LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

Volume 14

2018

Bate Stamp Numbers
00854913 - 00856762

Prepared for

Department of the Army
Longhorn Army Ammunition Plant

1976 – 2018

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

VOLUME 14

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: 00854913 – 00856762

Response Factor Report HPMS17

Method Path : D:\MassHunter\GCMS\1\methods\
Method File : 826_VMS.M
Title : 8260B/624 SOP:OVL MSV01 WATER 05/04/17 HPMS17
Last Update : Mon May 08 12:39:06 2017
Response Via : Initial Calibration
Curve: WG612871
Calibration Files
0.3 =17M0273332.D 0.4 =17M0273333.D 1 =17M0273334.D 2 =17M0273335.D 5 =17M0273336.D 20 =17M0273337.D
50 =17M0273338.D 100 =17M0273339.D 200 =17M0273340.D 300 =17M0273341.D

		Compound	0.3	0.4	1	2	5	20	50	100	200	300	Avg	%RSD	R^2	
1)	I	Fluorobenzene	----------	ISTD	----------											
2)	T	Dichlorodifluo...			0.309	0.282	0.301	0.342	0.367	0.366	0.354		0.332	10.18		
3)	P	Chloromethane			0.336	0.302	0.308	0.317	0.328	0.336	0.330		0.322	4.20		
4)	C	Vinyl Chloride		0.312	0.334	0.302	0.320	0.328	0.353	0.357	0.351		0.332	6.12#		
5)	T	1,3-Butadiene			0.215	0.182	0.198	0.191	0.200	0.201	0.200		0.198	5.10		
6)	T	Bromomethane			0.241	0.203	0.204	0.199	0.211	0.215	0.210		0.212	6.55		
7)	T	Chloroethane			0.193	0.172	0.185	0.182	0.190	0.153	0.130		0.172	13.44		
8)	T	Trichlorofluor...		0.436	0.452	0.400	0.432	0.428	0.453	0.443	0.417		0.433	4.17		
9)	T	Diethyl ether			0.189	0.195	0.199	0.205	0.204	0.203		0.189	0.198	3.54		
10)	C	1,1-Dichloroet...		0.350	0.391	0.375	0.387	0.391	0.415	0.424	0.396		0.391	5.86#		
11)	T	Carbon Disulfide		0.769	0.779	0.748	0.752	0.781	0.799	0.836	0.804		0.784	3.70		
12)	T	1,1,2-Trichlor...		0.243	0.255	0.243	0.253	0.249	0.263	0.269	0.253		0.254	3.61		
13)	T	Iodomethane				0.213	0.287	0.339	0.360	0.382	0.360		0.324	19.40	0.999	
14)	T	Acrolein			0.014	0.016	0.017	0.018	0.019	0.018		0.018	0.017	8.66		
15)	T	Methylene Chlo...		0.348	0.321	0.297	0.291	0.282	0.289	0.291	0.280		0.300	7.77		
16)	T	Acetone					0.036	0.033	0.036	0.034	0.037	0.035	0.035	3.75		
17)	T	trans-1,2-Dich...		0.250	0.261	0.239	0.257	0.253	0.270	0.275	0.266		0.259	4.45		
18)	T	Methyl acetate		0.115	0.110	0.109	0.108	0.112	0.122	0.119			0.114	4.74		
19)	T	Methyl Tert Bu...		0.586	0.573	0.568	0.606	0.636	0.670	0.673	0.636		0.619	6.70		
20)	P	1,1-Dichloroet...		0.471	0.506	0.462	0.494	0.483	0.503	0.505	0.492		0.489	3.34		
21)	T	Acrylonitrile			0.051	0.054	0.058	0.059	0.064	0.061		0.060	0.058	7.26		
22)	T	Vinyl Acetate					0.035	0.039	0.043	0.044	0.045		0.041	9.70		
23)	T	cis-1,2-Dichlo...		0.272	0.293	0.270	0.286	0.286	0.303	0.309	0.303		0.290	4.91		
24)	T	2,2-Dichloropr...		0.378	0.386	0.355	0.381	0.375	0.400	0.401	0.388		0.383	3.84		
25)	T	Cyclohexane		0.304	0.347	0.327	0.371	0.375	0.412	0.423	0.427		0.373	12.17		
26)	T	Bromochloromet...			0.184	0.183	0.189	0.190	0.200	0.200	0.194		0.191	3.64		
27)	C	Chloroform	0.642	0.627	0.554	0.494	0.501	0.482	0.499	0.505	0.484		0.532	11.65#		
28)	T	Carbon Tetrach...		0.349	0.384	0.335	0.383	0.375	0.407	0.412	0.403		0.381	7.17		
29)	S	Dibromofluorom...					0.265	0.237	0.270	0.275	0.261		0.262	5.52		
30)	T	1,1,1-Trichlor...		0.421	0.431	0.392	0.429	0.419	0.448	0.449	0.436		0.428	4.22		
31)	T	1,1-Dichloropr...		0.304	0.328	0.296	0.333	0.327	0.360	0.366	0.357		0.334	7.70		
32)	T	2-Butanone					0.057	0.057	0.065	0.063	0.065	0.066	0.062	6.51		
33)	T	Benzene		1.059	1.077	0.988	1.053	1.044	1.099	1.112	1.073		1.063	3.57		
34)	S	1,2-Dichloroet...					0.259	0.227	0.249	0.251	0.230		0.243	5.78		
35)	T	1,2-Dichloroet...		0.313	0.327	0.313	0.330	0.320	0.331	0.331	0.319		0.323	2.41		
36)	T	Methylcyclohexane	0.296	0.343	0.368	0.338	0.377	0.376	0.411	0.426	0.433		0.374	11.92		
37)	T	Trichloroethene		0.340	0.314	0.285	0.303	0.299	0.319	0.323	0.315		0.312	5.42		

38)	T	Dibromomethane	0.148	0.159	0.152	0.157	0.156	0.166	0.168	0.163		0.159	4.32	
39)	C	1,2-Dichloropr...	0.279	0.293	0.265	0.286	0.280	0.296	0.304	0.297		0.287	4.40#	
40)	T	Bromodichlorom...	0.348	0.380	0.346	0.364	0.363	0.384	0.393	0.383		0.370	4.73	
41)	T	1,4-Dioxane			0.000	0.000	0.001	0.001	0.001		0.001	0.000	38.44	0.992
42)	T	2-Chloroethyl ...				0.101	0.115	0.130	0.135	0.139	0.143	0.127	12.67	
43)	T	cis-1,3-Dichlo...	0.334	0.378	0.351	0.400	0.424	0.454	0.471	0.463		0.409	12.75	
44)	T	4-Methyl-2-Pen...				0.051	0.054	0.062	0.063	0.064	0.065	0.060	9.84	
45)	T	trans-1,3-Dich...		0.284	0.290	0.325	0.353	0.380	0.393	0.384		0.344	13.08	
46)	I	Chlorobenzene-d5	----------ISTD----------											
47)	S	Toluene-d8				1.210	1.090	1.264	1.292	1.216		1.215	6.37	
48)	C	Toluene	1.445	1.488	1.403	1.559	1.543	1.620	1.626	1.550		1.529	5.18#	
49)	T	Tetrachloroethene	0.449	0.448	0.402	0.436	0.419	0.448	0.453	0.442		0.437	4.08	
50)	T	1,1,2-Trichlor...	0.285	0.304	0.288	0.303	0.293	0.304	0.303	0.287		0.296	2.84	
51)	T	Dibromochlorom...	0.384	0.389	0.395	0.401	0.401	0.419	0.426	0.411		0.403	3.57	
52)	T	1,3-Dichloropr...	0.467	0.480	0.460	0.474	0.474	0.492	0.494	0.472		0.477	2.45	
53)	T	1,2-Dibromoethane	0.288	0.295	0.279	0.295	0.295	0.308	0.308	0.297		0.296	3.25	
54)	T	2-Hexanone			0.116	0.115	0.124	0.140	0.139	0.141	0.150	0.132	10.43	
55)	P	Chlorobenzene	1.042	1.035	0.972	1.020	1.009	1.054	1.081	1.050		1.033	3.18	
56)	T	1-Chlorohexane		0.089	0.076	0.081	0.080	0.086	0.089	0.090		0.085	6.21	
57)	C	Ethylbenzene	0.484	0.516	0.471	0.532	0.531	0.561	0.575	0.564		0.529	7.13#	
58)	T	1,1,1,2-Tetrac...	0.399	0.410	0.380	0.407	0.396	0.408	0.418	0.404		0.403	2.84	
59)	T	m-,p-Xylene	0.527	0.584	0.559	0.631	0.641	0.690	0.710	0.673		0.627	10.38	
60)	T	o-Xylene	0.532	0.574	0.538	0.604	0.619	0.662	0.681	0.664		0.609	9.46	
61)	T	Styrene	0.797	0.850	0.853	0.978	1.035	1.097	1.140	1.098		0.981	13.50	
62)	P	Bromoform	0.258	0.258	0.267	0.272	0.276	0.296	0.302	0.290		0.278	6.06	
63)	T	Isopropylbenzene	1.352	1.424	1.388	1.578	1.608	1.726	1.748	1.657		1.560	9.88	
64)	I	1,4-Dichlorobenzen...	----------ISTD----------											
65)	T	1,3,5-Trimethy...	2.327	2.449	2.232	2.726	2.728	2.876	2.961	2.817		2.639	10.20	
66)	S	p-Bromofluorob...				0.744	0.689	0.855	0.917	0.899		0.821	12.16	
67)	T	Bromobenzene	0.836	0.967	0.930	0.841	0.935	0.926	0.961	0.995	0.976	0.930	6.06	
68)	T	n-Propylbenzene	3.176	3.265	3.064	3.652	3.681	3.901	3.953	3.764		3.557	9.60	
69)	P	1,1,2,2-Tetrac...	0.718	0.732	0.665	0.712	0.686	0.706	0.706	0.673		0.700	3.29	
70)	T	2-Chlorotoluene	2.115	2.179	2.003	2.282	2.216	2.335	2.410	2.328		2.233	5.94	
71)	T	1,2,3-Trichlor...		0.204	0.177	0.198	0.182	0.193	0.194	0.186		0.191	4.97	
72)	T	trans-1,4-Dich...			0.096	0.111	0.127	0.138	0.150	0.144		0.128	16.11	0.998
73)	T	1,2,4-Trimethy...	2.184	2.524	2.368	2.786	2.774	2.900	2.949	2.786		2.659	10.22	
74)	T	4-Chlorotoluene	2.001	2.126	1.940	2.249	2.231	2.339	2.419	2.340		2.206	7.72	
75)	T	tert-Butylbenzene	0.414	0.499	0.464	0.532	0.521	0.552	0.562	0.546		0.511	9.85	
76)	T	sec-Butylbenzene	2.959	3.212	2.955	3.481	3.362	3.552	3.568	3.355		3.306	7.39	
77)	T	p-Isopropyltol...	2.293	2.542	2.367	2.822	2.821	3.042	3.078	2.915		2.735	10.95	
78)	T	1,3-Dichlorobe...	1.635	1.705	1.543	1.690	1.649	1.712	1.766	1.684		1.673	3.95	
79)	T	1,4-Dichlorobe...	1.597	1.676	1.680	1.522	1.676	1.603	1.684	1.743	1.666	1.650	3.93	
80)	T	n-Butylbenzene	2.172	2.277	2.026	2.381	2.472	2.673	2.722	2.599		2.415	10.24	
81)	T	1,2-Dichlorobe...	1.580	1.668	1.681	1.502	1.638	1.577	1.636	1.677	1.587	1.616	3.68	
82)	T	1,2-Dibromo-3-...		0.115	0.111	0.118	0.116	0.126	0.124	0.120		0.119	4.19	
83)	T	Hexachlorobuta...	0.737	0.714	0.595	0.674	0.639	0.675	0.686	0.679		0.675	6.43	
84)	T	1,2,4-Trichlor...	1.061	1.045	0.985	1.096	1.124	1.217	1.284	1.255		1.134	9.47	
85)	T	Naphthalene	1.839	1.765	1.668	1.916	2.111	2.295	2.316	2.170		2.010	12.26	
86)	T	1,2,3-Trichlor...	0.982	1.014	1.015	0.953	1.058	1.078	1.134	1.148	1.111	1.055	6.51	

(#) = Out of Range

826_VMS.M Mon May 08 16:14:46 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17050257 Run Date: 05/04/2017 Sample ID: WG612871-12
Instrument ID: HPMS17 Run Time: 16:55 Method: 8260B
File ID: 17M0273343 Analyst: ADC QC Key: DOD4
ICal Workgroup: WG612871 Cal ID: HPMS17 - 04-MAY-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	45.0	ug/L	0.352	9.90	20	
Chloroform	CCC	50.0	44.4	ug/L	0.472	11.2	20	
Ethylbenzene	CCC	50.0	49.6	ug/L	0.526	0.700	20	
Toluene	CCC	50.0	49.0	ug/L	1.50	1.90	20	
Vinyl Chloride	CCC	50.0	56.7	ug/L	0.376	13.3	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	47.0	ug/L	0.657	6.10	20	
Chloromethane	SPCC	50.0	54.3	ug/L	0.350	8.70	20	
Bromoform	SPCC	50.0	48.4	ug/L	0.268	3.30	20	
Chlorobenzene	SPCC	50.0	47.5	ug/L	0.981	5.00	20	
1,1-Dichloroethane	SPCC	50.0	46.6	ug/L	0.457	6.70	20	
1,1,1-Trichloroethane		50.0	48.7	ug/L	0.417	2.60	20	
1,1,2-Trichloroethane		50.0	46.8	ug/L	0.277	6.40	20	
1,2-Dichloroethane		50.0	46.6	ug/L	0.301	6.90	20	
Acetone		50.0	55.6	ug/L	0.0392	11.3	20	
Benzene		50.0	47.4	ug/L	1.01	5.10	20	
Carbon Tetrachloride		50.0	48.1	ug/L	0.366	3.90	20	
Methylene Chloride		50.0	44.3	ug/L	0.266	11.5	20	
m-,p-Xylene		100	102	ug/L	0.642	2.30	20	
o-Xylene		50.0	51.2	ug/L	0.624	2.40	20	
Styrene		50.0	53.2	ug/L	1.04	6.40	20	
Tetrachloroethene		50.0	48.2	ug/L	0.421	3.60	20	
Trichloroethene		50.0	46.0	ug/L	0.287	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: 5292949
Report generated 05/13/2017 17:48

Login Number: L17050257 Run Date: 05/10/2017 Sample ID: WG613713-02
Instrument ID: HPMS17 Run Time: 12:23 Method: 8260B
File ID: 17M0273575 Analyst: ADC QC Key: DOD4
Workgroup (AAB#): WG613811 Cal ID: HPMS17 - 04-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	49.1	ug/L	0.282	1.71	20	
1,1-Dichloroethene	CCC	50.0	48.4	ug/L	0.378	3.28	20	
Chloroform	CCC	50.0	44.1	ug/L	0.469	11.8	20	
Ethylbenzene	CCC	50.0	51.6	ug/L	0.546	3.23	20	
Toluene	CCC	50.0	51.4	ug/L	1.57	2.77	20	
Vinyl Chloride	CCC	50.0	46.9	ug/L	0.312	6.13	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	42.9	ug/L	0.601	14.1	20	
Bromoform	SPCC	50.0	44.9	ug/L	0.249	10.2	20	
Chlorobenzene	SPCC	50.0	49.0	ug/L	1.01	1.95	20	
Chloromethane	SPCC	50.0	49.0	ug/L	0.316	1.95	20	
1,1-Dichloroethane	SPCC	50.0	49.3	ug/L	0.482	1.47	20	
Xylenes		150	157	ug/L	0.649	4.96	20	
1,1,1-Trichloroethane		50.0	48.3	ug/L	0.413	3.49	20	
1,1,2-Trichloroethane		50.0	45.3	ug/L	0.268	9.31	20	
1,2-Dichloroethane		50.0	44.1	ug/L	0.285	11.9	20	
Acetone		50.0	45.7	ug/L	0.0322	8.57	20	
Benzene		50.0	50.0	ug/L	1.06	0.0932	20	
Carbon Tetrachloride		50.0	50.3	ug/L	0.383	0.518	20	
Methylene Chloride		50.0	45.9	ug/L	0.275	8.22	20	
m-,p-Xylene		100	105	ug/L	0.659	5.03	20	
o-Xylene		50.0	52.4	ug/L	0.639	4.83	20	
Styrene		50.0	53.1	ug/L	1.04	6.26	20	
Tetrachloroethene		50.0	50.6	ug/L	0.443	1.24	20	
Trichloroethene		50.0	48.9	ug/L	0.305	2.29	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5292951
Report generated 05/13/2017 17:48

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

Login Number: L17050257
Instrument ID: HPMS17
Workgroup (AAB#): WG613811

ICAL CCV Number: WG612871-08
CAL ID: HPMS17-04-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG612871-08	NA	NA	131618	257633	341845
Upper Limit	NA	NA	263236	515266	683690
Lower Limit	NA	NA	65809	128817	170923
L17050257-01	1.00	01	116222	244940	329525
L17050257-02	1.00	01	112416	238752	326713
WG613811-01	1.00	01	116301	242068	329406
WG613811-02	1.00	01	120154	241364	327892

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: 5292952
Report generated 05/13/2017 17:48

Microbac Laboratories Inc.

