 16:46 **Prep Method:** 3015A
File ID: T3.080917.164642 **Analyst:** JYH **Method:** 6010C
Workgroup (AAB#): WG625078 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD83126 **Cal ID:** ICP-TH-09-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Selenium, Total	0.250	0.270	108	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5425738
Report generated: 08/10/2017 12:02

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17080162 **Run Date:** 08/09/2017 **Sample ID:** WG624529-03
Instrument ID: ICP-THERMO4 **Run Time:** 10:29 **Prep Method:** 3015A
File ID: T4.080917.102955 **Analyst:** JYH **Method:** 6010C
Workgroup (AAB#): WG625078 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD83126 **Cal ID:** ICP-TH-09-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Selenium, Total	0.250	0.227	90.9	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5424286
Report generated: 08/09/2017 13:56

Loginnum:L17080162 Cal ID:ICP-THERMO3- Worknum:WG625078
Instrument ID:ICP-THERMO3 Contract #: Method:6010C
Parent ID:WG624529-01 File ID:T3.080917.165022 Dil:1 Matrix:WATER
Sample ID:WG624529-04 MS File ID:T3.080917.165414 Dil:1 Units:mg/L
Sample ID:WG624529-05 MSD File ID:T3.080917.165754 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Selenium	ND	0.250	0.274	110	0.250	0.269	108	1.83	80 - 120	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: 5425739
Report generated 08/10/2017 12:02

Loginnum:L17080162 Cal ID:ICP-THERMO4- Worknum:WG625078
Instrument ID:ICP-THERMO4 Contract #: Method:6010C
Parent ID:WG624529-01 File ID:T4.080917.103714 Dil:1 Matrix:WATER
Sample ID:WG624529-04 MS File ID:T4.080917.104055 Dil:1 Units:mg/L
Sample ID:WG624529-05 MSD File ID:T4.080917.104426 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Selenium	ND	0.250	0.237	94.9	0.250	0.248	99.3	4.51	80 - 120	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: 5424287
Report generated 08/09/2017 13:57

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17080162 **Worknum:** WG625078
Instrument: ICP-THERMO3 **Method:** 6010C
Serial Dil: WG625078-02 **File ID:** T3.080917.171307 **Dil:** 5 **Units:** ug/L
Sample: L17080163-01 **File ID:** T3.080917.170534 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Selenium	ND	U	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 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: 5425733
08/10/2017 12:02

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17080162 **Worknum:** WG625078
Instrument: ICP-THERMO4 **Method:** 6010C
Serial Dil: WG625078-02 **File ID:** T4.080917.105858 **Dil:** 5 **Units:** ug/L
Sample: L17080163-01 **File ID:** T4.080917.105147 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Selenium	ND	U	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 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: 5424281
08/09/2017 13:56

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17080162 **Worknum:** WG625078
Instrument ID: ICP-THERMO3 **Method:** 6010C
Post Spike ID: WG625078-01 **File ID:** T3.080917.170927 **Dil:** 1 **Units:** ug/L
Sample ID: L17080163-01 **File ID:** T3.080917.170534 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
SELENIUM	220		0	U	200	110.1	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: 5425734
Report generated: 08/10/2017 12:02

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17080162 **Worknum:** WG625078
Instrument ID: ICP-THERMO4 **Method:** 6010C
Post Spike ID: WG625078-01 **File ID:** T4.080917.105529 **Dil:** 1 **Units:** ug/L
Sample ID: L17080163-01 **File ID:** T4.080917.105147 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
SELENIUM	197		0	U	200	98.3	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: 5424282
Report generated: 08/09/2017 13:56

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17080162**	Workgroup (AAB#):	**WG625078**
Analytical Method:	**6010C**	Instrument ID:	**ICP-THERMO3**
ICAL Worknum:	**WG625299**	Initial Calibration Date:	**09-AUG-2017 14:56**

	WG625299-01		WG625299-02		WG625299-03		WG625299-04		WG625299-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
SELENIUM	0	-0.000140	NA	NA	.008	-0.0000600	.4	0.00452	.8	0.00915	.999997	

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: 5425742
Report generated: 10-AUG-2017 11:55

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17080162**	Workgroup (AAB#):	**WG625078**
Analytical Method:	**6010C**	Instrument ID:	**ICP-THERMO4**
ICAL Worknum:	**WG625195**	Initial Calibration Date:	**09-AUG-2017 09:53**

	WG625195-01		WG625195-02		WG625195-03		WG625195-04		WG625195-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
SELENIUM	0	0.0000400	NA	NA	.008	0.000100	.4	0.00632	.8	0.0125	.999571	

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: 5424290
Report generated: 09-AUG-2017 13:53

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625299-07
Instrument ID: ICP-THERMO3 Run Time: 15:03 Method: 6010C
File ID: T3.080917.150324 Analyst: JYH Units: mg/L
Workgroup (AAB#): WG625078 Cal ID: ICP-THERI - 09-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SELENIUM	.004	.016	.004	U

U = Result is less than 2 x MDL
F = Result is between MDL and 2 x MDL
* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 5425744
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17080162
Run Date: 08/09/2017
Sample ID: WG625195-07
Instrument ID: ICP-THERMO4
Run Time: 10:00
Method: 6010C
File ID: T4.080917.100004
Analyst: JYH
Units: mg/L
Workgroup (AAB#): WG625078
Cal ID: ICP-THERI - 09-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SELENIUM	.008	.016	.008	U

U = Result is less than 2 x MDL

F = Result is between MDL and 2 x MDL

* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 5424292
Report generated 08/09/2017 13:53

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17080162 | Run Date: 08/09/2017 | Sample ID: WG625299-12
Instrument ID: ICP-THERMO3 | Run Time: 15:22 | Method: 6010C
File ID: T3.080917.152229 | Analyst: JYH | Units: mg/L
Workgroup (AAB#): WG625078 | Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00400	0.0160	0.00400	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: 5425747
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17080162	Run Date:	08/09/2017	Sample ID:	WG625299-16
Instrument ID:	ICP-THERMO3	Run Time:	16:38	Method:	6010C
File ID:	T3.080917.163858	Analyst:	JYH	Units:	mg/L
Workgroup (AAB#):	WG625078	Cal ID:	ICP-TH - 09-AUG-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00400	0.0160	0.00400	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: 5425747
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17080162	Run Date:	08/09/2017	Sample ID:	WG625299-18
Instrument ID:	ICP-THERMO3	Run Time:	17:20	Method:	6010C
File ID:	T3.080917.172036	Analyst:	JYH	Units:	mg/L
Workgroup (AAB#):	WG625078	Cal ID:	ICP-TH - 09-AUG-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00400	0.0160	0.00400	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: 5425747
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17080162	Run Date:	08/09/2017	Sample ID:	WG625195-13
Instrument ID:	ICP-THERMO4	Run Time:	10:22	Method:	6010C
File ID:	T4.080917.102220	Analyst:	JYH	Units:	mg/L
Workgroup (AAB#):	WG625078	Cal ID:	ICP-TH - 09-AUG-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	0.00800	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: 5424295
Report generated 08/09/2017 13:53