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

Login Number: L17050257
Instrument ID: HPMS17
Workgroup (AAB#): WG613811

ICAL CCV Number: WG612871-08
CAL ID: HPMS17-04-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG612871-08	NA	NA	9.363	8.051	5.274
Upper Limit	NA	NA	9.863	8.551	5.774
Lower Limit	NA	NA	8.863	7.551	4.774
L17050257-01	1.00	01	9.36	8.05	5.27
L17050257-02	1.00	01	9.36	8.05	5.27
WG613811-01	1.00	01	9.36	8.05	5.27
WG613811-02	1.00	01	9.36	8.05	5.27

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: 5292954
Report generated: 05/13/2017 17:48

2.2 General Chemistry Data

2.2.1 Method 9056

2.2.1.1 Summary Data

Microbac

Lab Report #: L17050257
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050257-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP650-6436	**Prep Method:**	9056	**Prep Date:**	05/10/2017 17:56
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG613809	**Analyst:**	CAS	**Run Date:**	05/11/2017 00:20
Collect Date:	05/03/2017 15:00	**Dilution:**	5	**File ID:**	I2_051017-23
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	40.3		10.0	5.00	2.50

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

Microbac

Lab Report #: L17050257
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050257-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP650-6436	**Prep Method:**	9056	**Prep Date:**	05/10/2017 17:56
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG613809	**Analyst:**	CAS	**Run Date:**	05/11/2017 00:40
Collect Date:	05/03/2017 15:00	**Dilution:**	50	**File ID:**	I2_051017-24
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	588		20.0	10.0	5.00

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

Microbac

Lab Report #: L17050257
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)

TCLP Non-Volatile

Analyst(s): BNB
Date: 5-9-17
Filter Lot #: 948003D
Microbac SOP: TCLP01 Rev #: 12

Balance ID: BAL020
pH Probe ID: T5
Temp probe ID: ☒1025 ☐1023

Analyst / Date		Analyst / Date	
BNB 5-9-17		BNB 5-10-17	
Time On	Temp On °C	Time Off	Temp Off °C
1526	22.9	808	21.9

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	05-0534-01	Me	1311	F_2-395	S	100	12.45	12.08	100.05	2013	10.52
D	05-0544-01	300	1312	F_1-83			NA	NA	100.59	2011	10.01
D	05-0544-02								100.63	2012	9.87
D	05-0544-03								100.42	2008	9.95
D	05-0544-04								100.52	2010	9.87
D	05-0544-05								100.77	2015	9.72
D	05-0544-06								100.51	2010	9.88
D	05-0544-07								100.29	2005	9.84
D	05-0544-08								100.68	2013	9.77
D	05-0542-05								100.60	2012	9.73
33	05-0559-01	SV, pH-L	1311	F_1-235	S	100	11.20	4.60	100.27	2005	11.98
NA	FBLK-1	SV, pH-L			NA	NA	NA	NA	100	100	4.91
NA	FBLK-2	Me		F_2-395							2.92
NA	FBLK-1	300	1312	F_1-83							4.25

BNB 5-10-17

*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.

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: 051017 IC2.SEQ

Analyst1: CAS Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 160804254

Eluent ID#: RGT40129

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

Analytical WG613809 (Waters)

Internal STD: NA Surrogate STD: NA Calibration STD STD81395 (04-11-2017)

CCV STD: STD81395 LCS STD: STD81396 MS/MSD STD: STD81396

Comments: System Backpressure: 1771 psi

Sample L17050257-01 was analyzed at dilutions only due to its pre-run screen result for chloride, which was greater than 200 ppm.

Samples L17050487 (-01,02) were analyzed at dilutions only due to their pre-run screen results for sulfate, which were greater than the calibration maximum.

Samples L17050544 (-01,02,03,04) were reported at dilutions due to their initial results for chloride, which were greater than the calibration maximum.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I2_051017-01	ELUENT	1	1		05/10/17 17:18
2	I2_051017-02	DI WATER	1	1		05/10/17 17:37
3	I2_051017-03	WG613810-01 ANION CCV	1	1	STD81395	05/10/17 17:56
4	I2_051017-04	WG613810-02 ANION CCB	1	1		05/10/17 18:15
5	I2_051017-05	WG613809-01 ANION BLANK	1	1		05/10/17 18:34
6	I2_051017-06	WG613809-02 ANION LCS	1	1	STD81396	05/10/17 18:54
7	I2_051017-07	L17050542-05 (CL) REF	1	1		05/10/17 19:13
8	I2_051017-08	WG613809-04 DUP 0542-05	18	1		05/10/17 19:32
9	I2_051017-09	WG613809-05 MS 0542-05	18	1	STD81396	05/10/17 19:51
10	I2_051017-10	WG613809-06 MSD 0542-05	18	1	STD81396	05/10/17 20:10
11	I2_051017-11	L17050544-01 (CL) (NR)	18	1		05/10/17 20:30
12	I2_051017-12	L17050544-02 (CL) (NR)	18	1		05/10/17 20:49
13	I2_051017-13	L17050544-03 (CL) (NR)	18	1		05/10/17 21:08
14	I2_051017-14	L17050544-04 (CL) (NR)	18	1		05/10/17 21:27
15	I2_051017-15	WG613810-03 ANION CCV	1	1	STD81395	05/10/17 21:47
16	I2_051017-16	WG613810-04 ANION CCB	1	1		05/10/17 22:06
17	I2_051017-17	L17050544-05 (CL)	18	1		05/10/17 22:25
18	I2_051017-18	L17050544-06 (CL)	18	1		05/10/17 22:44
19	I2_051017-19	L17050544-07 (CL)	18	1		05/10/17 23:03
20	I2_051017-20	L17050544-08 (CL)	18	1		05/10/17 23:23
21	I2_051017-21	WG613541-01 FLUID BLANK	18	1		05/10/17 23:42
22	I2_051017-22	L17050169-01 (F)	2	1		05/11/17 00:01
23	I2_051017-23	L17050257-01 (CL,SO4) 5x	1	5		05/11/17 00:20
24	I2_051017-24	L17050257-01 RR CL 50x	1	50		05/11/17 00:40
25	I2_051017-25	L17050467-01 (CL,BR,SO4)	2	1		05/11/17 00:59
26	I2_051017-26	L17050467-01 RR CL 5x	2	5		05/11/17 01:18
27	I2_051017-27	WG613810-05 ANION CCV	1	1	STD81395	05/11/17 01:37
28	I2_051017-28	WG613810-06 ANION CCB	1	1		05/11/17 01:56

Page: 1 Approved: 11-MAY-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC2 Dataset: 051017 IC2.SEQ
Analyst1: CAS Analyst2: NA
Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 160804254
Eluent ID#: RGT40129

Workgroups: Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM
Analytical WG613809 (Waters)

Internal STD: NA Surrogate STD: NA STD81395 (04-11-2017)
CCV STD: STD81395 LCS STD: STD81396 STD81396

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
29	I2_051017-29	L17050478-01 (CL) REF	1	1		05/11/17 02:16
30	I2_051017-30	WG613809-08 DUP 0478-01	1	1		05/11/17 02:35
31	I2_051017-31	L17050478-02 (CL)	1	1		05/11/17 02:54
32	I2_051017-32	L17050478-03 (CL)	1	1		05/11/17 03:13
33	I2_051017-33	L17050478-04 (CL)	1	1		05/11/17 03:33
34	I2_051017-34	L17050485-03 (CL,SO4)	2	1		05/11/17 03:52
35	I2_051017-35	L17050487-01 (SO4) 5x	2	5		05/11/17 04:11
36	I2_051017-36	L17050487-02 (SO4) 5x	2	5		05/11/17 04:30
37	I2_051017-37	WG613810-07 ANION CCV	1	1	STD81395	05/11/17 04:49
38	I2_051017-38	WG613810-08 ANION CCB	1	1		05/11/17 05:09
39	I2_051017-39	WG613810-09 ANION CCV	1	1	STD81395	05/11/17 08:56
40	I2_051017-40	WG613810-10 ANION CCB	1	1		05/11/17 09:16
41	I2_051017-41	L17050544-01 RR CL 5x	18	5		05/11/17 09:35
42	I2_051017-42	L17050544-02 RR CL 5x	18	5		05/11/17 09:54
43	I2_051017-43	L17050544-04 RR CL 5x	18	5		05/11/17 10:32
44	I2_051017-44	L17050485-03 RR CL 5x	2	5		05/11/17 10:52
45	I2_051017-45	WG613810-11 ANION CCV	1	1	STD81395	05/11/17 11:11
46	I2_051017-46	WG613810-12 ANION CCB	1	1		05/11/17 11:30
47	I2_051017-47	L17050544-03 RR CL 5x	18	5		05/11/17 12:41
48	I2_051017-48	WG613810-13 ANION CCV	1	1	STD81395	05/11/17 13:01
49	I2_051017-49	WG613810-14 ANION CCB	1	1		05/11/17 13:20
50	I2_051017-50	END	1	1		05/11/17 13:39

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 11-MAY-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: 10-MAY-2017
Analyst: CAS
Analyst: NA
Method: 300/9056
Instrument: IC2
Curve Workgroup: NA
Runlog ID: 82105
Analytical Workgroups: L17050169, 0257, 0467, 0478, 0485, 0487, 0542, 0544

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)	1771 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:
11-MAY-2017

Secondary Reviewer:
11-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-11-2017 16:36:27

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 9056 **AAB#:** WG613809

Login Number: L17050257

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-SP650-6436	01	05/03/17					05/10/2017	7.1	2	*	05/11/17	7.4	2	*
LH18/24-SP650-6436	01	05/03/17					05/10/2017	7.1	2	*	05/11/17	7.4	2	*

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5289449
Report generated 05/11/2017 17:02

METHOD BLANK SUMMARY

Login Number:	L17050257	**Work Group:**	WG613809
Blank File ID:	I2_051017-05	**Blank Sample ID:**	WG613809-01
Prep Date:	05/10/17 17:56	**Instrument ID:**	IC2
Analyzed Date:	05/10/17 18:34	**Method:**	9056
Analyst:	CAS		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG613809-02	I2_051017-06	05/10/17 18:54	01
DUP	WG613809-04	I2_051017-08	05/10/17 19:32	01
LH18/24-SP650-6436	L17050257-01	I2_051017-23	05/11/17 00:20	DL01
LH18/24-SP650-6436	L17050257-01	I2_051017-24	05/11/17 00:40	DL02
DUP	WG613809-08	I2_051017-30	05/11/17 02:35	01

Report Name: BLANK_SUMMARY
PDF File ID: 5289450
Report generated 05/11/2017 17:02

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17050257 Prep Date: 05/10/17 17:56 Sample ID: WG613809-01
Instrument ID: IC2 Run Date: 05/10/17 18:34 Prep Method: 9056
File ID: I2_051017-05 Analyst: CAS Method: 9056
Workgroup (AAB#): WG613809 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: 5289451
11-MAY-2017 17:02

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050257 Run Date: 05/10/2017 Sample ID: WG613809-02
Instrument ID: IC2 Run Time: 18:54 Prep Method: 9056
File ID: I2_051017-06 Analyst: CAS Method: 9056
Workgroup (AAB#): WG613809 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	7.82	97.7	90 - 110	
Sulfate	40.0	39.8	99.5	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5289452
Report generated: 05/11/2017 17:02

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17050257
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: 5289630
Report generated 05/11/2017 17:02

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17050257
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: 5289630
Report generated 05/11/2017 17:02

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number: L17050257
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: 5289630
Report generated 05/11/2017 17:02

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17050257 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: 5289631
Report generated 05/11/2017 17:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17050257 | Run Date: 05/10/2017 | Sample ID: WG613810-02
Instrument ID: IC2 | Run Time: 18:15 | Method: 9056
File ID: I2_051017-04 | Analyst: CAS | Units: mg/L
Workgroup (AAB#): WG613809 | 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: 5289454
Report generated 05/11/2017 17:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050257	Run Date:	05/10/2017	Sample ID:	WG613810-04
Instrument ID:	IC2	Run Time:	22:06	Method:	9056
File ID:	I2_051017-16	Analyst:	CAS	Units:	mg/L
Workgroup (AAB#):	WG613809	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: 5289454
Report generated 05/11/2017 17:02

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050257	Run Date:	05/11/2017	Sample ID:	WG613810-06
Instrument ID:	IC2	Run Time:	01:56	Method:	9056
File ID:	I2_051017-28	Analyst:	CAS	Units:	mg/L
Workgroup (AAB#):	WG613809	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: 5289454
Report generated 05/11/2017 17:02

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050257 Run Date: 05/10/2017 Sample ID: WG613810-01

Instrument ID: IC2 Run Time: 17:56 Method: 9056

File ID: I2_051017-03 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG613809 Cal ID: IC2 - 11-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	7.74	mg/L	4.93	3.28	10	
Sulfate		40.0	39.3	mg/L	6.23	1.65	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5289453

Report generated 05/11/2017 17:02

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050257 Run Date: 05/10/2017 Sample ID: WG613810-03

Instrument ID: IC2 Run Time: 21:47 Method: 9056

File ID: I2_051017-15 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG613809 Cal ID: IC2 - 11-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	7.90	mg/L	4.82	1.31	10	
Sulfate		40.0	40.1	mg/L	6.11	0.205	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5289453

Report generated 05/11/2017 17:02

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050257 Run Date: 05/11/2017 Sample ID: WG613810-05

Instrument ID: IC2 Run Time: 01:37 Method: 9056

File ID: I2_051017-27 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG613809 Cal ID: IC2 - 11-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.00	mg/L	4.75	0.0250	10	
Sulfate		40.0	40.1	mg/L	6.10	0.270	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5289453

Report generated 05/11/2017 17:02

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
May 16, 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	

Microbac Laboratories Inc.
List of Valid Qualifiers
May 16, 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
May 16, 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-SP650-6436	Water	05/03/17 / 15:00		3	3		HCL	
LH18/24-SP650-6436	Water	05/03/17 / 15:00		1		1	NONE	
Trip Blank	Water	05/03/17		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	05/03/17	15:30									

9For 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: 05/04/2017 09:41
By: CARA STRICKLER 221000100390

Cara Strickler

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC

COOLER TEMP >6° C LOG

Cooler ID 390

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

CHD 5/4/17

pH Exceptions

pH Lot # HC693124

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

CHD 5/4/17

PRESERVATIVE EXCEPTIONS

✓ NONE

__ AS NOTED

CHD 5/4/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17050257
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 15-MAY-2017

Samplenum	Container ID	Products
L17050257-01	904354	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	04-MAY-2017 12:57	CLS		
2	ANALYZ	V1	ORG4	04-MAY-2017 15:21	HRF	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	04-MAY-2017 12:57	CLS		
2	ANALYZ	V1	ORG4	04-MAY-2017 15:20	HRF	CLS	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	04-MAY-2017 12:57	CLS		
2	ANALYZ	V1	ORG4	04-MAY-2017 15:20	HRF	CLS	

Samplenum	Container ID	Products
L17050257-01	904355	9056

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	04-MAY-2017 12:57	CLS		
2	PREP	W1	SEM	10-MAY-2017 15:20	CAS	BRG	
3	STORE	SEM	A1	12-MAY-2017 14:32	BRG	CAS	

Samplenum	Container ID	Products
L17050257-02	904356	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	04-MAY-2017 12:57	CLS		
2	ANALYZ	V1	ORG4	04-MAY-2017 15:21	HRF	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	04-MAY-2017 12:57	CLS		
2	ANALYZ	V1	ORG4	04-MAY-2017 15:21	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: L17050427

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 May 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 #: L17050427
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	3.0		J4616881579	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 #: L17050427
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-SP650-6437-GRAB	L17050427-01	05/04/2017 15:00	05/05/2017 09:35

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:**	L17050427
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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	2017-05-16 20:15:23

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050427
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG613870	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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	2017-05-16 18:27:53

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050427
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG613870	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG613870	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG613870	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG613870	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG613870	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG613090	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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	2017-05-16 18:27:17

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050427
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG613090	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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				

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050427
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG613090	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG613090	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG613090	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG613090	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG613086	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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	2017-05-16 18:28:19

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050427
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG613086	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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				

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050427
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG613086	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG613086	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG613086	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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:**	L17050427
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG613086	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-16 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 #: L17050427
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050427-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6437-GRAB	**Prep Method:**	6850	**Prep Date:**	05/11/2017 10:45
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG613876	**Analyst:**	JWR	**Run Date:**	05/11/2017 22:16
Collect Date:	05/04/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39612
Sample Tag:	01	**Units:**	ug/L		

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

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17050427
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050427-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6437-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	05/11/2017 14:38
Workgroup #:	WG613870	**Analyst:**	TB	**Run Date:**	05/11/2017 15:45
Collect Date:	05/04/2017 15:00	**Dilution:**	10	**File ID:**	S2170511003.064
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	17.2		2.00	1.00	0.500

Certificate of Analysis

Sample #:	L17050427-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP650-6437-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	03/09/2017 11:26
Workgroup #:	WG613090	**Analyst:**	DLP	**Run Date:**	05/05/2017 15:30
Collect Date:	05/04/2017 15:00	**Dilution:**	5	**File ID:**	00.1705051530-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	3.59		0.500	0.250	0.125

Certificate of Analysis

Sample #:	L17050427-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6437-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG613086	**Analyst:**	DCM	**Run Date:**	05/06/2017 11:15
Collect Date:	05/04/2017 15:00	**Dilution:**	4	**File ID:**	TC05052017.072
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	89.2		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 #: L17050427
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050427-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6437-GRAB	**Prep Method:**	6850	**Prep Date:**	05/11/2017 10:45
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG613876	**Analyst:**	JWR	**Run Date:**	05/11/2017 22:16
Collect Date:	05/04/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39612
Sample Tag:	01	**Units:**	ug/L		

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

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17050427
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)

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

Comments: ICAL WG611288 : Alternate Source STD80234
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39494	WG611288-01 CCB	1	1		04/24/17 13:27
2	1LM.LM39495	WG611288-02 STD (0.1 ug/L)	1	1	STD80232	04/24/17 13:46
3	1LM.LM39496	WG611288-03 STD (0.2 ug/L)	1	1	STD80232	04/24/17 14:05
4	1LM.LM39497	WG611288-04 STD (0.5 ug/L)	1	1	STD80232	04/24/17 14:24
5	1LM.LM39498	WG611288-05 STD (1.0 ug/L)	1	1	STD80232	04/24/17 14:43
6	1LM.LM39499	WG611288-06 STD (2.0 ug/L)	1	1	STD80232	04/24/17 15:02
7	1LM.LM39500	WG611288-07 STD (5.0 ug/L)	1	1	STD80232	04/24/17 15:21
8	1LM.LM39501	WG611288-08 STD (10 ug/L)	1	1	STD80232	04/24/17 15:40
9	1LM.LM39502	WG611288-09 SSCV (1.0 ug/L)	1	1	STD80234	04/24/17 15:59
10	1LM.LM39503	WG611330-01 CCB	1	1		04/24/17 16:18
11	1LM.LM39504	WG611330-02 CCV (1.0ug/L)	1	1	STD80232	04/24/17 16:37
12	1LM.LM39505	WG611327-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 16:56
13	1LM.LM39506	WG611327-01 MCT (0.2ug/L)	1	1	STD80234	04/24/17 17:14
14	1LM.LM39507	WG611327-02 BLANK	1	1		04/24/17 17:34
15	1LM.LM39508	WG611327-03 LCS (0.2ug/L)	1	1	STD80234	04/24/17 17:52
16	1LM.LM39509	L17040713-06 RS	1	1		04/24/17 18:11
17	1LM.LM39510	L17040713-07 MS	1	1	STD80234	04/24/17 18:30
18	1LM.LM39511	L17040713-08 MSD	1	1	STD80234	04/24/17 18:49
19	1LM.LM39512	L17040713-01	1	1		04/24/17 19:08
20	1LM.LM39513	L17040713-02	1	1		04/24/17 19:27
21	1LM.LM39514	L17040713-03	1	1		04/24/17 19:46
22	1LM.LM39515	L17040713-04	1	1		04/24/17 20:05
23	1LM.LM39516	WG611330-03 CCV (1.0ug/L)	1	1	STD80232	04/24/17 20:24
24	1LM.LM39517	WG611327-08 MRL (0.2ug/L)	1	1	STD80232	04/24/17 20:43
25	1LM.LM39518	WG611330-04 CCB	1	1		04/24/17 21:02
26	1LM.LM39519	L17040713-05	1	1		04/24/17 21:21
27	1LM.LM39520	L17040713-09	1	1		04/24/17 21:40
28	1LM.LM39521	L17040713-10	1	1		04/24/17 21:59
29	1LM.LM39522	L17040713-11	1	1		04/24/17 22:17
30	1LM.LM39523	L17040713-12	1	1		04/24/17 22:36
31	1LM.LM39524	L17040713-13	1	1		04/24/17 22:55
32	1LM.LM39525	WG611330-05 CCV (1.0ug/L)	1	1	STD80232	04/24/17 23:14
33	1LM.LM39526	WG611327-09 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:33

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 STD80234

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM39527	WG611328-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:52
35	1LM.LM39528	WG611330-06 CCB	1	1		04/25/17 00:11
36	1LM.LM39529	WG611328-01 MCT (0.2ug/L)	1	1	STD80234	04/25/17 00:30
37	1LM.LM39530	WG611328-02 BLANK	1	1		04/25/17 00:49
38	1LM.LM39531	WG611328-03 LCS (0.2ug/L)	1	1	STD80234	04/25/17 01:08
39	1LM.LM39532	L17040841-08 RS	1	1		04/25/17 01:27
40	1LM.LM39533	L17040841-09 MS	1	1	STD80234	04/25/17 01:46
41	1LM.LM39534	L17040841-10 MSD	1	1	STD80234	04/25/17 02:05
42	1LM.LM39535	L17040841-01	1	1		04/25/17 02:23
43	1LM.LM39536	L17040841-02	1	1		04/25/17 02:42
44	1LM.LM39537	L17040841-03	1	1		04/25/17 03:01
45	1LM.LM39538	L17040841-04	1	1		04/25/17 03:20
46	1LM.LM39539	WG611330-07 CCV (1.0ug/L)	1	1	STD80232	04/25/17 03:39
47	1LM.LM39540	WG611328-08 MRL (0.2ug/L)	1	1	STD80232	04/25/17 03:58
48	1LM.LM39541	WG611330-08 CCB	1	1		04/25/17 04:17
49	1LM.LM39542	L17040841-05	1	1		04/25/17 04:36
50	1LM.LM39543	L17040841-06	1	1		04/25/17 04:55
51	1LM.LM39544	L17040841-07	1	1		04/25/17 05:14
52	1LM.LM39545	L17040841-11	1	1		04/25/17 05:33
53	1LM.LM39546	L17040841-12	1	1		04/25/17 05:52
54	1LM.LM39547	L17040841-13	1	1		04/25/17 06:11
55	1LM.LM39548	WG611330-09 CCV (1.0ug/L)	1	1	STD80232	04/25/17 06:30
56	1LM.LM39549	WG611328-09 MRL (0.2ug/L)	1	1	STD80232	04/25/17 06:49
57	1LM.LM39550	WG611330-10 CCB	1	1		04/25/17 07:07

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 25-APR-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 051117_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 WG613813 (soils) Analytical WG613876 (waters)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments: Sample L17050687-01 was analyzed at a dilution based on its pre-run screen results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39606	WG613814-01 CCB	1	1		05/11/17 20:22
2	1LM.LM39607	WG613814-02 CCV (1.0ug/L)	1	1	STD80232	05/11/17 20:41
3	1LM.LM39608	WG613876-07 MRL (0.2ug/L)	1	1	STD80232	05/11/17 21:00
4	1LM.LM39609	WG613876-01 MCT (0.2ug/L)	1	1	STD80234	05/11/17 21:19
5	1LM.LM39610	WG613876-02 BLANK	1	1		05/11/17 21:38
6	1LM.LM39611	WG613876-03 LCS (0.2ug/L)	1	1	STD80234	05/11/17 21:57
7	1LM.LM39612	L17050427-01	1	1		05/11/17 22:16
8	1LM.LM39613	L17050687-01 (10,000x)	1	10000		05/11/17 22:35
9	1LM.LM39614	L17050688-01 REF	1	1		05/11/17 22:54
10	1LM.LM39615	L17050688-01 MS	1	1	STD80234	05/11/17 23:13
11	1LM.LM39616	L17050688-01 MSD	1	1	STD80234	05/11/17 23:32
12	1LM.LM39617	WG613814-03 CCV (1.0ug/L)	1	1	STD80232	05/11/17 23:51
13	1LM.LM39618	WG613876-08 MRL (0.2ug/L)	1	1	STD80232	05/12/17 00:10
14	1LM.LM39619	WG613813-07 MRL (2.0ug/kg)	7	1	STD80232	05/12/17 00:29
15	1LM.LM39620	WG613814-04 CCB	1	1		05/12/17 00:48
16	1LM.LM39621	WG613813-01 MCT (2.0ug/kg)	7	1	STD80234	05/12/17 01:07
17	1LM.LM39622	WG613813-02 BLANK	7	1		05/12/17 01:25
18	1LM.LM39623	WG613813-03 LCS (2.0ug/kg)	7	1	STD80234	05/12/17 01:44
19	1LM.LM39624	L17050554-03 REF	7	1		05/12/17 02:03
20	1LM.LM39625	L17050554-03 MS	7	1	STD80234	05/12/17 02:22
21	1LM.LM39626	L17050554-03 MSD	7	1	STD80234	05/12/17 02:41
22	1LM.LM39627	L17050554-01	7	1		05/12/17 03:00
23	1LM.LM39628	L17050554-02	7	1		05/12/17 03:19
24	1LM.LM39629	WG613814-05 CCV (1.0ug/L)	1	1	STD80232	05/12/17 03:38
25	1LM.LM39630	WG613813-08 MRL (2.0ug/kg)	7	1	STD80232	05/12/17 03:57
26	1LM.LM39631	WG613814-06 CCB	1	1		05/12/17 04:16

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 16-MAY-17

Microbac Laboratories Inc.

Data Checklist

Date: 24-APR-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG611288
Runlog ID: 81726
Analytical Workgroups: L17040713, L17040841

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	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:
25-APR-2017
John Richards

Secondary Reviewer:
25-APR-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: APR-25-2017 14:21:32

Microbac Laboratories Inc.

Data Checklist

Date: 11-MAY-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 82195
Analytical Workgroups: L17050427, L17050687, L17050688, L17050554

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)	X
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	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:
16-MAY-2017
John Richards

Secondary Reviewer:
16-MAY-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-16-2017 16:24:13

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG613876

Login Number: L17050427

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-SP650-6437-GRAB	01	05/04/17					05/11/2017	6.8	28		05/11/17	.5	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5296395
Report generated 05/16/2017 14:16

METHOD BLANK SUMMARY

Login Number: L17050427
Work Group: WG613876
Blank File ID: 1LM.LM39610
Blank Sample ID: WG613876-02
Prep Date: 05/11/17 10:45
Instrument ID: LCMS1
Analyzed Date: 05/11/17 21:38
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG613876-07	1LM.LM39608	05/11/17 21:00	01
MCT	WG613876-01	1LM.LM39609	05/11/17 21:19	01
LCS	WG613876-03	1LM.LM39611	05/11/17 21:57	01
LH18/24-SP650-6437-GRAB	L17050427-01	1LM.LM39612	05/11/17 22:16	01
QCMRL	WG613876-08	1LM.LM39618	05/12/17 00:10	01

Report Name: BLANK_SUMMARY
PDF File ID: 5296396
Report generated 05/16/2017 14:16

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050427 Prep Date: 05/11/17 10:45 Sample ID: WG613876-02
Instrument ID: LCMS1 Run Date: 05/11/17 21:38 Prep Method: 6850
File ID: 1LM.LM39610 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-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: 5296397
16-MAY-2017 14:16

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050427 **Run Date:** 05/11/2017 **Sample ID:** WG613876-03
Instrument ID: LCMS1 **Run Time:** 21:57 **Prep Method:** 6850
File ID: 1LM.LM39611 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG613876 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD80234 **Cal ID:** LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.202	101	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5296398
Report generated: 05/16/2017 14:16

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17050427
Analytical Method: 6850
ICAL Workgroup: WG611288

Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.286	4.98	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: 5299793
Report generated 05/18/2017 11:09

Login Number: L17050427
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-02			WG611288-03			WG611288-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	21000.0000	1.332	0.200	38200.0000	1.222	0.500	104000.000	1.335

INT_CAL - Modified 03/06/2008
PDF File ID: 5299793
Report generated 05/18/2017 11:09

Login Number: L17050427
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-05			WG611288-06			WG611288-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	206000.000	1.288	2.00	412000.000	1.312	5.00	955000.000	1.270

INT_CAL - Modified 03/06/2008
PDF File ID: 5299793
Report generated 05/18/2017 11:09

Login Number: L17050427
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-08		
	CONC	RESP	RF
Perchlorate	10.0	1860000.00	1.244

INT_CAL - Modified 03/06/2008
PDF File ID: 5299793
Report generated 05/18/2017 11:09

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17050427 Run Date: 04/24/2017 Sample ID: WG611288-09
Instrument ID: LCMS1 Run Time: 15:59 Method: 6850
File ID: 1LM.LM39502 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG611288 Cal ID: LCMS1 - 24-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.977	ug/L	1.24	2.30	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5299796
Report generated 05/18/2017 11:09

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050427	Run Date:	05/11/2017	Sample ID:	WG613814-01
Instrument ID:	LCMS1	Run Time:	20:22	Method:	6850
File ID:	1LM.LM39606	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG613876	Cal ID:	LCMS1 - 24-APR-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: 5296401
Report generated 05/16/2017 14:16

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17050427 | Run Date: 05/12/2017 | Sample ID: WG613814-04
Instrument ID: LCMS1 | Run Time: 00:48 | Method: 6850
File ID: 1LM.LM39620 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG613876 | Cal ID: LCMS1 - 24-APR-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: 5296401
Report generated 05/16/2017 14:16

Login Number: L17050427 Run Date: 05/11/2017 Sample ID: WG613814-02
Instrument ID: LCMS1 Run Time: 20:41 Method: 6850
File ID: 1LM.LM39607 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG613876 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.01	ug/L	1.29	1.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5296400
Report generated 05/16/2017 14:16

Login Number: L17050427 Run Date: 05/11/2017 Sample ID: WG613814-03
Instrument ID: LCMS1 Run Time: 23:51 Method: 6850
File ID: 1LM.LM39617 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG613876 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.30	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5296400
Report generated 05/16/2017 14:16

Login Number: L17050427 Run Date: 05/11/2017 Sample ID: WG613876-07
Instrument ID: LCMS1 Run Time: 21:00 Prep Method: 6850
File ID: 1LM.LM39608 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.203	102	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5296399
Report generated 05/16/2017 14:16

Login Number: L17050427 Run Date: 05/12/2017 Sample ID: WG613876-08
Instrument ID: LCMS1 Run Time: 00:10 Prep Method: 6850
File ID: 1LM.LM39618 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5296399
Report generated 05/16/2017 14:16

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

Login Number:L17050427
Instrument ID:LCMS1
Workgroup (AAB#):WG613876

ICAL CCV Number:WG611288-05
CAL ID: LCMS1-24-APR-17
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG611288	NA	NA	777000
Upper Limit	NA	NA	1165500
Lower Limit	NA	NA	388500
L17050427-01	1.00	01	672000
WG613876-02	1.00	01	722000
WG613876-03	1.00	01	716000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5296402
Report generated 05/16/2017 14:16

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**	6850	**Samplenum:**	L17050427-01
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39612
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 22:16	**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 #:	L17050427	**Prep Method:**		**Samplenum:**	WG611288-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39495
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 13:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21000	6820	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG611288-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39496
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38200	13500	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG611288-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39497
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	104000	33400	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG611288-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39498
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	65300	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG611288-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39499
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	412000	130000	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG611288-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39500
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	955000	298000	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG611288-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39501
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1860000	603000	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG611288-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39502
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	65000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG613814-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39606
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 20:22	**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 #:	L17050427	**Prep Method:**		**Samplenum:**	WG613814-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39607
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 20:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	179000	57600	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG613814-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39617
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 23:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	64200	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**		**Samplenum:**	WG613814-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39620
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 00:48	**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 #:	L17050427	**Prep Method:**		**Samplenum:**	WG613814-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39629
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 03:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	70200	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**	6850	**Samplenum:**	WG613876-01
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39609
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40100	12100	3.31	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**	6850	**Samplenum:**	WG613876-02
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39610
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	849	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Microbac

Login #:	L17050427	**Prep Method:**	6850	**Samplenum:**	WG613876-03
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39611
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	37800	11800	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**	6850	**Samplenum:**	WG613876-07
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39608
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36900	12800	2.88	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050427	**Prep Method:**	6850	**Samplenum:**	WG613876-08
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39618
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 00:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44200	14400	3.07	2.3	3.8	

2.2 General Chemistry Data

2.2.1 Ammonia Data

2.2.1.1 Summary Data

Microbac

Lab Report #: L17050427
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050427-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6437-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	05/11/2017 14:38
Workgroup #:	WG613870	**Analyst:**	TB	**Run Date:**	05/11/2017 15:45
Collect Date:	05/04/2017 15:00	**Dilution:**	10	**File ID:**	S2170511003.064
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	17.2		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: 11-MAY-2017
Analyst: TB
Analyst: NA
Method: NH3
Instrument: SC2
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG613870 WG613871

Calibration/Linearity	05/11/2017
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:
11-MAY-2017

Secondary Reviewer:
15-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-15-2017 14:05:39

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1 **AAB#:** WG613870

Login Number: L17050427

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-SP650-6437-GRAB	01	05/04/17					05/11/2017	7	28		05/11/17	7	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5293592
Report generated 05/15/2017 10:53

METHOD BLANK SUMMARY

Login Number:	L17050427	Work Group:	WG613870
Blank File ID:	S2170511003.011	Blank Sample ID:	WG613870-01
Prep Date:	05/11/17 14:42	Instrument ID:	SMARTCHEM2
Analyzed Date:	05/11/17 14:42	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	WG613870-02	S2170511003.012	05/11/17 14:43	01
DUP	WG613870-05	S2170511003.037	05/11/17 15:09	01
LH18/24-SP650-6437-GRAB	L17050427-01	S2170511003.064	05/11/17 15:45	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5293593
Report generated 05/15/2017 10:53

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050427 Prep Date: 05/11/17 14:42 Sample ID: WG613870-01
Instrument ID: SMARTCHEM2 Run Date: 05/11/17 14:42 Prep Method: 350.1
File ID: S2170511003.011 Analyst: TB Method: 350.1
Workgroup (AAB#): WG613870 Matrix: Water Units: mg/L
Contract #: Cal ID: SMARTC-11-MAY-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: 5293594
15-MAY-2017 10:53

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050427 **Run Date:** 05/11/2017 **Sample ID:** WG613870-02
Instrument ID: SMARTCHEM2 **Run Time:** 14:43 **Prep Method:** 350.1
File ID: S2170511003.012 **Analyst:** TB **Method:** 350.1
Workgroup (AAB#): WG613870 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80299 **Cal ID:** SMARTC-11-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.81	90.3	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5293595
Report generated: 05/15/2017 10:53

2.2 General Chemistry Data

2.2.2 Orthophosphate Data

2.2.2.1 Summary Data

Microbac

Lab Report #: L17050427
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050427-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP650-6437-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	03/09/2017 11:26
Workgroup #:	WG613090	**Analyst:**	DLP	**Run Date:**	05/05/2017 15:30
Collect Date:	05/04/2017 15:00	**Dilution:**	5	**File ID:**	00.1705051530-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	3.59		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: 05-MAY-2017
Analyst: DLP
Analyst: NA
Method: PO4
Instrument: V-1200
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG613090

Calibration/Linearity	03-09-17
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	DLP
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
05-MAY-2017

Secondary Reviewer:
15-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-15-2017 14:13:48

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.2 **AAB#:** WG613090

Login Number: L17050427

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-SP650-6437-GRAB	01	05/04/17					05/05/2017	1	2		05/05/17	1	2	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5288914
Report generated 05/11/2017 13:59

METHOD BLANK SUMMARY

Login Number:	L17050427	**Work Group:**	WG613090
Blank File ID:	00.1705051530-03	**Blank Sample ID:**	WG613090-01
Prep Date:	05/05/17 15:30	**Instrument ID:**	V-1200
Analyzed Date:	05/05/17 15:30	**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	WG613090-02	00.1705051530-04	05/05/17 15:30	
LCS2	WG613090-03	00.1705051530-05	05/05/17 15:30	
LH18/24-SP650-6437-GRAB	L17050427-01	00.1705051530-06	05/05/17 15:30	
DUP	WG613090-05	00.1705051530-07	05/05/17 15:30	

Report Name: BLANK_SUMMARY
PDF File ID: 5288915
Report generated 05/11/2017 13:59

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L17050427 Prep Date:05/05/17 15:30 Sample ID:WG613090-01
Instrument ID:V-1200 Run Date:05/05/17 15:30 Prep Method:365.2
File ID:00.1705051530-03 Analyst:DLP Method:365.2
Workgroup (AAB#):WG613090 Matrix:Water Units:mg/L
Contract #: Cal ID:V-1200-12-APR-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: 5288916
11-MAY-2017 13:59

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050427 Analyst: DLP Prep Method: 365.2
Instrument ID: V-1200 Matrix: Water Method: 365.2
Workgroup (AAB#): WG613090 Units: mg/L
QC Key: DOD4 Lot #: STD81764

Sample ID: WG613090-02 LCS File ID: 00.1705051530-04 Run Date: 05/05/2017 15:30
Sample ID: WG613090-03 LCS2 File ID: 00.1705051530-05 Run Date: 05/05/2017 15:30

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	0.781	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5288917
Report generated: 05/11/2017 13:59

2.2.2.3 Raw Data

Std605653

Curves

Parameter: PO4

Spectrophotometer: V-1200

Calibration (Curve) standard stock: 79440

Concentration: 1000 mg/L

Recipe for preparation of curve standards found in:
SOP: 3653 Revision: H Page: 9

Second Source Stock: Std80857 (concentration: 10)

Daily Preparation: 10(10)/100 ÷ 2

concentration = 1.0

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
1.0	50	1cm	880	0.635
0.7	↓	↓	↓	0.440
0.5	↓	↓	↓	0.318
0.2	↓	↓	↓	0.129
0.1	↓	↓	↓	0.067
0.05	↓	↓	↓	0.038
0	↓	↓	↓	0.007
	↓	↓	↓	
2nd Source 1.0	↓	↓	↓	0.631