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625195-15
Instrument ID: ICP-THERMO4 Run Time: 11:06 Method: 6010C
File ID: T4.080917.110610 Analyst: JYH Units: mg/L
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.00800	0.0160	-0.00902	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: 5424295
Report generated 08/09/2017 13:53

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625299-06
Instrument ID: ICP-THERMO3 Run Time: 14:59 Method: 6010C
File ID: T3.080917.145947 Analyst: JYH Units: mg/L
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
QC Key: DOD4

Analyte	Expected	Found	%REC	LIMITS	Q
Selenium	.4	0.413	103	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5425743
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625195-06
Instrument ID: ICP-THERMO4 Run Time: 09:56 Method: 6010C
File ID: T4.080917.095636 Analyst: JYH Units: mg/L
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Selenium		.4	0.408	102	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5424291
Report generated 08/09/2017 13:53

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625299-11
Instrument ID: ICP-THERMO3 Run Time: 15:18 Method: 6010C
File ID: T3.080917.151853 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.407	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5425746
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625299-15

Instrument ID: ICP-THERMO3 Run Time: 16:35 Method: 6010C

File ID: T3.080917.163523 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.434	mg/L	109	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5425746

Report generated 08/10/2017 11:55

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625299-17
Instrument ID: ICP-THERMO3 Run Time: 17:17 Method: 6010C
File ID: T3.080917.171701 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.423	mg/L	106	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5425746
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625195-12

Instrument ID: ICP-THERMO4 Run Time: 10:18 Method: 6010C

File ID: T4.080917.101852 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.394	mg/L	98.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5424294

Report generated 08/09/2017 13:53

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625195-14
Instrument ID: ICP-THERMO4 Run Time: 11:02 Method: 6010C
File ID: T4.080917.110242 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.401	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5424294
Report generated 08/09/2017 13:53

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625299-08
Instrument ID: ICP-THERMO3 Run Time: 15:07 Method: 6010C
File ID: T3.080917.150723 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0145	mg/L	90.5	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5425748
Report generated 08/10/2017 12:02

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625299-19
Instrument ID: ICP-THERMO3 Run Time: 17:24 Method: 6010C
File ID: T3.080917.172435 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0162	mg/L	101	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5425748
Report generated 08/10/2017 12:02

Microbac Laboratories Inc.

LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625195-08
Instrument ID: ICP-THERMO4 Run Time: 10:03 Method: 6010C
File ID: T4.080917.100351 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0130	mg/L	81.4	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5424296
Report generated 08/09/2017 13:57

Login Number: L17080162 Run Date: 08/09/2017 Sample ID: WG625195-18
Instrument ID: ICP-THERMO4 Run Time: 11:32 Method: 6010C
File ID: T4.080917.113218 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG625078 Cal ID: ICP-TH - 09-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0130	mg/L	81.3	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5424296
Report generated 08/09/2017 13:57

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17080162 **Workgroup (AAB#):** WG625078
Instrument ID: ICP-THERMO3 **Method:** 6010C
Sol. A : WG625299-09 **File ID:** T3.080917.151119 **Units:** mg/L
Sol. AB : WG625299-10 **File ID:** T3.080917.151512 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Selenium	NS	0.00694	NS	0.250	0.250	100	

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: 5425745
Report generated 08/10/2017 11:55

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17080162 **Workgroup (AAB#):** WG625078
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG625195-10 **File ID:** T4.080917.101118 **Units:** mg/L
Sol. AB : WG625195-11 **File ID:** T4.080917.101510 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Selenium	NS	0.00251	NS	0.250	0.249	99.6	

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: 5424293
Report generated 08/09/2017 13:53

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO3 **Method:** 6010C

Analyte	Wave Length	AG	AL	AS	B	BA
ALUMINUM	308.20	0	0	0	0	0
ANTIMONY	206.80	0	0.0000310	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	0.000250	0	0	0
LITHIUM	670.70	0	0	0	0	0
MAGNESIUM	279.00	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	196.00	0	-0.0000400	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	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	0.00000700	0	0	0
ZIRCONIUM	339.10	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 5425741
Report generated: 08/10/2017 11:55

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO3 **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	279.00	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	196.00	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	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: 5425741
Report generated: 08/10/2017 11:55

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO3 **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	-0.0000210	0	0	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.10	0	0	0	0	0
BORON	249.60	0	-0.000220	0	0	0
CADMIUM	228.80	0	-0.0000100	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	0.000650	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	279.00	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	0.0000420	0	0	0
PHOSPHORUS	214.90	0.0390	0.000900	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	0	-0.000150	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	-0.000300	0	0	0
VANADIUM	292.40	0	0.0000100	0	0	0
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.10	0	-0.0000300	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 5425741
Report generated: 08/10/2017 11:55

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO3 **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	0.00120	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	279.00	-0.00290	-0.0230	0	0	0
MANGANESE	257.60	0	0.0000300	0	0	0
MOLYBDENUM	202.00	0	0	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	196.00	0.000600	0.000580	0	0	0
SILICON	212.40	0	0.0187	0	0	0
SILVER	328.00	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
PDF File ID: 5425741
Report generated: 08/10/2017 11:55

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO3 **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	279.00	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	196.00	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	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
PDF File ID: 5425741
Report generated: 08/10/2017 11:55

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO3 **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	279.00	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	196.00	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	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
PDF File ID: 5425741
Report generated: 08/10/2017 11:55

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO3 **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	279.00	0
MANGANESE	257.60	0
MOLYBDENUM	202.00	0
NICKEL	231.60	0
PHOSPHORUS	214.90	0
POTASSIUM	766.40	0
SELENIUM	196.00	0
SILICON	212.40	0
SILVER	328.00	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: 5425741
Report generated: 08/10/2017 11:55

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5424289
Report generated: 08/09/2017 13:53

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5424289
Report generated: 08/09/2017 13:53

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5424289
Report generated: 08/09/2017 13:53

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5424289
Report generated: 08/09/2017 13:53

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5424289
Report generated: 08/09/2017 13:53

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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
PDF File ID: 5424289
Report generated: 08/09/2017 13:53

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17080162 **Date:** 01/04/2017
Insturment ID: ICP-THERMO4 **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: 5424289
Report generated: 08/09/2017 13:53

Login Number: L17080162 **Date:** 07/10/2017
Insturment ID: ICP-THERMO3 **Method:** 6010C