Analyst: April Greene Date/Time: 3/9/17 @ 0112

DCN#124439

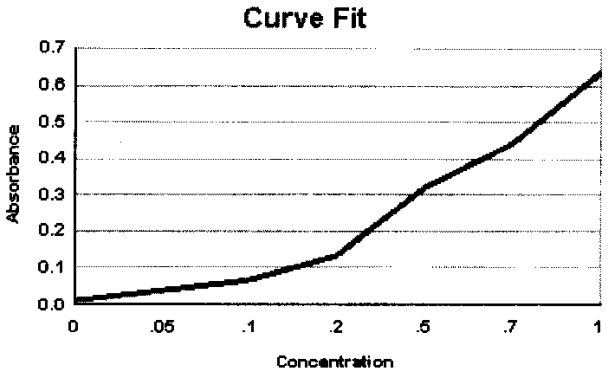
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG605653
Analytical Method:300
Instrument ID:V-1200

Analyst:ADG
Initial Calibration Date:03/09/2017

Analyte: ORTHOPHOSPHATE
Number of Points: 7
Slope: 0.626650
Y-Intercept: 0.00514888
Coef. Of Correlation (R^2): 0.999901
Coef. Of Correlation (R): 0.999951

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00700	0.00	0.00	0.00514888
0.0500	0.0380	0.00250	0.00190	0.0364814
0.100	0.0670	0.0100	0.00670	0.0678139
0.200	0.129	0.0400	0.0258	0.130479
0.500	0.318	0.250	0.159	0.318474
0.700	0.440	0.490	0.308	0.443804
1.00	0.635	1.00	0.635	0.631799



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 03/09/2017 12:03

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG605653
File ID: 00.1703091126-08
CCV ID: WG605653-08
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 03/09/2017
Run Time: 11:26
Analyst: ADG
Cal ID: V-1200 - 09-MAR-17 11:26:07

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	1	0.999	0.631	0.1	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 03/09/2017 12:06

[redacted]

WORKGROUP: WG613090

Orthophosphate

(orthophosphate1)

EPA 365.2 / SM4500-P E
SOP K3653 Rev 17
Color Reagent Chemicals
RGT 39679
RGT 38726
RGT 39475
Cob 18278

CCV: STD 81763 Daily Dilution: 5L 5/50 = Daily Dilution: 0.5
LCS: STD 81764 Daily Dilution: 1(10)/100 = Daily Dilution: 2.0
Spectrophotometer: V-1200 Curve ID: 605653 3-09-17

Spike: STD 81764 Daily Dilution: 2(10)/50 = Daily Dilution: 0.4

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: 0.5 mg/L	50	✓		0.327
BLK/CCB:	50	✓		0.000
LCS: 1.0 ppm	50	✓		0.643
LCSD: ppm	50	✓		0.648
05-427-01	50	✓	V5	0.455
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP 05-427-01	50	✓	V5	0.455
MS: ( )427-01	50	✓	V5	0.496
MSD: ( )	50			
CCV: ( )0.5	50	✓		0.325
CCB: 0.00	50	✓		0.001

Analyst: Courtney Rupp Date / Time: 05-05-17 1530

DCN#125676

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG613090
Analyte: ORTHOPHOSPHATE

Analyst: DLP
Date: 05/05/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG613090-01	50	50	0	0.6267	0.005149	-0.0082165	-0.0082165	1	mg/L
WG613090-02	50	50	0.643	0.6267	0.005149	1.0179	1.0179	1	mg/L
WG613090-03	50	50	0.648	0.6267	0.005149	1.0259	1.0259	1	mg/L
L17050427-01	50	50	0.455	0.6267	0.005149	0.71787	3.5893	5	mg/L
WG613090-04	50	50	0.455	0.6267	0.005149	0.71787	3.5893	5	mg/L
WG613090-05	50	50	0.455	0.6267	0.005149	0.71787	3.5893	5	mg/L
WG613090-06	50	50	0.496	0.6267	0.005149	0.78329	3.9165	5	mg/L

[redacted]

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 05/05/2017 17:31

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG613144
File ID: 00.1705051530-01
CCV ID: WG613144-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 05/05/2017
Run Time: 15:30
Analyst: DLP
Cal ID: V-1200 - 12-APR-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.514	0.654	2.8	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

[redacted]

WET_WG_CCV - Modified 03/06/2008

Report generated 05/05/2017 17:30

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG613144
File ID: 00.1705051530-09
CCV ID: WG613144-03
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 05/05/2017
Run Time: 15:30
Analyst: DLP
Cal ID: V-1200 - 12-APR-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.510	0.650	2.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/05/2017 17:30

[redacted]

2.2 General Chemistry Data

2.2.3 Total Organic Carbon Data

2.2.3.1 Summary Data

Microbac

Lab Report #: L17050427
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050427-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6437-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG613086	**Analyst:**	DCM	**Run Date:**	05/06/2017 11:15
Collect Date:	05/04/2017 15:00	**Dilution:**	4	**File ID:**	TC05052017.072
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	89.2		8.00	4.00	2.00

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: 05-MAY-2017
Analyst: DCM
Analyst: NA
Method: TOC
Instrument: TOC-VWP
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG613086 WG613085

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	DIH
Comments	

Primary Reviewer:
08-MAY-2017

Secondary Reviewer:
09-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-09-2017 14:54:59

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 415.1 AAB#: WG613086

Login Number: L17050427

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-SP650-6437-GRAB	01	05/04/17					05/06/2017	1.8	28		05/06/17	1.8	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5283890
Report generated 05/09/2017 11:38

METHOD BLANK SUMMARY

Login Number:	L17050427	**Work Group:**	WG613086
Blank File ID:	TC05052017.029	**Blank Sample ID:**	WG613086-01
Prep Date:	05/05/17 20:34	**Instrument ID:**	TOC-VWP
Analyzed Date:	05/05/17 20:34	**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	WG613086-02	TC05052017.030	05/05/17 20:53	01
LCS2	WG613086-03	TC05052017.031	05/05/17 21:14	01
DUP	WG613086-08	TC05052017.048	05/06/17 02:56	01
LH18/24-SP650-6437-GRAB	L17050427-01	TC05052017.072	05/06/17 11:15	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5283891
Report generated 05/09/2017 11:38

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050427 Prep Date: 05/05/17 20:34 Sample ID: WG613086-01
Instrument ID: TOC-VWP Run Date: 05/05/17 20:34 Prep Method: 415.1
File ID: TC05052017.029 Analyst: DCM Method: 415.1
Workgroup (AAB#): WG613086 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: 5283892
09-MAY-2017 11:38

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050427 Analyst: DCM Prep Method: 415.1
Instrument ID: TOC-VWP Matrix: Water Method: 415.1
Workgroup (AAB#): WG613086 Units: mg/L
QC Key: DOD4 Lot #: STD80787

Sample ID: WG613086-02 LCS File ID: TC05052017.030 Run Date: 05/05/2017 20:53
Sample ID: WG613086-03 LCS2 File ID: TC05052017.031 Run Date: 05/05/2017 21:14

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	24.5	98.0	25.0	24.9	99.4	1.38	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5283893
Report generated: 05/09/2017 11:38

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 for point Preparation	
53		
54		
55		
56		
57		
58		
59		
60	5/200 (100) = 25	
61		
62		
63		
64		
65		
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67		
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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

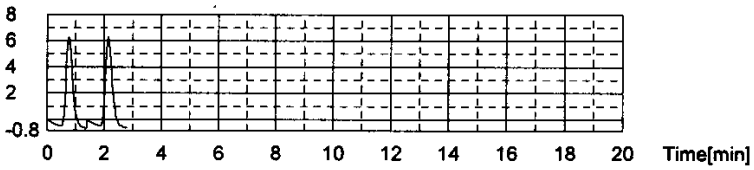
Sample Name:	TCCURVE
Sample ID:	Untitled
Cal. Curve:	TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status	Completed

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

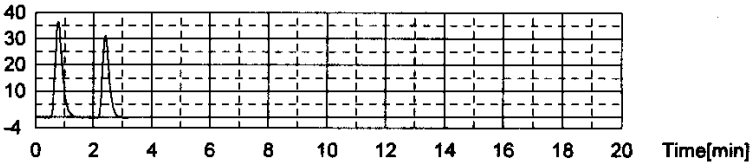
Acid Add. 0.000%
Mean Area 10.82



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

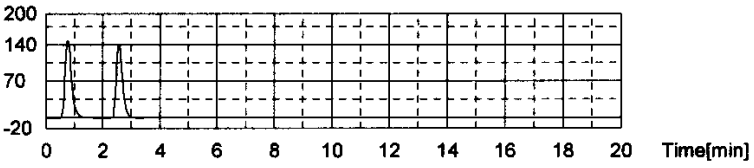
Acid Add. 0.000%
Mean Area 57.92



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

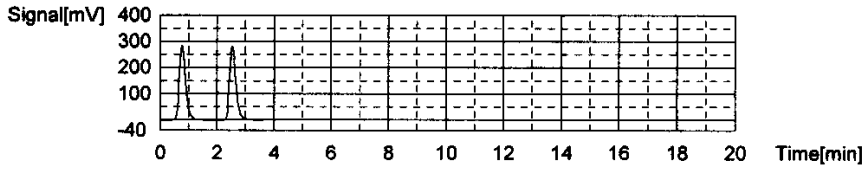
Acid Add. 0.000%
Mean Area 227.4



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

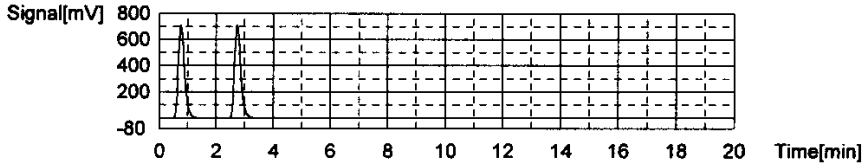
Acid Add. 0.000%
Mean Area 440.2



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

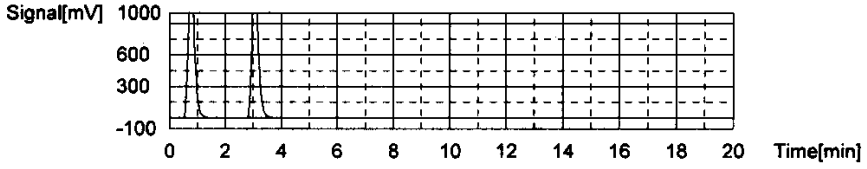
Acid Add. 0.000%
Mean Area 1092



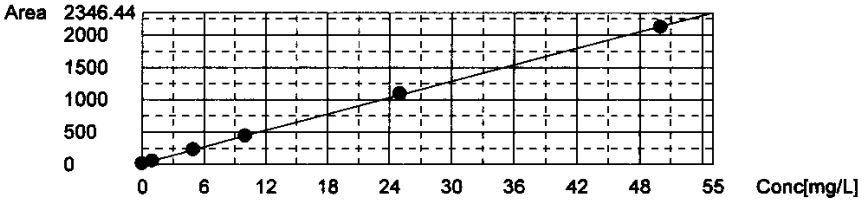
Conc: 50.00mg/L

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

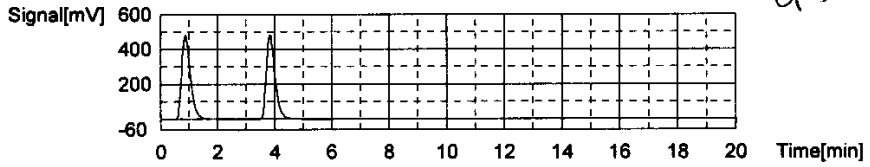
1. Det

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

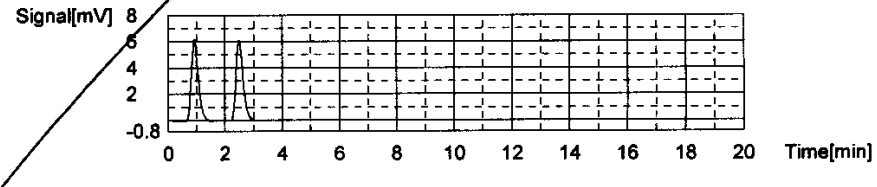
Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed

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

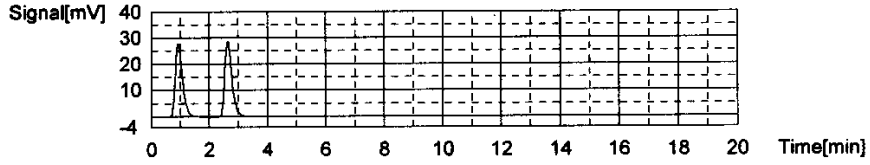
Acid Add. 3.000%
Mean Area 10.51



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



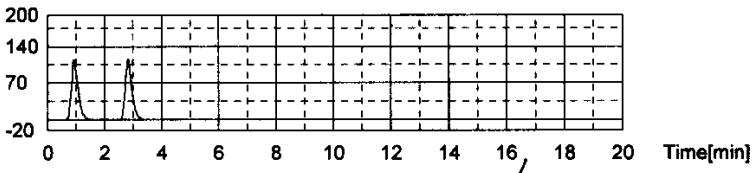
Conc: 5.000mg/L

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

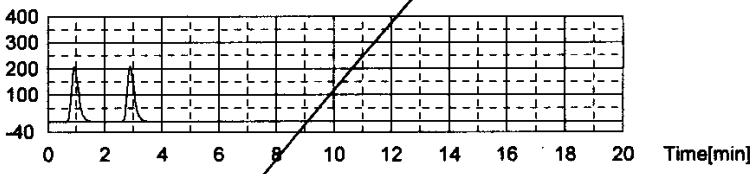
Acid Add. 3.000%
Mean Area 189.6



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

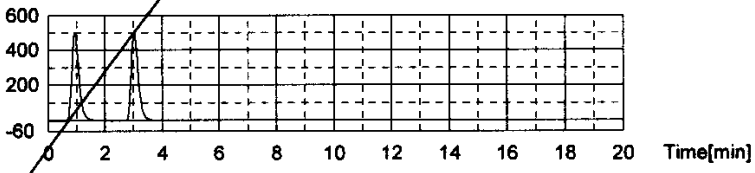
Acid Add. 3.000%
Mean Area 361.4



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

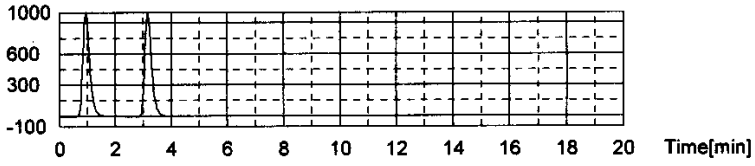
Acid Add. 3.000%
Mean Area 858.1



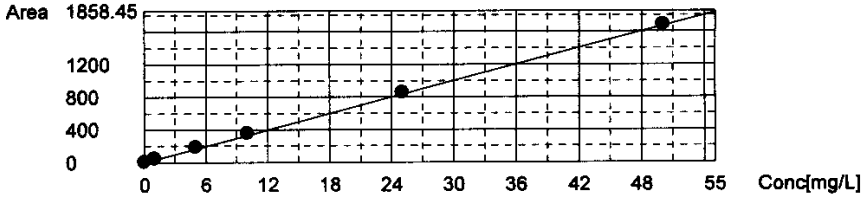
Conc: 50.00mg/L

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

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

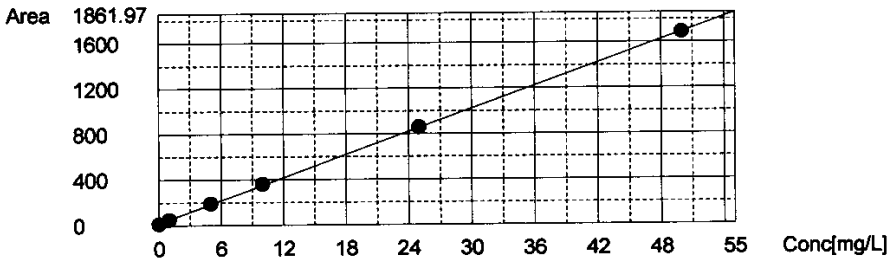
Acid Add.	3.000%
Mean Area	858.1
SD Area	1.697
CV Area	0.20%
Vial	4

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

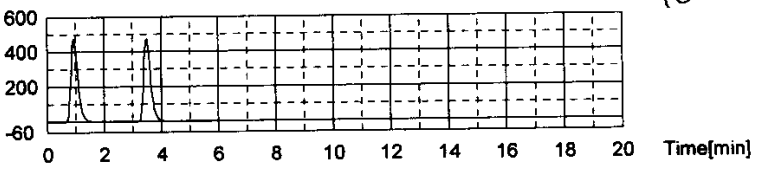
1. Det

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

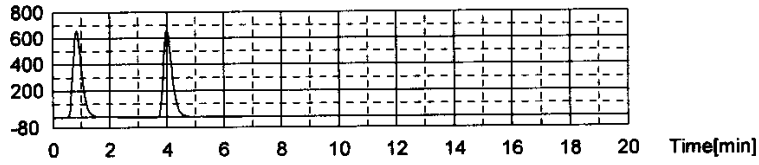
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

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

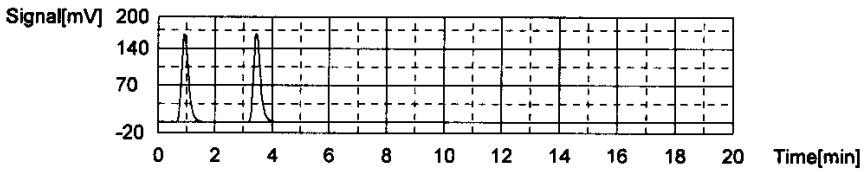
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

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

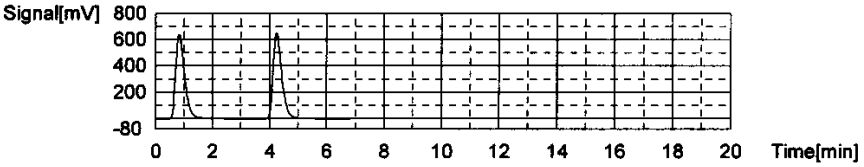
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

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: WG613085
(613086)

dcm 5/5/17

Total Organic Carbon

MAKE DAILY

CCV (TOC): Std ~~80787~~ 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 0.4(1000)/40 = 10