Analyte	Integration Time (Sec.)	Concentration (mg/L)
Aluminum	10.00	900.0
Antimony	20.00	45.0
Arsenic	10.00	45.0
Barium	10.00	45.0
Beryllium	10.00	4.5
Boron	20.00	45.0
Cadmium	20.00	4.5
Calcium	5.00	270.0
Chromium	20.00	36.0
Cobalt	20.00	45.0
Copper	20.00	90.0
Iron	5.00	630.0
Lead	20.00	180.0
Lithium	5.00	36.0
Magnesium	5.00	900.0
Manganese	10.00	36.0
Molybdenum	20.00	27.0
Nickel	20.00	90.0
Phosphorus	20.00	180.0
Potassium	5.00	360.0
Selenium	20.00	90.0
Silicon	20.00	36.0
Silver	10.00	9.0
Sodium	5.00	360.0
Strontium	5.00	9.0
Thallium	20.00	18.0
Tin	20.00	45.0
Titanium	5.00	45.0
Vanadium	20.00	36.0
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: 5425740
Report generated: 08/10/2017 11:55

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17080162 **Date:** 07/17/2017
Insturment ID: ICP-THERMO4 **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: 5424288
Report generated: 08/09/2017 13:53

2.3 Metals Data

2.3.2 Metals ICP-MS Data

2.3.2.1 Summary Data

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	3015A	**Prep Date:**	08/08/2017 07:50
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	08/10/2017 13:52
Workgroup #:	WG624996	**Analyst:**	JYH	**Run Date:**	08/10/2017 14:47
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	NI.081017.144748
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Barium, Total	7440-39-3	0.165		0.00600	0.00300	0.00150
Lead, Total	7439-92-1	0.00100	U	0.00200	0.00100	0.000500
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.3.2.2 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:	**Example:**
Cs = Concentration computed by the data system (ug/L)	0.1
Vf = Final volume	100
Vi = Initial volume	40
D = Dilution factor as a multiplier (10X = 10)	1
Cx = Concentration of element in (ug/L)	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:	**Example:**
Cs = Concentration computed by the data system (ug/L)	0.1
Vf = Final volume	200
Vi = Initial volume	0.5
D = Dilution factor as a multiplier (10X = 10)	1
Cx = Concentration of element in (ug/kg)	40

4.0 Adjusting the concentration to dry weight:

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

Where:	**Example:**
Cx = Concentration calculated as received (wet basis)	40
Px = Percent solids of sample (%wt)	80
$Cdry$ = Concentration calculated as dry weight (ug/kg)	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: WG624914
Analyst: VC
Spike Analyst: VC
Run Date: 08/08/2017 07:50
Method: 3015A
Balance: BAL016
Instrument: MW-3
Instrument Start: 08/08/2017 07:54

SOP: ME407 Revison 19
Spike Solution: STD80296
Spike Witness: ERP
40 & 50 ML. DIGESTION TU: COA19886
HNO3 Lot #: COA19798
MS Filters- fisher-Lot#r: RGT40686

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG624914-02	BLANK	1	20 mL	50 mL	183.22 g	183.202 g		
2	WG624914-03	LCS	1	20 mL	50 mL	186.125 g	186.118 g	.25 mL	
3	L17070948-01	SAMP	1	20 mL	50 mL	184.931 g	184.908 g		08/17/17
4	L17080162-01	SAMP	1	20 mL	50 mL	183.743 g	183.735 g		08/14/17
5	WG624914-01	REF	1	20 mL	50 mL	182.12 g	182.088 g		
6	L17080163-01	SAMP	1	20 mL	50 mL	182.12 g	182.088 g		08/14/17
7	WG624914-04	MS	1	20 mL	50 mL	182.487 g	182.472 g	.25 mL	
8	WG624914-05	MSD	1	20 mL	50 mL	184.87 g	184.863 g	.25 mL	

Analyst: Vicki Collins

Reviewer: Erin Potter

MW_DIG - Modified 09/30/2009
PDF ID: 5420919
Report generated: 08/08/2017 08:52

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 081017A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

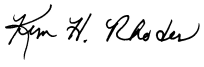
Calibration Std: STD82933 ICV Std: STD83299 Post Spike: STD83027
ICSA: STD83297 ICSAB: STD83298 Int. Std: RGT39300
CCV: STD82932 LLCCV: STD83301 Tuning Sol : STD83302
Stannous : Hydroxylamine :

Workgroups: 624996,625296,625344,625346

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.081017.133940	Blank	Blank		1		08/10/17 13:39
2	NI.081017.134246	WG625463-01	Calibration Point		1		08/10/17 13:42
3	NI.081017.134552	WG625463-02	Calibration Point		1		08/10/17 13:45
4	NI.081017.134858	WG625463-03	Calibration Point		1		08/10/17 13:48
5	NI.081017.135203	WG625463-04	Calibration Point		1		08/10/17 13:52
6	NI.081017.135510	WG625463-05	Initial Calibration Verification		1		08/10/17 13:55
7	NI.081017.135816	WG625463-06	Initial Calib Blank		1		08/10/17 13:58
8	NI.081017.140123	WG625463-07	Low Level Initial Calibration V		1		08/10/17 14:01
9	NI.081017.140428	WG625463-08	Interference Check		1		08/10/17 14:04
10	NI.081017.140734	WG625463-09	Interference Check		1		08/10/17 14:07
11	NI.081017.141041	WG625463-10	CCV		1		08/10/17 14:10
12	NI.081017.141346	WG625463-11	CCB		1		08/10/17 14:13
13	NI.081017.141652	WG624914-02	Method/Prep Blank	20/50	1		08/10/17 14:16
14	NI.081017.141957	WG624914-03	Laboratory Control S	20/50	1		08/10/17 14:19
15	NI.081017.142303	L17070948-01	P270-4402	20/50	1		08/10/17 14:23
16	NI.081017.142608	WG624996-03	Serial Dilution		5	L17070948-01	08/10/17 14:26
17	NI.081017.142913	WG624996-03	Serial Dilution		25	L17070948-01	08/10/17 14:29
18	NI.081017.143220	WG625463-12	CCV		1		08/10/17 14:32
19	NI.081017.143526	WG625463-13	CCB		1		08/10/17 14:35
20	NI.081017.143832	WG624914-01	Reference Sample		1	L17080163-01	08/10/17 14:38
21	NI.081017.144137	WG624914-04	Matrix Spike	20/50	1	L17080163-01	08/10/17 14:41
22	NI.081017.144443	WG624914-05	Matrix Spike Duplica	20/50	1	L17080163-01	08/10/17 14:44
23	NI.081017.144748	L17080162-01	LH18/24-SP650-6461-GRAB	20/50	1		08/10/17 14:47
24	NI.081017.145054	WG624996-01	Post Digestion Spike		1	L17080162-01	08/10/17 14:50
25	NI.081017.145359	WG624996-02	Serial Dilution		5	L17080162-01	08/10/17 14:53
26	NI.081017.145704	WG624996-02	Serial Dilution		25	L17080162-01	08/10/17 14:57
27	NI.081017.150010	WG625463-14	CCV		1		08/10/17 15:00
28	NI.081017.150316	WG625463-15	CCB		1		08/10/17 15:03
29	NI.081017.150623	WG625463-16	Low Level Continuing Calibra		1		08/10/17 15:06
30	NI.081017.151354	WG625256-02	Method/Prep Blank	40/50	50		08/10/17 15:13
31	NI.081017.151659	WG625256-03	Laboratory Control S	40/50	50		08/10/17 15:16
32	NI.081017.152004	WG625110-02	Fluid Blank 2		50		08/10/17 15:20
33	NI.081017.152309	WG625256-01	Reference Sample		50	L17080423-01	08/10/17 15:23
34	NI.081017.152615	WG625256-04	Matrix Spike	5/50	50	L17080423-01	08/10/17 15:26

Page: 1 Approved: August 14, 2017



Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 081017A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

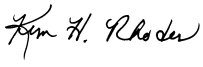
Calibration Std: STD82933 ICV Std: STD83299 Post Spike: STD83027
ICSA: STD83297 ICSAB: STD83298 Int. Std: RGT39300
CCV: STD82932 LLCCV: STD83301 Tuning Sol : STD83302
Stannous : Hydroxylamine :

Workgroups: 624996,625296,625344,625346

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	NI.081017.152920	WG625256-05	Matrix Spike Duplica	5/50	50	L17080423-01	08/10/17 15:29
36	NI.081017.153226	L17080431-01	10 ALAN BAGS	5/50	50		08/10/17 15:32
37	NI.081017.153531	WG625296-01	Post Digestion Spike		50	L17080431-01	08/10/17 15:35
38	NI.081017.153836	WG625296-02	Serial Dilution		50	L17080431-01	08/10/17 15:38
39	NI.081017.154141	WG624363-02	Serial Dilution		250	L17071493-01	08/10/17 15:41
40	NI.081017.154449	WG625463-17	CCV		1		08/10/17 15:44
41	NI.081017.154754	WG625463-18	CCB		1		08/10/17 15:47
42	NI.081017.155809	WG625314-01	Method/Prep Blank	10/100	1		08/10/17 15:58
43	NI.081017.160115	WG625314-02	Laboratory Control S	10/100	1		08/10/17 16:01
44	NI.081017.160421	WG625314-03	Laboratory Control S	10/100	1		08/10/17 16:04
45	NI.081017.160727	L17080535-01	BFB-17-078	0.143/100	1		08/10/17 16:07
46	NI.081017.161032	L17080535-03	BFB-17-079	0.163/100	1		08/10/17 16:10
47	NI.081017.161338	L17080535-05	BFB-17-080	0.202/100	1		08/10/17 16:13
48	NI.081017.161643	L17080535-07	BFB-17-081	0.174/100	1		08/10/17 16:16
49	NI.081017.161948	L17080535-09	BFB-17-082	0.337/100	1		08/10/17 16:19
50	NI.081017.162253	L17080535-11	BFB-17-083	0.417/100	1		08/10/17 16:22
51	NI.081017.162558	L17080535-13	BFB-17-084	0.439/100	1		08/10/17 16:25
52	NI.081017.162906	WG625463-19	CCV		1		08/10/17 16:29
53	NI.081017.163211	WG625463-20	CCB		1		08/10/17 16:32
54	NI.081017.163518	L17080535-15	BFB-17-085	0.108/100	1		08/10/17 16:35
55	NI.081017.163823	L17080535-17	BFB-17-086	0.412/100	1		08/10/17 16:38
56	NI.081017.164129	L17080535-19	BFB-17-087	0.446/100	1		08/10/17 16:41
57	NI.081017.164434	L17080535-21	BFB-17-088	0.339/100	1		08/10/17 16:44
58	NI.081017.164740	L17080535-23	BFB-17-089	0.211/100	1		08/10/17 16:47
59	NI.081017.165045	L17080535-25	BFB-17-090	0.128/100	1		08/10/17 16:50
60	NI.081017.165350	L17080535-27	BFB-17-091	0.287/100	1		08/10/17 16:53
61	NI.081017.165656	WG625344-01	Post Digestion Spike		1	L17080535-01	08/10/17 16:56
62	NI.081017.170001	WG625344-02	Serial Dilution		5	L17080535-01	08/10/17 17:00
63	NI.081017.170308	WG625463-21	CCV		1		08/10/17 17:03
64	NI.081017.170613	WG625463-22	CCB		1		08/10/17 17:06
65	NI.081017.170920	WG625319-02	Method/Prep Blank	.25/100	1		08/10/17 17:09
66	NI.081017.171225	WG625319-03	Laboratory Control S	.25/100	1		08/10/17 17:12
67	NI.081017.171531	L17080087-23	SS-21		1	WG625319-01	08/10/17 17:15
68	NI.081017.171836	WG625319-04	Matrix Spike	.255/100	1	L17080087-23	08/10/17 17:18

Page: 2 Approved: August 14, 2017



Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 081017A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

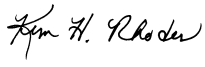
Calibration Std: STD82933 ICV Std: STD83299 Post Spike: STD83027
ICSA: STD83297 ICSAB: STD83298 Int. Std: RGT39300
CCV: STD82932 LLCCV: STD83301 Tuning Sol : STD83302
Stannous : Hydroxylamine :