Calibration Curve Date: 2/10/17

Reagent: RGT 40069 RGT 39266

☑ SM5310-C : Matrix 2 WG 613086
☑ EPA 415.1/9060A(mod): Matrix 1 WG 613085 SOP: K 4151 Rev. 19
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	Position	Sample ID	Dilution	Position	Sample ID	Dilution
1	TIC		26	CCV		51	CCB	
2	TOC/TIC		27	CCB		52	C5-429-C1	1/3
3	CCV		28	MS C5-419-C7		53	C2	1/3
4	Blk		29	Blk		54	C3	
5	LCS		30	LCS		55	C5-431-C1	
6	LCSDUP		31	LCSDUP		56	C3	1/2
7	05-290-C1		32	C5-261-C1	1/5	57	C5	
8	C2		33	C2		58	05-427-C1	1/25
9	05-244-C2		34	C5-262-C1	1/5	59	05-440-C1	
10	C3		35	MS C2	1/5	60	C3 ~~C2~~	
11	C4		36	MSD C3	1/5	61	C4 ~~C4~~	
12	C5		37	C4		62	CCV	
13	C6		38	CCV		63	CCB	
14	CCV		39	CCB		64	CCV	
15	CCB		40	C5-421-C1		65	CCB	
16	C5-244-C7		41	C3		66	290-01	~~1/2~~ 1/3
17	C5-255-C1		42	C5		67	02	1/3
18	C5-419-C1		43	C7		68	244-04	1/2
19	C2		44	C9		~~69~~ 1	419-06	1/2
20	C3		45	11		~~70~~ 2	429-02	1/25
21	C4		46	13		~~71~~ 3	431-05	~~1/3~~ 1/2
22	C5		47	15		~~72~~ 4	427-01	~~1/3~~
23	C6		48	DUP 05-421-11		~~73~~ 5	CCV	
24	C7		49	05-184-11		~~74~~ 6	CCB	
25	DUP C5-419-C7		50	CCV		75		

dcm 5/5/17; dcm 5/6/17; dcm 5/6/17; dcm 5/6/17 1/4

Analyst: David Merkle Date/Time: 5/5/17 1442

DCN#125674

C:\TOC3201\Data\05-05-2017-DCM-TOC.t32

	Analysis	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:1.591mg/L TC:24.69mg/L IC:23.10mg/L	Complete	5/5/2017 2:42:18 PM	1
2	TOC	TOC/TIC	TOC:25.02mg/L TC:32.87mg/L IC:7.851mg/L	Complete	5/5/2017 2:54:50 PM	2
3	TOC	CCV	!!Error!! TOC:23.12mg/L TC:22.76mg/L IC:-0.3660mg/L	Complete	5/5/2017 3:06:57 PM	3
4	TOC	WG613085-01 BLK	!!Error!! TOC:0.1455mg/L TC:-0.2056mg/L IC:-0.3512mg/	Complete	5/5/2017 3:15:43 PM	0
5	TOC	WG613085-02 LCS	!!Error!! TOC:24.75mg/L TC:24.36mg/L IC:-0.3855mg/L	Complete	5/5/2017 3:27:45 PM	5
6	TOC	WG613085-03 LCSDUP	!!Error!! TOC:24.68mg/L TC:24.29mg/L IC:-0.3866mg/L	Complete	5/5/2017 3:39:47 PM	6
7	TOC		!!Error!! TOC:-1.694mg/L TC:61.01mg/L IC:62.70mg/L	Complete	5/5/2017 4:00:38 PM	7
8	TOC		!!Error!! TOC:-17.56mg/L TC:86.03mg/L IC:103.6mg/L	Complete	5/5/2017 4:16:03 PM	8
9	TOC	L17050244-02	TOC:0.1355mg/L TC:49.10mg/L IC:48.96mg/L	Complete	5/5/2017 4:28:54 PM	9
10	TOC	L17050244-03	!!Error!! TOC:-0.3236mg/L TC:49.03mg/L IC:49.35mg/L	Complete	5/5/2017 4:42:17 PM	10
11	TOC		!!Error!! TOC:-2.192mg/L TC:53.73mg/L IC:55.92mg/L	Complete	5/5/2017 4:56:53 PM	11
12	TOC	L17050244-05	TOC:0.8355mg/L TC:47.92mg/L IC:47.08mg/L	Complete	5/5/2017 5:10:08 PM	12
13	TOC	L17050244-06	TOC:5.828mg/L TC:23.98mg/L IC:18.16mg/L	Complete	5/5/2017 5:22:59 PM	13
14	TOC	CCV	!!Error!! TOC:23.17mg/L TC:22.91mg/L IC:-0.2582mg/L	Complete	5/5/2017 5:35:03 PM	14
15	TOC	CCB	!!Error!! TOC:0.1332mg/L TC:-0.2037mg/L IC:-0.3369mg/	Complete	5/5/2017 5:43:52 PM	0
16	TOC	L17050244-07	TOC:0.4466mg/L TC:49.05mg/L IC:48.61mg/L	Complete	5/5/2017 5:57:15 PM	16
17	TOC	L17050255-01	!!Error!! TOC:0.4401mg/L TC:0.2706mg/L IC:-0.1695mg/L	Complete	5/5/2017 6:08:33 PM	17
18	TOC	L17050419-01	TOC:1.397mg/L TC:39.91mg/L IC:38.51mg/L	Complete	5/5/2017 6:21:53 PM	18
19	TOC	L17050419-02	TOC:2.774mg/L TC:36.96mg/L IC:34.18mg/L	Complete	5/5/2017 6:35:26 PM	19
20	TOC	L17050419-03	TOC:1.883mg/L TC:10.56mg/L IC:8.681mg/L	Complete	5/5/2017 6:47:31 PM	20
21	TOC	L17050419-04	TOC:2.509mg/L TC:37.17mg/L IC:34.66mg/L	Complete	5/5/2017 7:00:30 PM	21
22	TOC	L17050419-05	TOC:2.827mg/L TC:39.13mg/L IC:36.30mg/L	Complete	5/5/2017 7:13:27 PM	22
23	TOC		!!Error!! TOC:-1.011mg/L TC:53.90mg/L IC:54.91mg/L	Complete	5/5/2017 7:27:25 PM	23
24	TOC	L17050419-07	TOC:2.985mg/L TC:47.47mg/L IC:44.48mg/L	Complete	5/5/2017 7:41:47 PM	24
25	TOC	WG613085-05 DUP	TOC:2.926mg/L TC:42.03mg/L IC:39.11mg/L	Complete	5/5/2017 7:55:30 PM	25
26	TOC	CCV	!!Error!! TOC:22.55mg/L TC:22.36mg/L IC:-0.1934mg/L	Complete	5/5/2017 8:07:40 PM	26
27	TOC	CCB	!!Error!! TOC:0.1225mg/L TC:-0.2037mg/L IC:-0.3262mg/	Complete	5/5/2017 8:16:28 PM	0
28	TOC	WG613085-06 MS	TOC:11.48mg/L TC:39.70mg/L IC:28.21mg/L	Complete	5/5/2017 8:29:39 PM	28
29	TOC	WG613086-01 BLK	!!Error!! TOC:0.1182mg/L TC:-0.1841mg/L IC:-0.3023mg/	Complete	5/5/2017 8:45:54 PM	0
30	TOC	WG613086-02 LCS	!!Error!! TOC:24.51mg/L TC:24.17mg/L IC:-0.3334mg/L	Complete	5/5/2017 9:06:34 PM	30
31	TOC	WG613086-03 LCSDUP	!!Error!! TOC:24.85mg/L TC:24.50mg/L IC:-0.3419mg/L	Complete	5/5/2017 9:27:12 PM	31
32	TOC	L17050261-01 (5)	TOC:3.050mg/L TC:17.69mg/L IC:14.64mg/L	Complete	5/5/2017 9:48:13 PM	32
33	TOC	L17050261-02	!!Error!! TOC:0.4936mg/L TC:0.2455mg/L IC:-0.2481mg/L	Complete	5/5/2017 10:07:18 PM	33
34	TOC	L17050262-01 (5)	TOC:4.617mg/L TC:23.69mg/L IC:19.07mg/L	Complete	5/5/2017 10:29:50 PM	34
35	TOC	L17050262-02 (5) MS	TOC:6.712mg/L TC:19.77mg/L IC:13.06mg/L	Complete	5/5/2017 10:51:21 PM	35
36	TOC	L17050262-03 (5) MSD	TOC:11.90mg/L TC:38.22mg/L IC:26.32mg/L	Complete	5/5/2017 11:13:49 PM	36
37	TOC	L17050262-04	!!Error!! TOC:0.4338mg/L TC:0.1814mg/L IC:-0.2524mg/L	Complete	5/5/2017 11:32:52 PM	37
38	TOC	CCV	!!Error!! TOC:23.06mg/L TC:22.74mg/L IC:-0.3176mg/L	Complete	5/5/2017 11:44:58 PM	38
39	TOC	CCB	!!Error!! TOC:0.1319mg/L TC:-0.2067mg/L IC:-0.3385mg/	Complete	5/5/2017 11:53:47 PM	0
40	TOC	L17050421-01	TOC:4.473mg/L TC:44.21mg/L IC:39.74mg/L	Complete	5/6/2017 12:17:25 AM	40
41	TOC	L17050421-03	TOC:1.071mg/L TC:7.138mg/L IC:6.068mg/L	Complete	5/6/2017 12:37:57 AM	41
42	TOC	L17050421-05	TOC:7.411mg/L TC:41.05mg/L IC:33.64mg/L	Complete	5/6/2017 1:01:40 AM	42
43	TOC	L17050421-07	TOC:2.905mg/L TC:23.51mg/L IC:20.61mg/L	Complete	5/6/2017 1:23:41 AM	43
44	TOC	L17050421-09	TOC:1.567mg/L TC:12.06mg/L IC:10.49mg/L	Complete	5/6/2017 1:44:40 AM	44
45	TOC	L17050421-11	TOC:2.486mg/L TC:12.86mg/L IC:10.37mg/L	Complete	5/6/2017 2:05:55 AM	45
46	TOC	L17050421-13	TOC:4.364mg/L TC:41.11mg/L IC:36.75mg/L	Complete	5/6/2017 2:30:05 AM	46
47	TOC	L17050421-15	!!Error!! TOC:0.5648mg/L TC:0.3340mg/L IC:-0.2309mg/L	Complete	5/6/2017 2:49:18 AM	47
48	TOC	WG613086-05 DUP	TOC:2.150mg/L TC:8.953mg/L IC:6.802mg/L	Complete	5/6/2017 3:10:09 AM	48
49	TOC	L17050184-11	TOC:1.809mg/L TC:7.838mg/L IC:6.029mg/L	Complete	5/6/2017 3:22:07 AM	49
50	TOC	CCV	!!Error!! TOC:23.38mg/L TC:23.09mg/L IC:-0.2939mg/L	Complete	5/6/2017 3:34:13 AM	50
51	TOC	CCB	!!Error!! TOC:0.1261mg/L TC:-0.1999mg/L IC:-0.3260mg/	Complete	5/6/2017 3:43:04 AM	0
52	TOC	L17050429-01 (3)	TOC:3.710mg/L TC:14.59mg/L IC:10.88mg/L	Complete	5/6/2017 3:55:21 AM	52
53	TOC		TOC:48.73mg/L TC:75.14mg/L IC:26.40mg/L	Complete	5/6/2017 4:10:01 AM	53
54	TOC	L17050429-03	TOC:12.31mg/L TC:41.68mg/L IC:29.37mg/L	Complete	5/6/2017 4:23:42 AM	54
55	TOC	L17050431-01	TOC:5.330mg/L TC:17.03mg/L IC:11.70mg/L	Complete	5/6/2017 4:48:14 AM	55
56	TOC	L17050431-03 (2)	TOC:6.930mg/L TC:25.69mg/L IC:18.76mg/L	Complete	5/6/2017 5:14:08 AM	56
57	TOC	<Untitled>	!!Error!! TOC:-0.1381mg/L TC:58.34mg/L IC:58.48mg/L	Complete	5/6/2017 5:38:01 AM	57
58	TOC	<Untitled>	TOC:3.046mg/L TC:3.071mg/L IC:0.02510mg/L	Complete	5/6/2017 5:57:47 AM	58
59	TOC	L17050440-01	!!Error!! TOC:3.028mg/L TC:2.864mg/L IC:-0.1641mg/L	Complete	5/6/2017 6:17:22 AM	59
60	TOC	L17050440-02	TOC:8.772mg/L TC:18.69mg/L IC:9.920mg/L	Complete	5/6/2017 6:40:10 AM	60
61	TOC	L17050440-04	TOC:2.969mg/L TC:3.702mg/L IC:0.7326mg/L	Complete	5/6/2017 7:00:43 AM	61
62	TOC	CCV	!!Error!! TOC:24.67mg/L TC:24.34mg/L IC:-0.3266mg/L	Complete	5/6/2017 7:12:51 AM	62
63	TOC	CCB	!!Error!! TOC:0.1266mg/L TC:-0.1956mg/L IC:-0.3222mg/	Complete	5/6/2017 7:21:42 AM	0
64	TOC	CCV	!!Error!! TOC:21.95mg/L TC:21.74mg/L IC:-0.2152mg/L	Complete	5/6/2017 8:39:27 AM	64
65	TOC	CCB	!!Error!! TOC:0.1317mg/L TC:-0.1994mg/L IC:-0.3311mg/	Complete	5/6/2017 8:48:17 AM	0
66	TOC	L17050290-01 (3)	TOC:4.256mg/L TC:24.81mg/L IC:20.55mg/L	Complete	5/6/2017 9:11:58 AM	66
67	TOC	L17050290-02 (3)	TOC:3.357mg/L TC:21.75mg/L IC:18.39mg/L	Complete	5/6/2017 9:24:17 AM	67

5/8/2017 7:02:58 AM

1/2

C:\TOC3201\Data\05-05-2017-DCM-TOC.t32

	Analysis	Sample Name	Result	Status	Date / Time	Vial
68	TOC	L17050244-04 (2)	TOC:1.247mg/L TC:22.31mg/L IC:21.06mg/L	Complete	5/6/2017 9:37:04 AM	68
69	TOC	L17050419-06 (2)	TOC:3.312mg/L TC:34.24mg/L IC:30.93mg/L	Complete	5/6/2017 9:49:57 AM	1
70	TOC	L17050429-02 (25)	TOC:1.887mg/L TC:11.60mg/L IC:9.717mg/L	Complete	5/6/2017 10:02:13 AM	2
71	TOC	L17050431-05 (25)	TOC:3.348mg/L TC:13.62mg/L IC:10.27mg/L	Complete	5/6/2017 10:41:27 AM	3
72	TOC	L17050427-01 (4)	TOC:22.29mg/L TC:26.50mg/L IC:4.207mg/L	Complete	5/6/2017 11:30:21 AM	4
73	TOC	CCV	!!Error!! TOC:23.14mg/L TC:22.91mg/L IC:-0.2355mg/L	Complete	5/6/2017 11:42:31 AM	5
74	TOC	CCB	!!Error!! TOC:0.4073mg/L TC:0.07808mg/L IC:-0.3292mg/	Complete	5/6/2017 11:52:00 AM	0

dcm 5/8/17

5/8/2017 7:02:58 AM 2/2

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

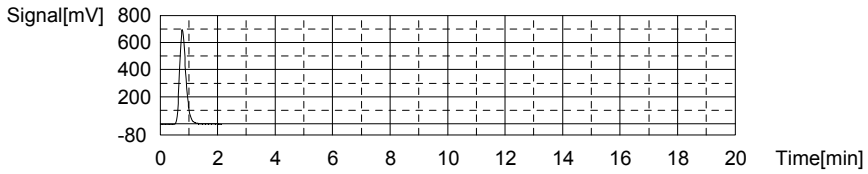
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.591mg/L TC:24.69mg/L IC:23.10mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1062	24.69mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 2:37:12 PM

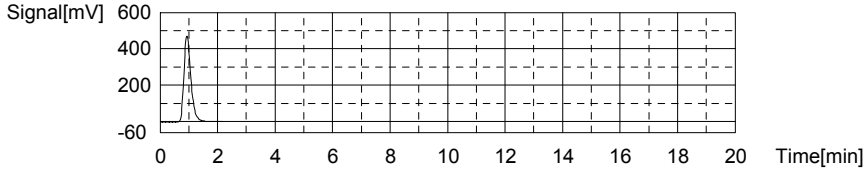
Mean Area 1062
Mean Conc. 24.69mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	792.0	23.10mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 2:42:18 PM

Mean Area 792.0
Mean Conc. 23.10mg/L



Sample

Sample Name: TOC/TIC
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

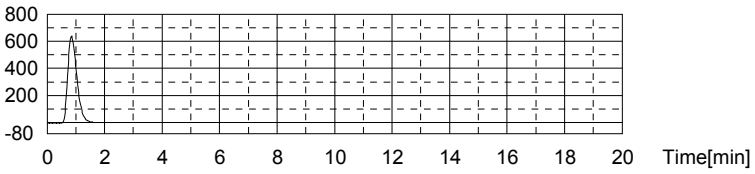
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:25.02mg/L TC:32.87mg/L IC:7.851mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1408	32.87mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 2:50:09 PM

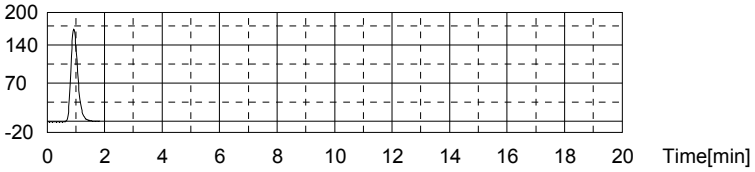
Mean Area 1408
Mean Conc. 32.87mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	281.3	7.851mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 2:54:50 PM

Mean Area 281.3
Mean Conc. 7.851mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

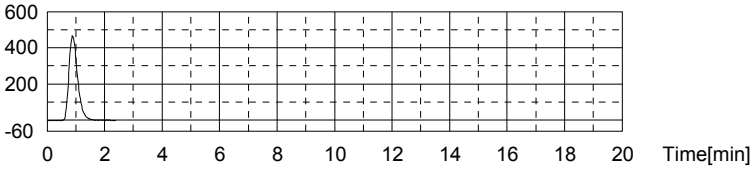
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.12mg/L TC:22.76mg/L IC:-0.3660mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	980.0	22.76mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 3:02:40 PM

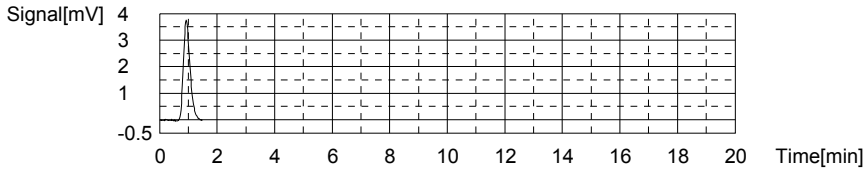
Mean Area 980.0
Mean Conc. 22.76mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	6.159	-0.3660mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 3:06:57 PM