Workgroups: 624996,625296,625344,625346

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	NI.081017.172141	WG625319-05	Matrix Spike Duplica	.251/100	1	L17080087-23	08/10/17 17:21
70	NI.081017.172446	L17080535-02	BFB-17-078	.259/100	1		08/10/17 17:24
71	NI.081017.172752	L17080535-04	BFB-17-079	.251/100	1		08/10/17 17:27
72	NI.081017.173057	L17080535-06	BFB-17-080	.258/100	1		08/10/17 17:30
73	NI.081017.173403	L17080535-08	BFB-17-081	.251/100	1		08/10/17 17:34
74	NI.081017.173707	L17080535-10	BFB-17-082	.257/100	1		08/10/17 17:37
75	NI.081017.174014	WG625463-23	CCV		1		08/10/17 17:40
76	NI.081017.174320	WG625463-24	CCB		1		08/10/17 17:43
77	NI.081017.174626	L17080535-12	BFB-17-083	.251/100	1		08/10/17 17:46
78	NI.081017.174932	L17080535-14	BFB-17-084	.254/100	1		08/10/17 17:49
79	NI.081017.175237	L17080535-16	BFB-17-085	.255/100	1		08/10/17 17:52
80	NI.081017.175542	L17080535-18	BFB-17-086	.251/100	1		08/10/17 17:55
81	NI.081017.175848	L17080535-20	BFB-17-087	.259/100	1		08/10/17 17:58
82	NI.081017.180152	L17080535-22	BFB-17-088	.256/100	1		08/10/17 18:01
83	NI.081017.180458	L17080535-24	BFB-17-089	.25/100	1		08/10/17 18:04
84	NI.081017.180803	L17080535-26	BFB-17-090	.252/100	1		08/10/17 18:08
85	NI.081017.181109	WG625463-25	CCV		1		08/10/17 18:11
86	NI.081017.181415	WG625463-26	CCB		1		08/10/17 18:14
87	NI.081017.181721	L17080535-28	BFB-17-091	.259/100	1		08/10/17 18:17
88	NI.081017.182026	WG625346-01	Post Digestion Spike		1	L17080535-28	08/10/17 18:20
89	NI.081017.182331	WG625346-02	Serial Dilution		5	L17080535-28	08/10/17 18:23
90	NI.081017.182637	WG625346-02	Serial Dilution		25	L17080535-28	08/10/17 18:26
91	NI.081017.182944	WG625463-27	CCV		1		08/10/17 18:29
92	NI.081017.183249	WG625463-28	CCB		1		08/10/17 18:32

Page: 3 Approved: August 14, 2017



Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 10-AUG-2017
Analyst: JYH
Analyst: NA
Method: 6020/6020A/200.8
Instrument: ICP-MS
Curve Workgroup: 625463
Runlog ID: 83862
Analytical Workgroups: 624996,625296,625344,625346

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	948,162,163,535
Client Forms	X
Level X	
Level 3	535
Level 4	948,162,163
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:
14-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-14-2017 11:06:38

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6020A AAB#: WG624996

Login Number: L17080162

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
LH18/24-SP650-6461-GRAB	01	08/02/17					08/08/2017	5.7	180		08/10/17	8	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5428278
Report generated 08/11/2017 12:18

METHOD BLANK SUMMARY

Login Number:	L17080162	Work Group:	WG624996
Blank File ID:	NI.081017.141652	Blank Sample ID:	WG624914-02
Prep Date:	08/08/17 07:50	Instrument ID:	ICP-MS2
Analyzed Date:	08/10/17 14:16	Method:	6020A
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG624914-03	NI.081017.141957	08/10/17 14:19	01
LH18/24-SP650-6461-GRAB	L17080162-01	NI.081017.144748	08/10/17 14:47	01

Report Name: BLANK_SUMMARY
PDF File ID: 5428279
Report generated 08/11/2017 12:25

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17080162 Prep Date: 08/08/17 07:50 Sample ID: WG624914-02
Instrument ID: ICP-MS2 Run Date: 08/10/17 14:16 Prep Method: 3015A
File ID: NI.081017.141652 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG624996 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-MS-10-AUG-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Barium, Total	0.00150	0.00600	0.00150	1	U
Lead, Total	0.000500	0.00200	0.000500	1	U
Silver, Total	0.000500	0.00200	0.000500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5428280
11-AUG-2017 12:25

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17080162 **Run Date:** 08/10/2017 **Sample ID:** WG624914-03
Instrument ID: ICP-MS2 **Run Time:** 14:19 **Prep Method:** 3015A
File ID: NI.081017.141957 **Analyst:** JYH **Method:** 6020A
Workgroup (AAB#): WG624996 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80296 **Cal ID:** ICP-MS-10-AUG-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Barium, Total	0.125	0.129	103	80 - 120	
Lead, Total	0.125	0.121	96.5	80 - 120	
Silver, Total	0.125	0.117	93.3	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5428281
Report generated: 08/11/2017 12:25

Loginnum:L17080162 Cal ID:ICP-MS2- Worknum:WG624996
Instrument ID:ICP-MS2 Contract #: Method:6020A
Parent ID:WG624914-01 File ID:NI.081017.143832 Dil:1 Matrix:WATER
Sample ID:WG624914-04 MS File ID:NI.081017.144137 Dil:1 Units:mg/L
Sample ID:WG624914-05 MSD File ID:NI.081017.144443 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Barium, Total	1.11	0.125	1.26	125	0.125	1.25	111	1.42	80 - 120	20	*
Lead, Total	ND	0.125	0.129	103	0.125	0.131	105	1.35	80 - 120	20	
Silver, Total	ND	0.125	0.109	87.4	0.125	0.111	88.7	1.51	80 - 120	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: 5428282
Report generated 08/11/2017 12:25

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17080162 **Worknum:** WG624996
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG624996-02 **File ID:** NI.081017.145359 **Dil:** 5 **Units:** ug/L
Sample: L17080162-01 **File ID:** NI.081017.144748 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Barium	66.1		67.6		2.28	
Lead	ND	U	ND	U		
Silver	ND	U	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
PDF File ID: 5428276
08/11/2017 12:25

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17080162 **Worknum:** WG624996
Instrument ID: ICP-MS2 **Method:** 6020A
Post Spike ID: WG624996-01 **File ID:** NI.081017.145054 **Dil:** 1 **Units:** ug/L
Sample ID: L17080162-01 **File ID:** NI.081017.144748 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
BARIUM	119		66.1		50	105.2	75 - 125	
LEAD	52.6		0	U	50	105.2	75 - 125	
SILVER	45.9		0	U	50	91.9	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: 5428277
Report generated: 08/11/2017 12:25

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17080162**	Workgroup (AAB#):	**WG624996**
Analytical Method:	**6020A**	Instrument ID:	**ICP-MS2**
ICAL Worknum:	**WG625463**	Initial Calibration Date:	**10-AUG-2017 13:52**

	WG625463-01		WG625463-02		WG625463-03		WG625463-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
BARIUM	0	21.3	.4	98.3	50	70700	100	144000	.999958	
LEAD	0	587	.4	1270	50	593000	100	1190000	.999938	
SILVER	0	98.3	.4	346	50	229000	100	460000	1	

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: 5428285
Report generated: 11-AUG-2017 12:18

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17080162 Run Date: 08/10/2017 Sample ID: WG625463-06
Instrument ID: ICP-MS2 Run Time: 13:58 Method: 6020A
File ID: NI.081017.135816 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG624996 Cal ID: ICP-MS2 - 10-AUG-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SILVER	.2	.8	.2	U
BARIUM	.6	2.4	.6	U
LEAD	.2	.8	.2	U