Mean Area 6.159
Mean Conc. -0.3660mg/L



Sample

Sample Name: WG613085-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

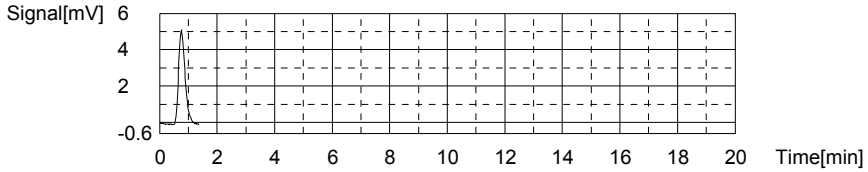
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1455mg/L TC:-0.2056mg/L IC:-0.3512mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.161	-0.2056mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 3:11:56 PM

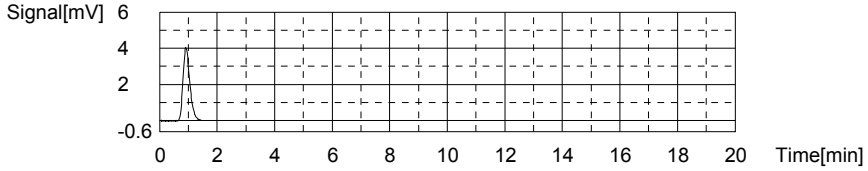
Mean Area 8.161
Mean Conc. -0.2056mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	6.655	-0.3512mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 3:15:43 PM

Mean Area 6.655
Mean Conc. -0.3512mg/L



Sample

Sample Name: WG613085-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

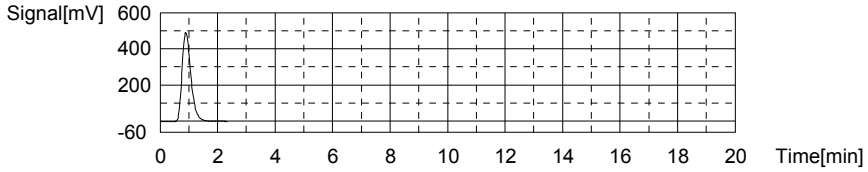
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:24.75mg/L TC:24.36mg/L IC:-0.3855mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1048	24.36mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 3:23:30 PM

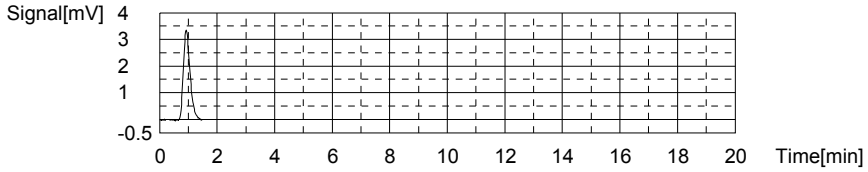
Mean Area 1048
Mean Conc. 24.36mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	5.507	-0.3855mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 3:27:45 PM

Mean Area 5.507
Mean Conc. -0.3855mg/L



Sample

Sample Name: WG613085-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

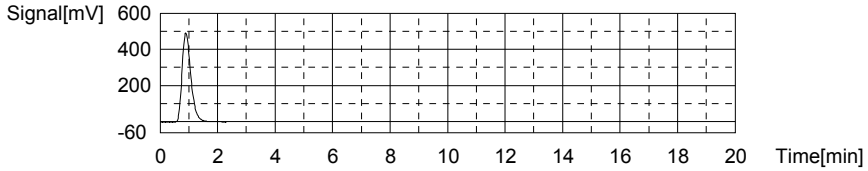
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:24.68mg/L TC:24.29mg/L IC:-0.3866mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1045	24.29mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 3:35:29 PM

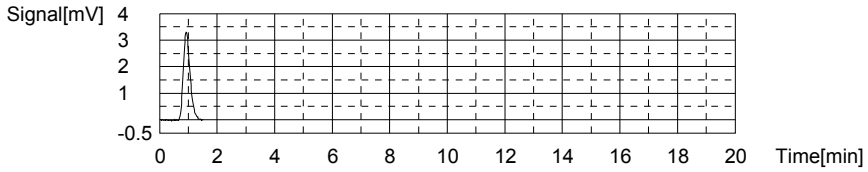
Mean Area 1045
Mean Conc. 24.29mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	5.470	-0.3866mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 3:39:47 PM

Mean Area 5.470
Mean Conc. -0.3866mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

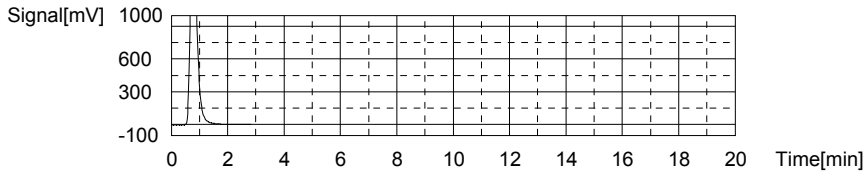
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-1.694mg/L TC:61.01mg/L IC:62.70mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2599	61.01mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 3:55:22 PM

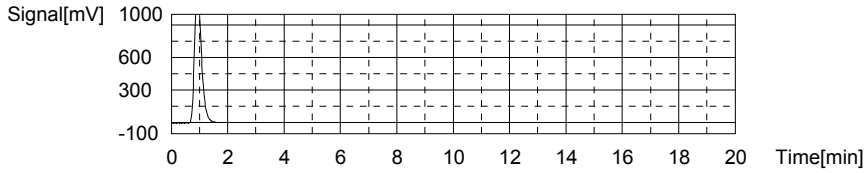
Mean Area 2599
Mean Conc. 61.01mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2118	62.70mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 4:00:38 PM

Mean Area 2118
Mean Conc. 62.70mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

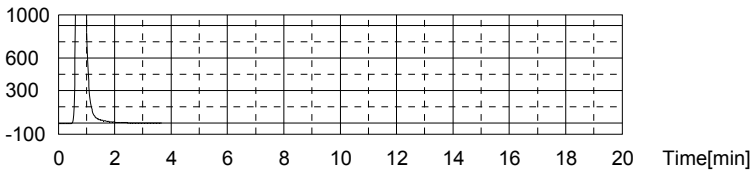
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-17.56mg/L TC:86.03mg/L IC:103.6mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3658	86.03mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 4:09:44 PM

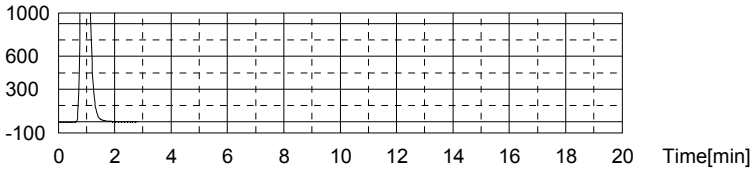
Mean Area 3658
Mean Conc. 86.03mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3487	103.6mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 4:16:03 PM

Mean Area 3487
Mean Conc. 103.6mg/L



Sample

Sample Name: L1705244-02
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

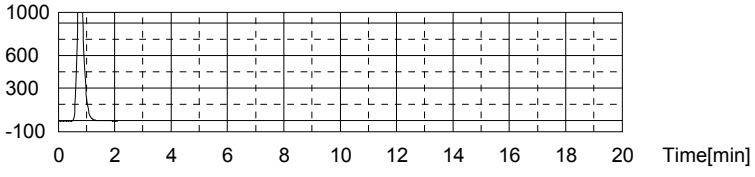
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.1355mg/L TC:49.10mg/L IC:48.96mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2095	49.10mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 4:23:36 PM

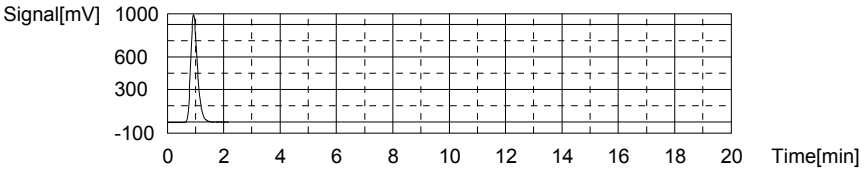
Mean Area 2095
Mean Conc. 49.10mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1658	48.96mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 4:28:54 PM

Mean Area 1658
Mean Conc. 48.96mg/L



Sample

Sample Name: L17050244-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

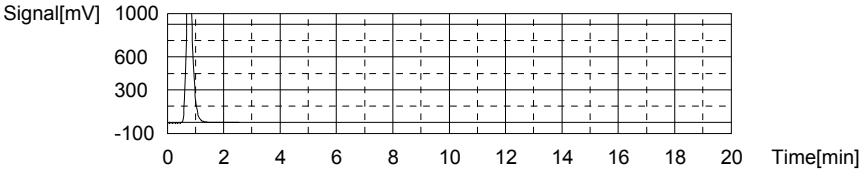
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-0.3236mg/L TC:49.03mg/L IC:49.35mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2092	49.03mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 4:36:52 PM

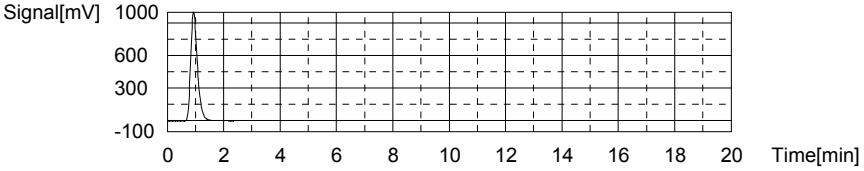
Mean Area 2092
Mean Conc. 49.03mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1671	49.35mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 4:42:17 PM

Mean Area 1671
Mean Conc. 49.35mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

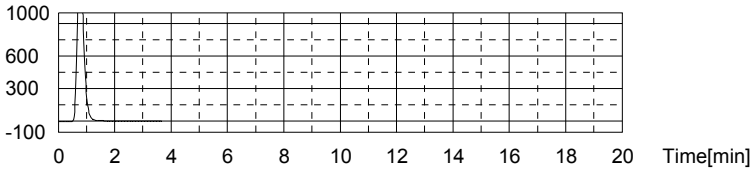
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-2.192mg/L TC:53.73mg/L IC:55.92mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2291	53.73mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 4:51:24 PM

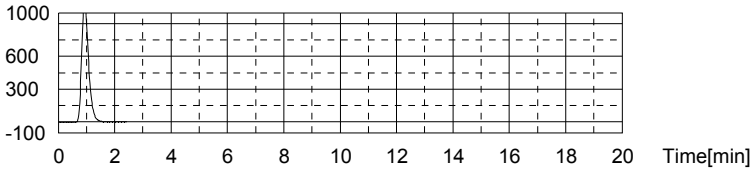
Mean Area 2291
Mean Conc. 53.73mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1891	55.92mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 4:56:53 PM

Mean Area 1891
Mean Conc. 55.92mg/L



Sample

Sample Name: L17050244-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

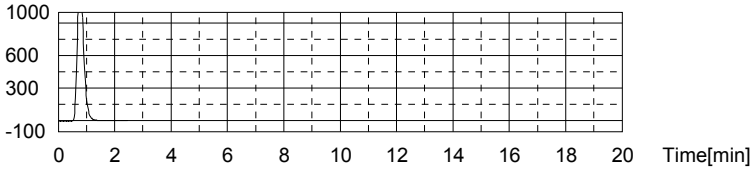
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.8355mg/L TC:47.92mg/L IC:47.08mg/L

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_55	5/5/2017 5:04:47 PM

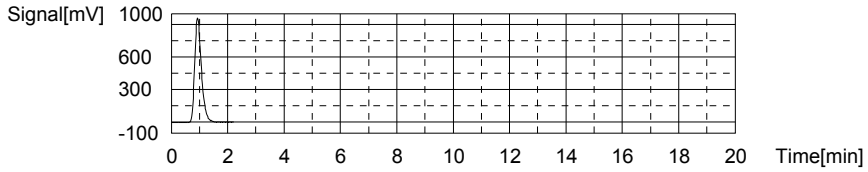
Mean Area 2045
Mean Conc. 47.92mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1595	47.08mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 5:10:08 PM

Mean Area 1595
Mean Conc. 47.08mg/L



Sample

Sample Name: L17050244-06
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

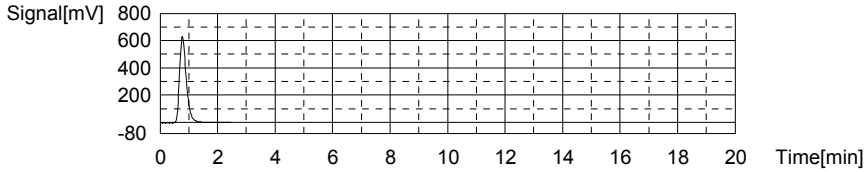
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.828mg/L TC:23.98mg/L IC:18.16mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1032	23.98mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 5:18:02 PM

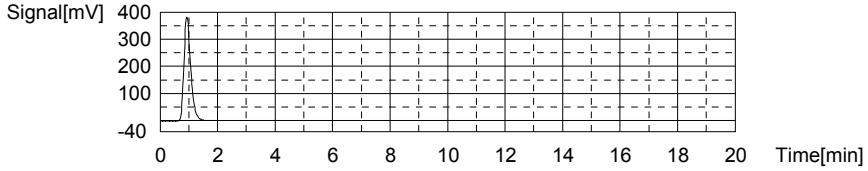
Mean Area 1032
Mean Conc. 23.98mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	626.4	18.16mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 5:22:59 PM

Mean Area 626.4
Mean Conc. 18.16mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

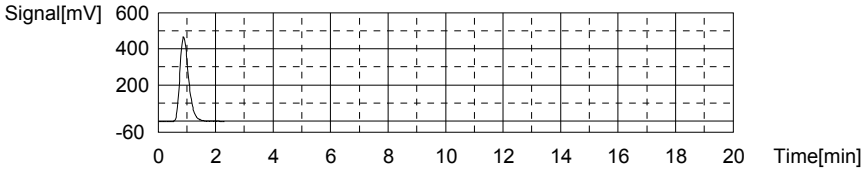
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.17mg/L TC:22.91mg/L IC:-0.2582mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	986.5	22.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 5:30:44 PM

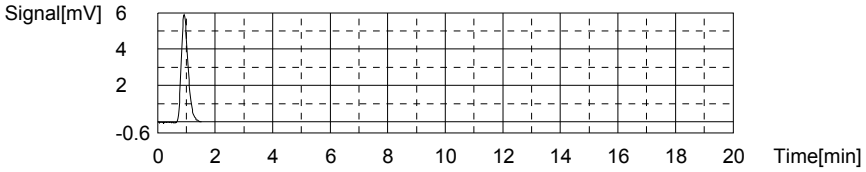
Mean Area 986.5
Mean Conc. 22.91mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.768	-0.2582mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 5:35:03 PM

Mean Area 9.768
Mean Conc. -0.2582mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

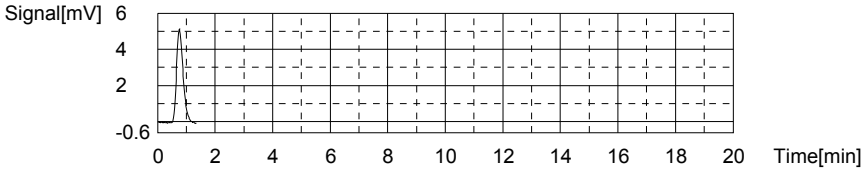
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1332mg/L TC:-0.2037mg/L IC:-0.3369mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.244	-0.2037mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 5:40:01 PM

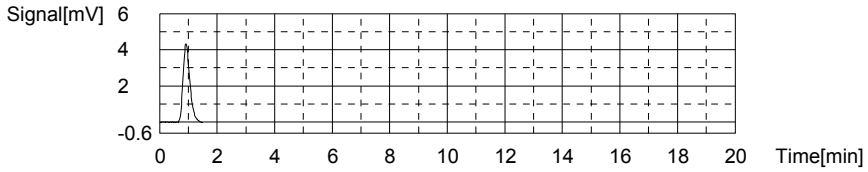
Mean Area 8.244
Mean Conc. -0.2037mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.133	-0.3369mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 5:43:52 PM

Mean Area 7.133
Mean Conc. -0.3369mg/L



Sample

Sample Name: L17050244-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

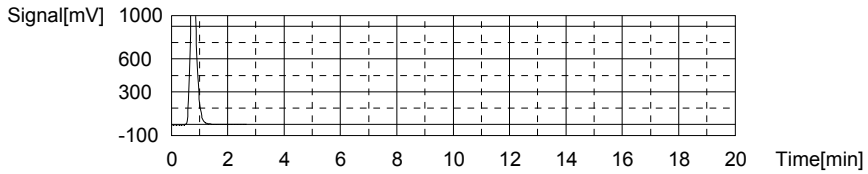
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.4466mg/L TC:49.05mg/L IC:48.61mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2093	49.05mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 5:52:00 PM

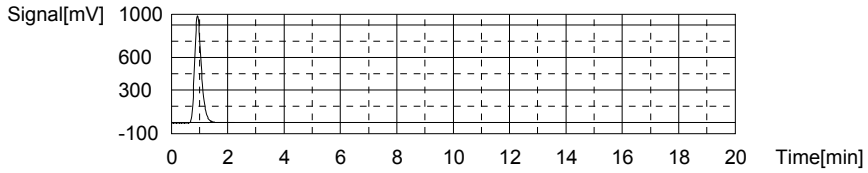
Mean Area 2093
Mean Conc. 49.05mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1646	48.61mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 5:57:15 PM

Mean Area 1646
Mean Conc. 48.61mg/L



Sample

Sample Name: L17050255-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

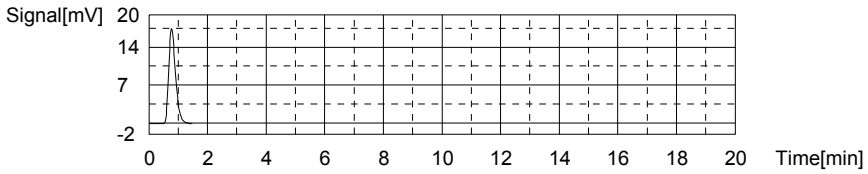
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.4401mg/L TC:0.2706mg/L IC:-0.1695mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	28.32	0.2706mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 6:04:10 PM

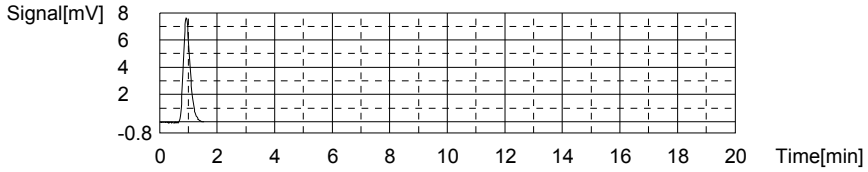
Mean Area 28.32
Mean Conc. 0.2706mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.74	-0.1695mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 6:08:33 PM

Mean Area 12.74
Mean Conc. -0.1695mg/L



Sample

Sample Name: L17050419-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

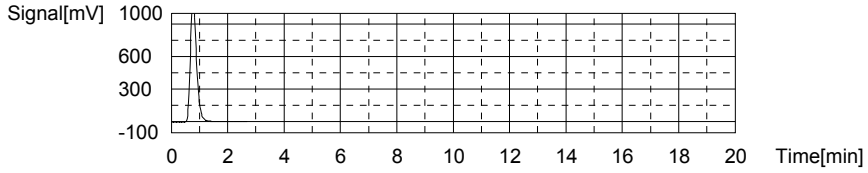
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.397mg/L TC:39.91mg/L IC:38.51mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1706	39.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 6:16:41 PM

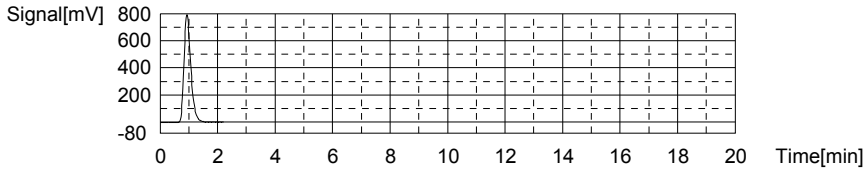
Mean Area 1706
Mean Conc. 39.91mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1308	38.51mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 6:21:53 PM

Mean Area 1308
Mean Conc. 38.51mg/L



Sample

Sample Name: L17050419-02
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

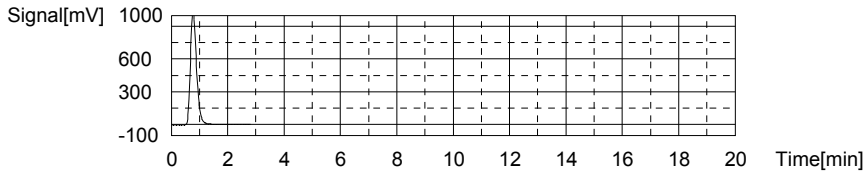
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.774mg/L TC:36.96mg/L IC:34.18mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1581	36.96mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 6:30:08 PM

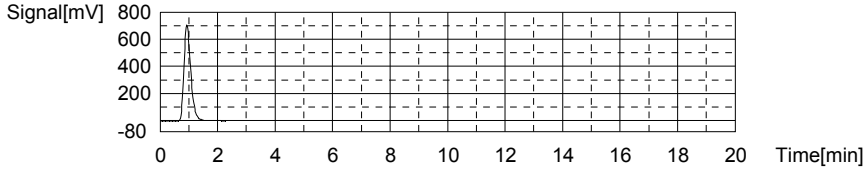
Mean Area 1581
Mean Conc. 36.96mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1163	34.18mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 6:35:26 PM

Mean Area 1163
Mean Conc. 34.18mg/L



Sample

Sample Name: L17050419-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

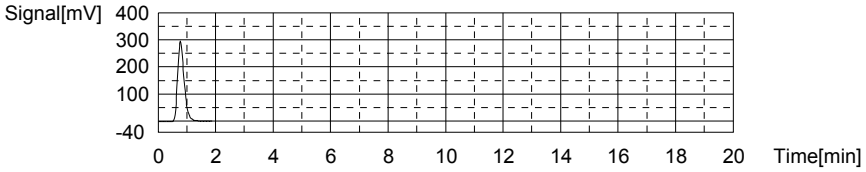
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.883mg/L TC:10.56mg/L IC:8.681mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	464.0	10.56mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 6:42:45 PM

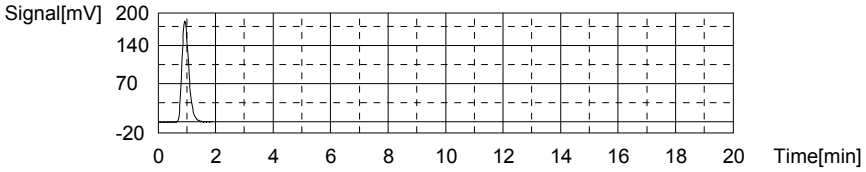
Mean Area 464.0
Mean Conc. 10.56mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	309.1	8.681mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 6:47:31 PM

Mean Area 309.1
Mean Conc. 8.681mg/L



Sample

Sample Name: L17050419-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

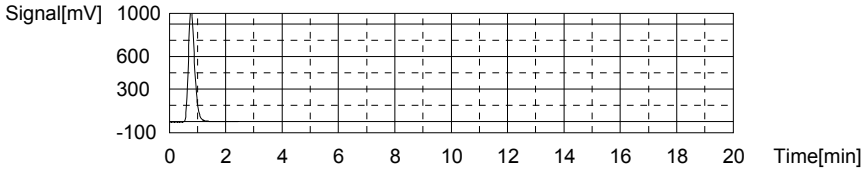
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.509mg/L TC:37.17mg/L IC:34.66mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1590	37.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 6:55:23 PM

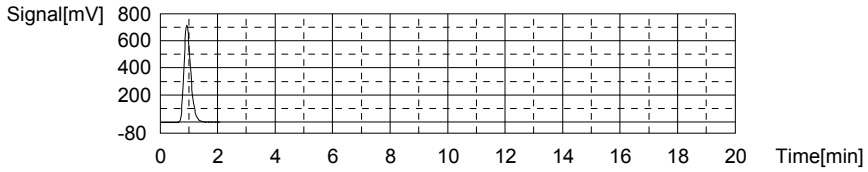
Mean Area 1590
Mean Conc. 37.17mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1179	34.66mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 7:00:30 PM

Mean Area 1179
Mean Conc. 34.66mg/L



Sample

Sample Name: L17050419-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

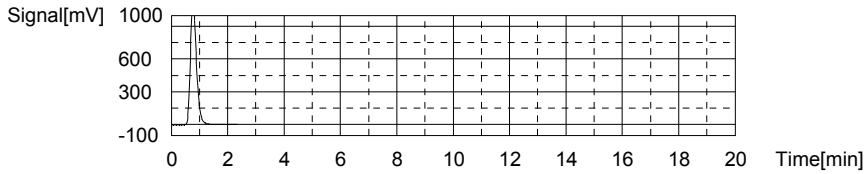
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.827mg/L TC:39.13mg/L IC:36.30mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1673	39.13mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 7:08:16 PM

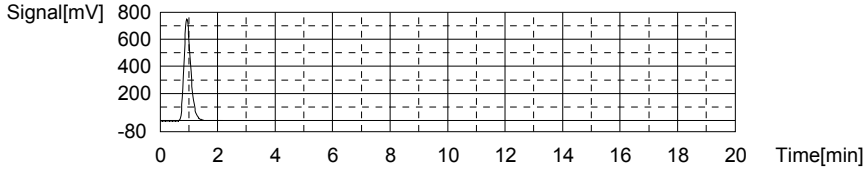
Mean Area 1673
Mean Conc. 39.13mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1234	36.30mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 7:13:27 PM

Mean Area 1234
Mean Conc. 36.30mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

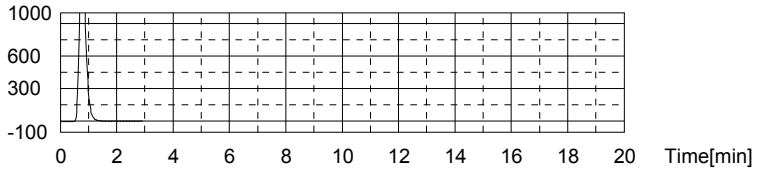
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-1.011mg/L TC:53.90mg/L IC:54.91mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2298	53.90mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 7:21:50 PM

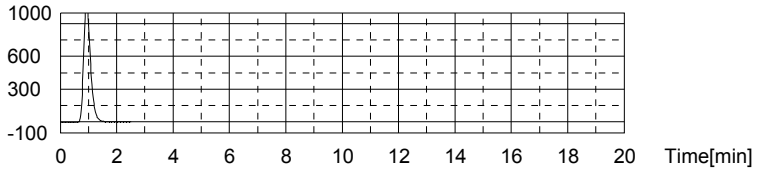
Mean Area 2298
Mean Conc. 53.90mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1857	54.91mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 7:27:25 PM

Mean Area 1857
Mean Conc. 54.91mg/L



Sample

Sample Name: L17050419-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

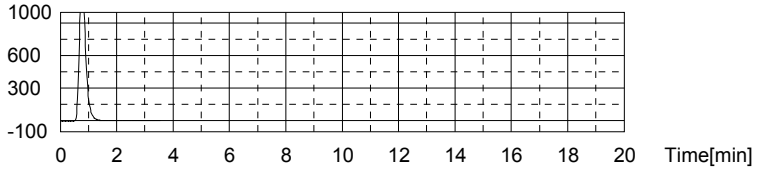
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.985mg/L TC:47.47mg/L IC:44.48mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2026	47.47mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 7:36:23 PM

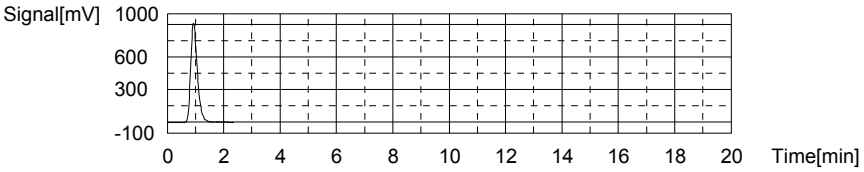
Mean Area 2026
Mean Conc. 47.47mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1508	44.48mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 7:41:47 PM

Mean Area 1508
Mean Conc. 44.48mg/L



Sample

Sample Name: WG613085-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

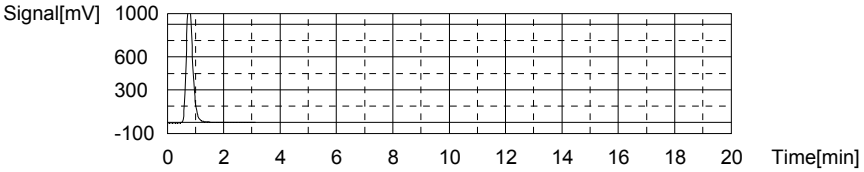
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.926mg/L TC:42.03mg/L IC:39.11mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1796	42.03mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 7:50:21 PM

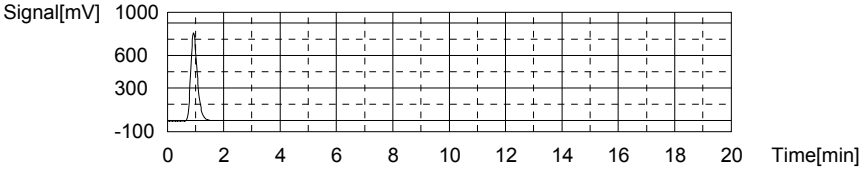
Mean Area 1796
Mean Conc. 42.03mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1328	39.11mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 7:55:30 PM

Mean Area 1328
Mean Conc. 39.11mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

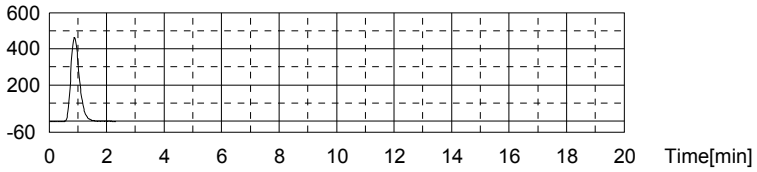
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:22.55mg/L TC:22.36mg/L IC:-0.1934mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	963.1	22.36mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 8:03:16 PM

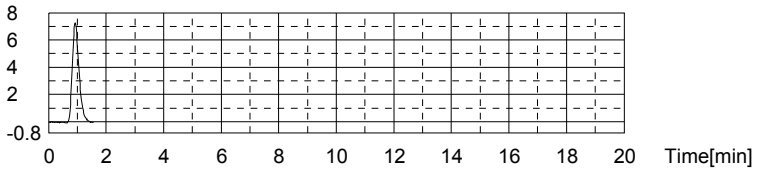
Mean Area 963.1
Mean Conc. 22.36mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.94	-0.1934mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 8:07:40 PM

Mean Area 11.94
Mean Conc. -0.1934mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

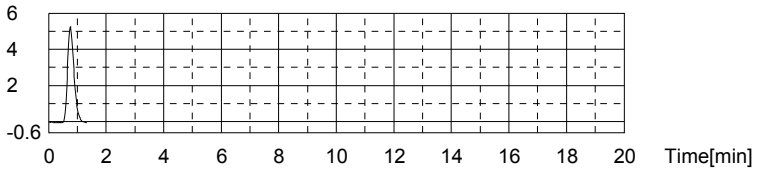
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1225mg/L TC:-0.2037mg/L IC:-0.3262mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.242	-0.2037mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 8:12:38 PM

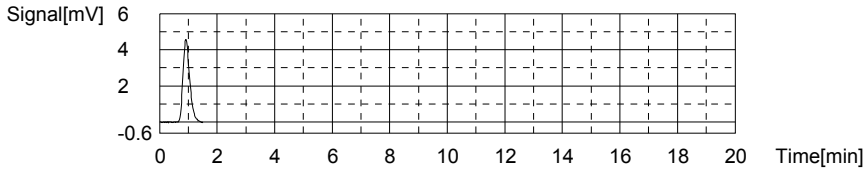
Mean Area 8.242
Mean Conc. -0.2037mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.490	-0.3262mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 8:16:28 PM

Mean Area 7.490
Mean Conc. -0.3262mg/L



Sample

Sample Name: WG613085-06 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

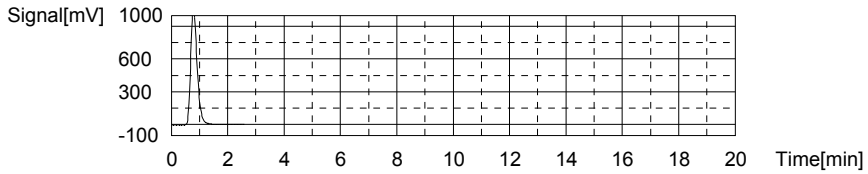
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:11.48mg/L TC:39.70mg/L IC:28.21mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1697	39.70mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 8:24:30 PM

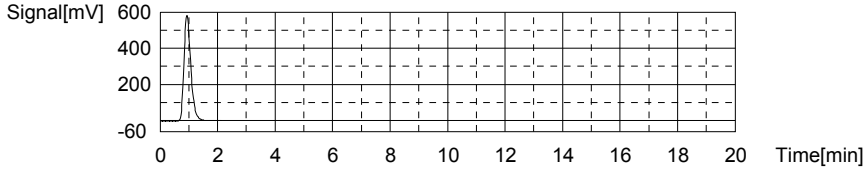
Mean Area 1697
Mean Conc. 39.70mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	963.2	28.21mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 8:29:39 PM

Mean Area 963.2
Mean Conc. 28.21mg/L



Sample

Sample Name: WG613086-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

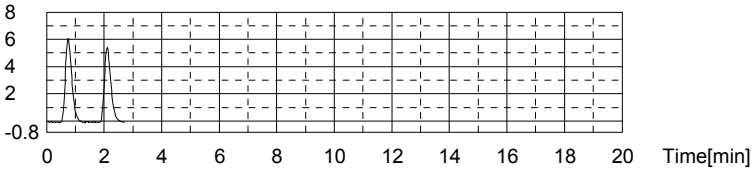
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1182mg/L TC:-0.1841mg/L IC:-0.3023mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.562	-0.1725mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 8:34:39 PM
2	8.581	-0.1957mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 8:38:09 PM

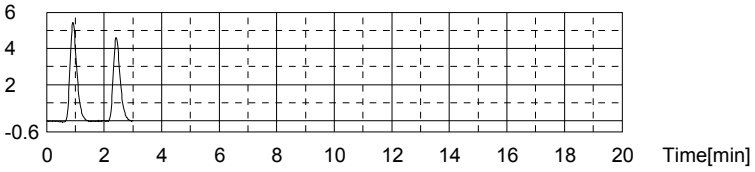
Mean Area 9.072
Mean Conc. -0.1841mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.001	-0.2811mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 8:42:02 PM
2	7.583	-0.3235mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 8:45:54 PM

Mean Area 8.292
Mean Conc. -0.3023mg/L



Sample

Sample Name: WG613086-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

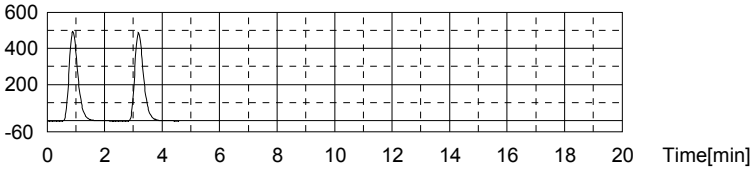
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:24.51mg/L TC:24.17mg/L IC:-0.3334mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1049	24.39mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 8:53:38 PM
2	1031	23.96mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 8:58:13 PM

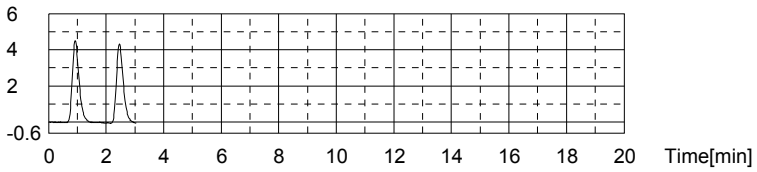
Mean Area 1040
Mean Conc. 24.17mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.373	-0.3297mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/5/2017 9:02:31 PM
2	7.127	-0.3371mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/5/2017 9:06:34 PM

Mean Area 7.250
Mean Conc. -0.3334mg/L



Sample

Sample Name: WG613086-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

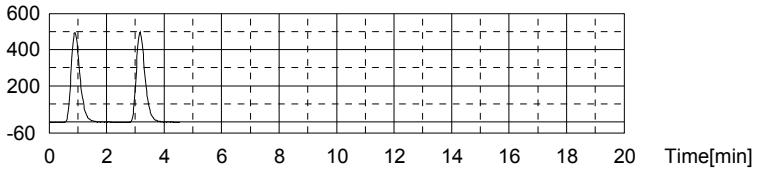
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:24.85mg/L TC:24.50mg/L IC:-0.3419mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1059	24.62mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/5/2017 9:14:17 PM
2	1049	24.39mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/5/2017 9:18:50 PM