U = Result is less than 2 x MDL
F = Result is between MDL and 2 x MDL
* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 5428287
Report generated 08/11/2017 12:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17080162 | Run Date: 08/10/2017 | Sample ID: WG625463-11
Instrument ID: ICP-MS2 | Run Time: 14:13 | Method: 6020A
File ID: NI.081017.141346 | Analyst: JYH | Units: ug/L
Workgroup (AAB#): WG624996 | Cal ID: ICP-MS - 10-AUG-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Barium	0.600	2.40	0.600	U
Lead	0.200	0.800	0.200	U
Silver	0.200	0.800	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: 5428290
Report generated 08/11/2017 12:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17080162 Run Date: 08/10/2017 Sample ID: WG625463-13
Instrument ID: ICP-MS2 Run Time: 14:35 Method: 6020A
File ID: NI.081017.143526 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG624996 Cal ID: ICP-MS - 10-AUG-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Barium	0.600	2.40	0.600	U
Lead	0.200	0.800	0.200	U
Silver	0.200	0.800	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: 5428290
Report generated 08/11/2017 12:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17080162 | Run Date: 08/10/2017 | Sample ID: WG625463-15
Instrument ID: ICP-MS2 | Run Time: 15:03 | Method: 6020A
File ID: NI.081017.150316 | Analyst: JYH | Units: ug/L
Workgroup (AAB#): WG624996 | Cal ID: ICP-MS - 10-AUG-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Barium	0.600	2.40	0.600	U
Lead	0.200	0.800	0.200	U
Silver	0.200	0.800	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: 5428290
Report generated 08/11/2017 12:18

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17080162 Run Date: 08/10/2017 Sample ID: WG625463-05
Instrument ID: ICP-MS2 Run Time: 13:55 Method: 6020A
File ID: NI.081017.135510 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG624996 Cal ID: ICP-MS - 10-AUG-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Barium		50	50.5	101	90 - 110	
Lead		50	48.6	97.3	90 - 110	
Silver		50	49.6	99.1	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5428286
Report generated 08/11/2017 12:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17080162 Run Date: 08/10/2017 Sample ID: WG625463-10
Instrument ID: ICP-MS2 Run Time: 14:10 Method: 6020A
File ID: NI.081017.141041 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG624996 Cal ID: ICP-MS - 10-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0511	mg/L	102	90 - 110		
Lead		0.0500	0.0473	mg/L	94.6	90 - 110		
Silver		0.0500	0.0487	mg/L	97.5	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5428289
Report generated 08/11/2017 12:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17080162 Run Date: 08/10/2017 Sample ID: WG625463-12

Instrument ID: ICP-MS2 Run Time: 14:32 Method: 6020A

File ID: NI.081017.143220 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG624996 Cal ID: ICP-MS - 10-AUG-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0511	mg/L	102	90 - 110		
Lead		0.0500	0.0483	mg/L	96.5	90 - 110		
Silver		0.0500	0.0486	mg/L	97.3	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5428289

Report generated 08/11/2017 12:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17080162 Run Date: 08/10/2017 Sample ID: WG625463-14

Instrument ID: ICP-MS2 Run Time: 15:00 Method: 6020A

File ID: NI.081017.150010 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG624996 Cal ID: ICP-MS - 10-AUG-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0509	mg/L	102	90 - 110		
Lead		0.0500	0.0490	mg/L	98.0	90 - 110		
Silver		0.0500	0.0486	mg/L	97.1	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5428289

Report generated 08/11/2017 12:18

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17080162 Run Date: 08/10/2017 Sample ID: WG625463-07
Instrument ID: ICP-MS2 Run Time: 14:01 Method: 6020A
File ID: NI.081017.140123 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG624996 Cal ID: ICP-MS - 10-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.750	0.707	ug/L	94.3	70 - 130		
Lead		0.200	0.181	ug/L	90.4	70 - 130		
Silver		0.400	0.386	ug/L	96.4	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5428291
Report generated 08/11/2017 12:25

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17080162 Run Date: 08/10/2017 Sample ID: WG625463-16
Instrument ID: ICP-MS2 Run Time: 15:06 Method: 6020A
File ID: NI.081017.150623 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG624996 Cal ID: ICP-MS - 10-AUG-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.750	0.748	ug/L	99.7	70 - 130		
Lead		0.200	0.177	ug/L	88.3	70 - 130		
Silver		0.400	0.359	ug/L	89.7	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5428291
Report generated 08/11/2017 12:25

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17080162 **Workgroup (AAB#):** WG624996
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG625463-08 **File ID:** NI.081017.140428 **Units:** ug/L
Sol. AB : WG625463-09 **File ID:** NI.081017.140734 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Barium	NS	0.164	NS	100	99.7	99.7	
Lead	NS	0.0838	NS	100	92.2	92.2	
Silver	NS	0.000600	NS	100	81.6	81.6	

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: 5428288
Report generated 08/11/2017 12:18

Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L17080162 **Analytical Method:** 6020
Analytical Workgroup: WG624996 **Matrix:** 1
Instrument: ICP-MS2 **Analyst:** JYH
ICAL Date: 10-AUG-2017 13:42

			BISMUTH	GERMANIUM	INDIUM
Sample	Type	Run Date	% Rec	% Rec	% Rec
L17070948-01	SAMP	10-AUG-2017 14:23	103.417	99.627	105.606
L17080162-01	SAMP	10-AUG-2017 14:47	91.887	97.497	105.867
WG624914-02	BLANK	10-AUG-2017 14:16	102.628	98.549	103.996
WG624914-03	LCS	10-AUG-2017 14:19	102.333	99.808	105.561
WG624996-01	PSPK	10-AUG-2017 14:50	91.601	97.609	106.112
WG624996-02	SERIAL	10-AUG-2017 14:53	93.045	94.839	99.899
WG624996-03	SERIAL	10-AUG-2017 14:26	101.086	100.111	104.962
WG625463-05	ICV	10-AUG-2017 13:55	97.43	96.803	100.62
WG625463-06	ICB	10-AUG-2017 13:58	100.188	96.585	100.882
WG625463-07	LLICV	10-AUG-2017 14:01	99.814	97.356	100.792
WG625463-08	ICS	10-AUG-2017 14:04	93.81	91.857	96.768
WG625463-09	ICS	10-AUG-2017 14:07	96.889	93.73	100.627
WG625463-10	CCV	10-AUG-2017 14:10	101.913	99.527	106.163
WG625463-11	CCB	10-AUG-2017 14:13	102.748	98.501	104.982
WG625463-12	CCV	10-AUG-2017 14:32	99.802	98.782	104.176
WG625463-13	CCB	10-AUG-2017 14:35	102.061	98.86	104.578
WG625463-14	CCV	10-AUG-2017 15:00	100.884	102.343	107.06
WG625463-15	CCB	10-AUG-2017 15:03	101.385	99.014	105.658
WG625463-16	LLCCV	10-AUG-2017 15:06	100.915	100.063	105.174

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: 5428284
Report generated: 08/11/2017 12:25

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17080162 **Date:** 04/12/2017
Insturment 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: 5428283
Report generated: 08/11/2017 12:18

2.4 General Chemistry Data

2.4.1 Hexavalent Chromium Data

2.4.1.1 Summary Data

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17080162-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6461-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	06/05/2017 10:10
Workgroup #:	WG624404	**Analyst:**	SDC	**Run Date:**	08/03/2017 12:45
Collect Date:	08/02/2017 15:00	**Dilution:**	1	**File ID:**	00.1708031245-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Hexavalent	18540-29-9	0.0100	U	0.0200	0.0100	0.00500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17080162
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.4.1.2 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: 03-AUG-2017
Analyst: SDC
Analyst: NA
Method: CR-6
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG624404

Calibration/Linearity	06/05/17
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	SDC
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
07-AUG-2017

Secondary Reviewer:
07-AUG-2017

CHECKLIST1 - Modified 03/05/2008
Generated: AUG-07-2017 15:30:29

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 7196A AAB#: WG624404

Login Number: L17080162

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
LH18/24-SP650-6461-GRAB	01	08/02/17					08/03/2017	.9	1		08/03/17	.9	1	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5419554
Report generated 08/07/2017 13:14

METHOD BLANK SUMMARY

Login Number:	L17080162	Work Group:	WG624404
Blank File ID:	00.1708031245-03	Blank Sample ID:	WG624404-01
Prep Date:	08/03/17 12:45	Instrument ID:	UV-2600
Analyzed Date:	08/03/17 12:45	Method:	7196A
Analyst:	SDC		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG624404-02	00.1708031245-04	08/03/17 12:45	
LCS2	WG624404-03	00.1708031245-05	08/03/17 12:45	
LH18/24-SP650-6461-GRAB	L17080162-01	00.1708031245-06	08/03/17 12:45	
DUP	WG624404-06	00.1708031245-08	08/03/17 12:45	

Report Name: BLANK_SUMMARY
PDF File ID: 5419555
Report generated 08/07/2017 13:14

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17080162 Prep Date: 08/03/17 12:45 Sample ID: WG624404-01
Instrument ID: UV-2600 Run Date: 08/03/17 12:45 Prep Method: 7196A
File ID: 00.1708031245-03 Analyst: SDC Method: 7196A
Workgroup (AAB#): WG624404 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-11-JUL-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Chromium, Hexavalent	0.00500	0.0200	0.00500	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5419556
07-AUG-2017 13:14

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17080162 Analyst: SDC Prep Method: 7196A
Instrument ID: UV-2600 Matrix: Water Method: 7196A
Workgroup (AAB#): WG624404 Units: mg/L
QC Key: DOD4 Lot #: STD81994

Sample ID: WG624404-02 LCS File ID: 00.1708031245-04 Run Date: 08/03/2017 12:45
Sample ID: WG624404-03 LCS2 File ID: 00.1708031245-05 Run Date: 08/03/2017 12:45

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chromium, Hexavalent	0.100	0.101	101	0.100	0.101	101	0.481	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5419557
Report generated: 08/07/2017 13:14

2.4.1.3 Raw Data

Curves

Parameter: Cr-6 Low

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: 80872, 82188

Concentration: 50mg/L, 5mg/L

Recipe for preparation of curve standards found in:
SOP: 2184 Revision: 22 Page: 12

Second Source Stock: 81994 (concentration: 2mg/L)

Daily Preparation: 10(2)/200

concentration = =0.1

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
0.2	100	5	540	0.822
0.1	100	5	540	0.432
0.05	100	5	540	0.209
0.02	100	5	540	0.083
0.01	100	5	540	0.041
0.00	100	5	540	0.004
		5	5	
2nd source 0.1	100	5	540	0.423

Analyst: [signature] Date/Time: 6/5/17 @ 1010

DCN#126170

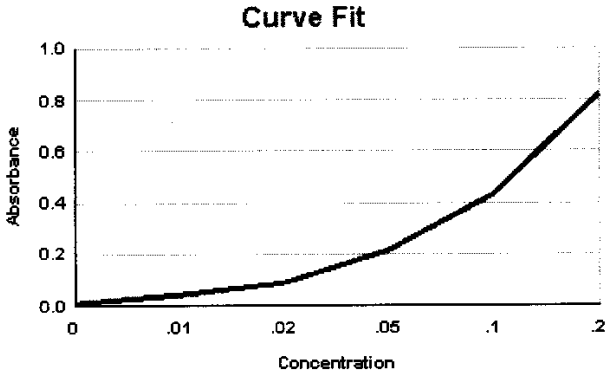
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG616556
Analytical Method:3500CR
Instrument ID:UV-2600

Analyst:ADG
Initial Calibration Date:06/05/2017

Analyte: CHROMIUM, HEXAVALENT
Number of Points: 6
Slope: 4.12523
Y-Intercept: 0.00390207
Coef. Of Correlation (R^2): 0.999348
Coef. Of Correlation (R): 0.999674

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00400	0.00	0.00	0.00390207
0.0100	0.0410	0.000100	0.000410	0.0451544
0.0200	0.0830	0.000400	0.00166	0.0864067
0.0500	0.209	0.00250	0.0105	0.210164
0.100	0.432	0.0100	0.0432	0.416425
0.200	0.822	0.0400	0.164	0.828948



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 06/05/2017 13:03

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG616556
File ID: 00.1706051010-07
CCV ID: WG616556-07
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 06/05/2017
Run Time: 10:10
Analyst: ADG
Cal ID: UV-260 - 05-JUN-17 10:10:06

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.1	0.102	4.23	2.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 06/05/2017 13:03

[redacted]*

WORKGROUP: WG624404

CHROMIUM (6)

(cr6)

Standard Methods 3500 Cr-D (18th, 19th), 3500Cr-B(20th) SPEC: UV-2600

SOP K2186 Rev. # 22 SW846 7196A Curve ID: 6-5-17

SOP OVAP K3500-Cr Rev. # _____ CCV: 82188 LCS: 81994 Spike: 80872 RGT 19852

Matrix: Liquid (mg/L) Daily dilution: 1(5)/100 Daily dilution: 0(2)/200 Daily dilution: 0.2(50)/100 RGT _____

Soil (mg/Kg) Daily dilution: =0.05 Daily dilution: 0.1 Daily dilution: =0.1

Sample	Volume (mL)	pH adj. to 2 ± 0.5	Dilution	Cell size (cm)	Absorbance @ 540 nm
CCV: mg/L(1 cm)	100				
CCV: mg/L(5 cm)	100	✓		5cm	0.206
Blank/CCB:	100	✓		5cm	0.000
LCS: ppm	100	✓		5cm	0.419
LCSDUP: ppm	100	✓		5cm	0.421
08-162-01	100	✓		5cm	0.002
08-163-01	100	✓		5cm	0.000
	100				
	100				
	100				
	100				
	100				
	100				
	100				
CCV: (1 cm)	100				
CCV: (5 cm)	100				
CCB:	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
	100				
DUP: 08-162-01	100	✓		5cm	0.002
MS: ( ) 08-163-01	100	✓		5cm	0.012
MSD: ( )	100				
CCV: (1 cm)	100				SDC 8-3-17
CCV: (5 cm)	100	✓		5cm	~~0.000~~ 0.2056
CCB:	100	✓		5cm	0.000

Analyst: Sheelyn Cooley Date / Time: 8-3-17 , 1245

SW846 7196 (Dup and/or MS every 10 samples) **SM3500 Cr (Dup and MS/MSD every 20 samples)**

DCN#127428

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG624404 **Analyst:** SDC
Analyte: CHROMIUM, HEXAVALENT **Date:** 08/03/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG624404-01	100	100	0	4.125	0.003902	-0.00094590	-0.00094590	1	mg/L
WG624404-02	100	100	0.419	4.125	0.003902	0.10062	0.10062	1	mg/L
WG624404-03	100	100	0.421	4.125	0.003902	0.10111	0.10111	1	mg/L
L17080162-01	100	100	0.00200	4.125	0.003902	-0.00046108	ND	1	mg/L
WG624404-04	100	100	0.00200	4.125	0.003902	-0.00046108	-0.00046108	1	mg/L
WG624404-05	100	100	0	4.125	0.003902	-0.00094590	-0.00094590	1	mg/L
L17080163-01	100	100	0	4.125	0.003902	-0.00094590	ND	1	mg/L
WG624404-06	100	100	0.00200	4.125	0.003902	-0.00046108	-0.00046108	1	mg/L
WG624404-07	100	100	0.0120	4.125	0.003902	0.0019630	0.0019630	1	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 08/04/2017 13:59

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG624632
File ID: 00.1708031245-01
CCV ID: WG624632-01
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 08/03/2017
Run Time: 12:45
Analyst: SDC
Cal ID: UV-260 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0490	4.12	2.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 08/04/2017 13:57

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG624632
File ID: 00.1708031245-10
CCV ID: WG624632-03
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 08/03/2017
Run Time: 12:45
Analyst: SDC
Cal ID: UV-260 - 11-JUL-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0490	4.12	2.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 08/04/2017 13:57

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
August 17, 2017

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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	

Microbac Laboratories Inc.
List of Valid Qualifiers
August 17, 2017

Qualkey: DOD

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.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated 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	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
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 reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
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 LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
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	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
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.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. 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
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
August 17, 2017

Qualkey: DOD

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	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
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

CHAIN OF CUSTODY

Name Of Lab Shipping To: MICROBAC (740) 373-4071 ATTN: STEPHANIE MOSSBURG

Project: AECOM LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS	Project No. 60256135.GWTPT HRUMAR16
Job: **GROUNDWATER TREATMENT PLANT MONTHLY EFFLUENT SAMPLES**	
Prepared By: Scott Beesinger	P.O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: VOLATILES	SILVER, SELENIUM, LEAD, BARIUM	HEXAVALENT CHROMIUM	1, 4 - DIOXANE	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650-6461-Grab	Water	08/02/17 / 15:00		3	X				HCL	
LH18/24-SP650-6461-Grab	Water	08/02/17 / 15:00		3			X	X	NONE	
LH18/24-SP650-6461-Grab	Water	08/02/17 / 15:00		1		X			HNO3	
Trip Blank	Water	08/02/17		2	X				HCL	

Additional Remarks: **STANDARD TURN AROUND TIME**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	08/02/17	15:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

Microbac OVD
Received: 08/03/2017 09:53
By: BRENDA GREGORY
221000104102

Brenda Gregory

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC®

Cooler ID 4102

COOLER TEMP >6° C LOG

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

8/3/17 BLG

pH Exceptions

pH Lot # HC601354

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

8/3/17 BLG

PRESERVATIVE EXCEPTIONS

__NONE

__AS NOTED

BLG 8/3/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17080162
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 14-AUG-2017

Samplenum	Container ID	Products
L17080162-01	944979	625-SPE9

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	03-AUG-2017 10:23	BRG		
2	ANALYZ	L1	ORG4	03-AUG-2017 15:47	JST	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	03-AUG-2017 10:23	BRG		
2	ANALYZ	L1	ORG4	03-AUG-2017 15:47	JST	CLS	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	03-AUG-2017 10:23	BRG		
2	ANALYZ	L1	ORG4	03-AUG-2017 15:48	JST	CLS	

Samplenum	Container ID	Products
L17080162-01	944980	826-SPE2

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	03-AUG-2017 10:23	BRG		
2	PREP	W1	EXT	03-AUG-2017 17:23	JDH	AZH	
3	ANALYZ*	EXT	SEMI	07-AUG-2017 09:39	SCB	JDH	
4	DISP	EXT	DISP	08-AUG-2017 09:11	ZTB	JDH	

***Sample extract/digestate/leachate**

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		03-AUG-2017 10:23	BRG		

***Sample extract/digestate/leachate**

Samplenum	Container ID	Products
L17080162-01	944981	826-SPE2 AG-MS BA-MS PB-MS SE-AX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	03-AUG-2017 10:23	BRG		
2	PREP	W1	DIG	03-AUG-2017 13:40	ERP	BRG	
3	STORE	DIG	A1	08-AUG-2017 10:19	BRG	ERP	
4	ANALYZ*	DIG	METALS	08-AUG-2017 12:48	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

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17080162
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 14-AUG-2017

Samplenum	Container ID	Products
L17080162-01	944982	826-SPE2 826-SPE 827-DIOXANE CR-6

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	03-AUG-2017 10:23	BRG		
2	ANALYZ	W1	WET	03-AUG-2017 10:46	EPT	BRG	
3	STORE	WET	A1	03-AUG-2017 16:54	BRG	SDC	

Samplenum	Container ID	Products
L17080162-02	944983	826-SPE2 826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	03-AUG-2017 10:23	BRG		
2	ANALYZ	L1	ORG4	03-AUG-2017 15:48	JST	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	L1	03-AUG-2017 10:23	BRG		
2	ANALYZ	L1	ORG4	03-AUG-2017 15:48	JST	CLS	

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 MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)