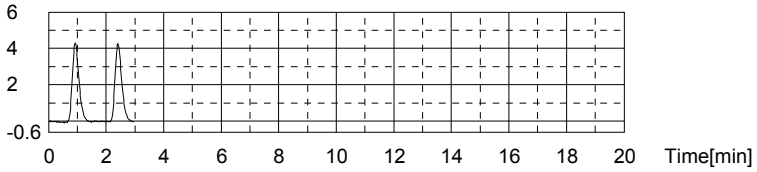
Mean Area 1054
Mean Conc. 24.50mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.082	-0.3384mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/5/2017 9:23:08 PM
2	6.849	-0.3454mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/5/2017 9:27:12 PM

Mean Area 6.966
Mean Conc. -0.3419mg/L



Sample

Sample Name: L17050261-01 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

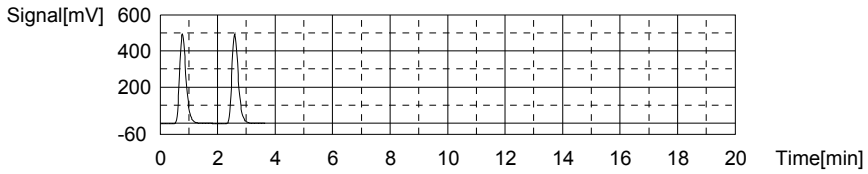
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.050mg/L TC:17.69mg/L IC:14.64mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	765.7	17.69mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 9:34:29 PM
2	765.8	17.69mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 9:38:37 PM

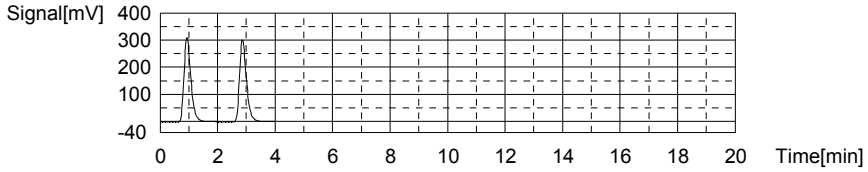
Mean Area 765.8
Mean Conc. 17.69mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	514.0	14.80mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 9:43:27 PM
2	503.5	14.49mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 9:48:13 PM

Mean Area 508.8
Mean Conc. 14.64mg/L



Sample

Sample Name: L17050261-02
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

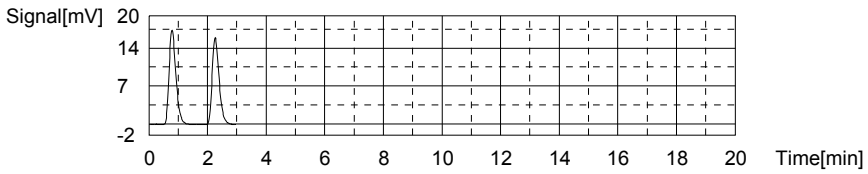
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.4936mg/L TC:0.2455mg/L IC:-0.2481mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	28.19	0.2676mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 9:55:08 PM
2	26.32	0.2234mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 9:58:53 PM

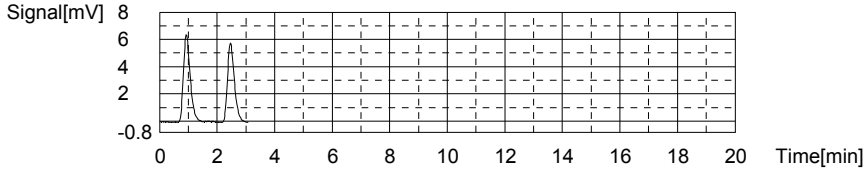
Mean Area 27.26
Mean Conc. 0.2455mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.55	-0.2349mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 10:03:13 PM
2	9.665	-0.2613mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 10:07:18 PM

Mean Area 10.11
Mean Conc. -0.2481mg/L



Sample

Sample Name: L17050262-01 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

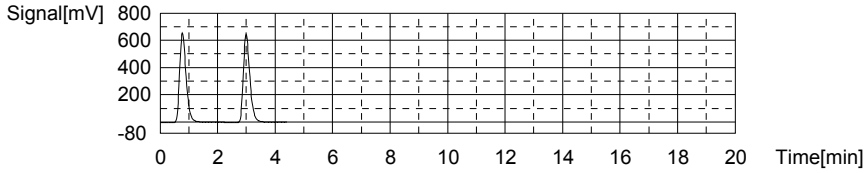
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.617mg/L TC:23.69mg/L IC:19.07mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1024	23.80mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 10:14:59 PM
2	1015	23.58mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 10:20:18 PM

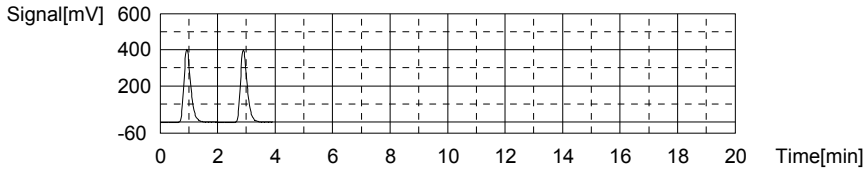
Mean Area 1020
Mean Conc. 23.69mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	659.6	19.15mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 10:25:12 PM
2	654.5	19.00mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 10:29:50 PM

Mean Area 657.0
Mean Conc. 19.07mg/L



Sample

Sample Name: L17050262-02 (5) MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

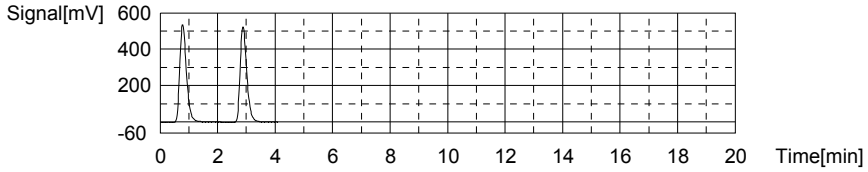
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.712mg/L TC:19.77mg/L IC:13.06mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	864.2	20.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 10:37:24 PM
2	843.4	19.53mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 10:41:51 PM

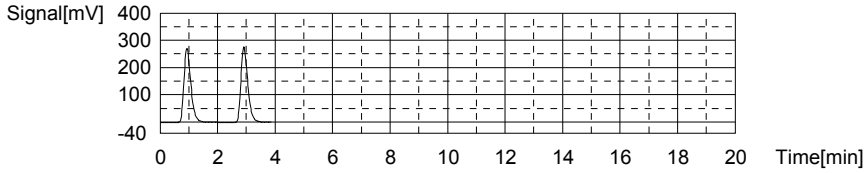
Mean Area 853.8
Mean Conc. 19.77mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	451.7	12.94mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 10:46:47 PM
2	459.9	13.18mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 10:51:21 PM

Mean Area 455.8
Mean Conc. 13.06mg/L



Sample

Sample Name: L17050262-03 (5) MSD
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

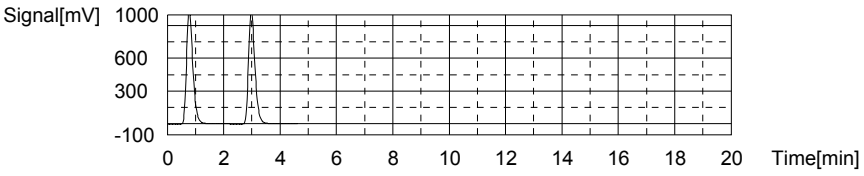
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:11.90mg/L TC:38.22mg/L IC:26.32mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1626	38.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 10:59:01 PM
2	1643	38.42mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 11:03:43 PM

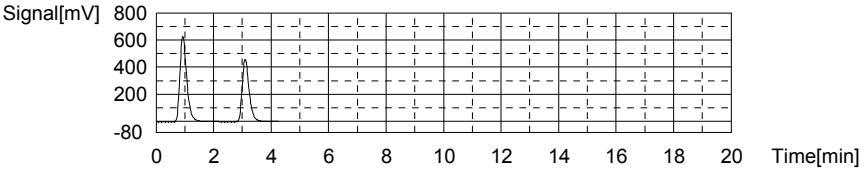
Mean Area 1635
Mean Conc. 38.22mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1036	30.39mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 11:08:53 PM
2	763.4	22.25mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 11:13:49 PM

Mean Area 899.7
Mean Conc. 26.32mg/L



Sample

Sample Name: L17050262-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

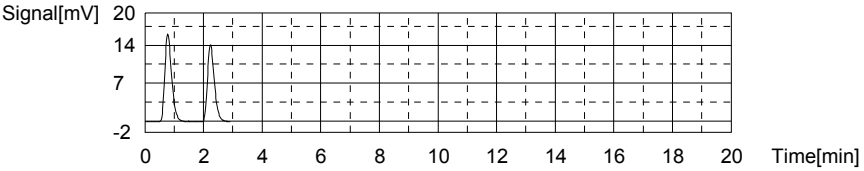
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.4338mg/L TC:0.1814mg/L IC:-0.2524mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	26.07	0.2175mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 11:20:45 PM
2	23.02	0.1454mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 11:24:29 PM

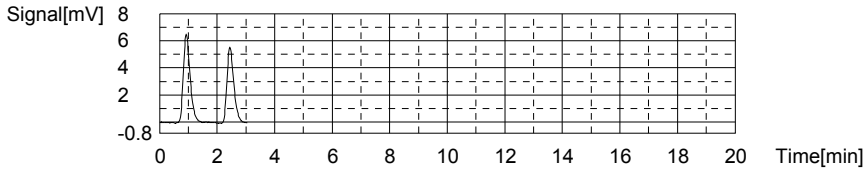
Mean Area 24.55
Mean Conc. 0.1814mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.69	-0.2307mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/5/2017 11:28:49 PM
2	9.238	-0.2740mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/5/2017 11:32:52 PM

Mean Area 9.964
Mean Conc. -0.2524mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

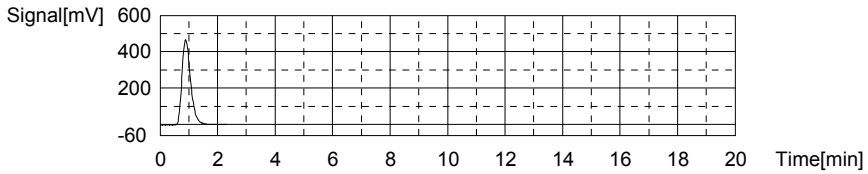
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.06mg/L TC:22.74mg/L IC:-0.3176mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	979.4	22.74mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 11:40:39 PM

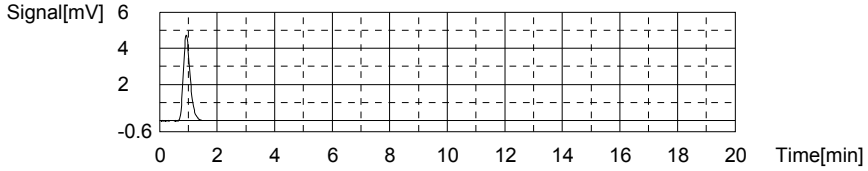
Mean Area 979.4
Mean Conc. 22.74mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.781	-0.3176mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/5/2017 11:44:58 PM

Mean Area 7.781
Mean Conc. -0.3176mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

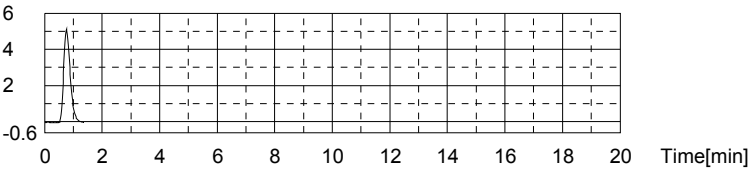
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1319mg/L TC:-0.2067mg/L IC:-0.3385mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.118	-0.2067mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/5/2017 11:49:56 PM

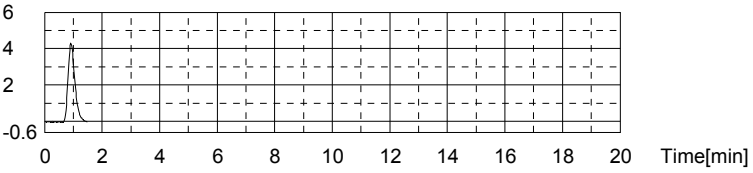
Mean Area 8.118
Mean Conc. -0.2067mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.078	-0.3385mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/5/2017 11:53:47 PM

Mean Area 7.078
Mean Conc. -0.3385mg/L



Sample

Sample Name: L17050421-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

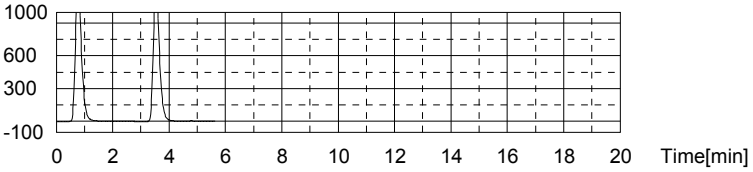
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.473mg/L TC:44.21mg/L IC:39.74mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1902	44.54mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 12:02:02 AM
2	1874	43.88mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 12:07:10 AM

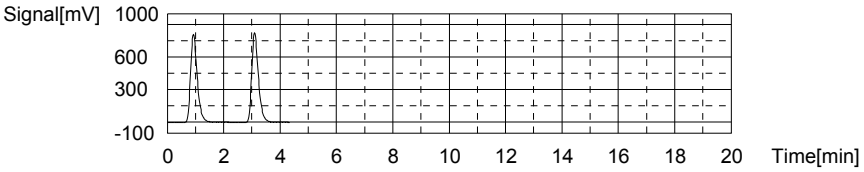
Mean Area 1888
Mean Conc. 44.21mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1339	39.44mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 12:12:19 AM
2	1359	40.03mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 12:17:25 AM

Mean Area 1349
Mean Conc. 39.74mg/L



Sample

Sample Name: L17050421-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

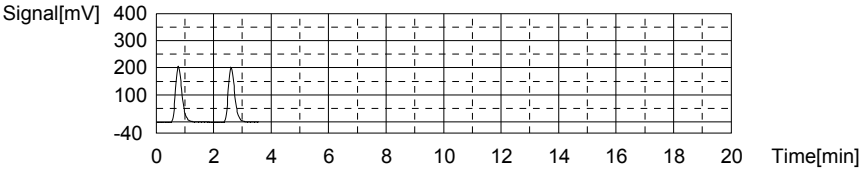
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.071mg/L TC:7.138mg/L IC:6.068mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	323.0	7.233mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 12:24:43 AM
2	315.0	7.044mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 12:28:47 AM

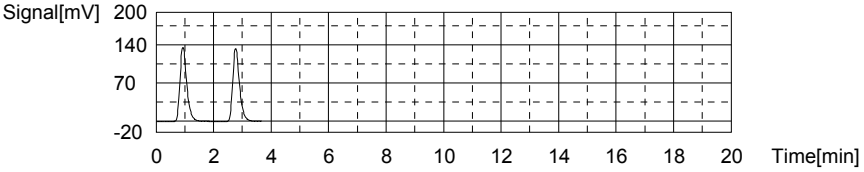
Mean Area 319.0
Mean Conc. 7.138mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	222.9	6.107mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 12:33:29 AM
2	220.3	6.029mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 12:37:57 AM

Mean Area 221.6
Mean Conc. 6.068mg/L



Sample

Sample Name: L17050421-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

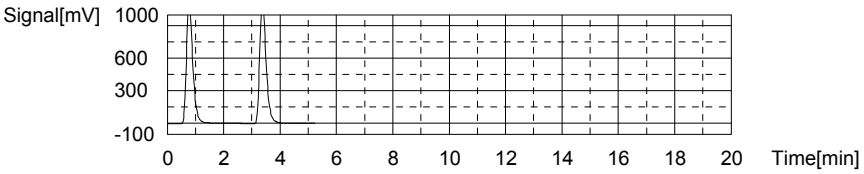
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:7.411mg/L TC:41.05mg/L IC:33.64mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1740	40.71mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 12:46:01 AM
2	1769	41.40mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 12:51:44 AM

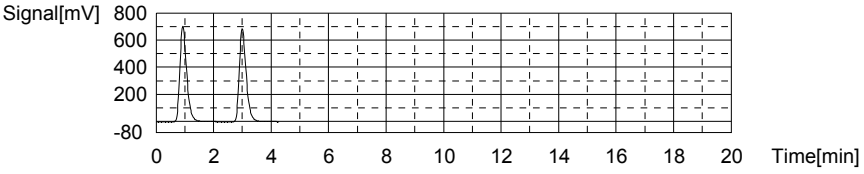
Mean Area 1755
Mean Conc. 41.05mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1156	33.97mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 12:56:46 AM
2	1134	33.32mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 1:01:40 AM

Mean Area 1145
Mean Conc. 33.64mg/L



Sample

Sample Name: L17050421-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

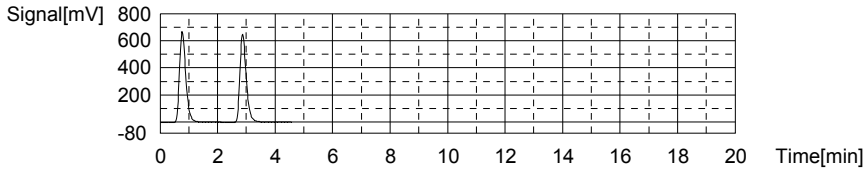
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.905mg/L TC:23.51mg/L IC:20.61mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1020	23.70mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 1:09:13 AM
2	1004	23.32mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 1:14:01 AM

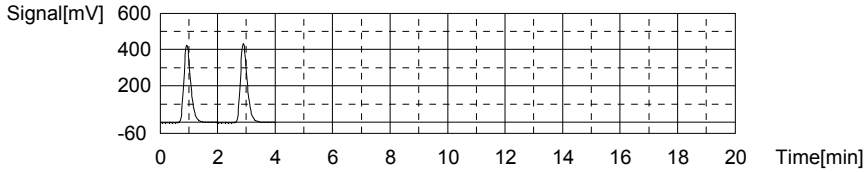
Mean Area 1012
Mean Conc. 23.51mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	701.2	20.39mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 1:18:56 AM
2	715.7	20.82mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 1:23:41 AM

Mean Area 708.5
Mean Conc. 20.61mg/L



Sample

Sample Name: L17050421-09
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

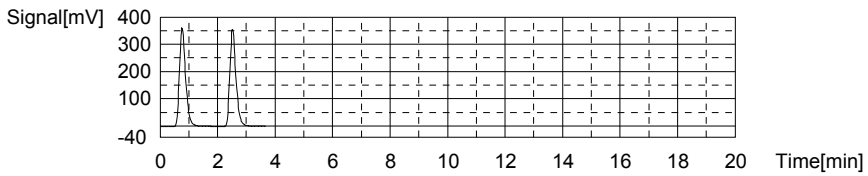
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.567mg/L TC:12.06mg/L IC:10.49mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	530.5	12.14mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 1:30:54 AM
2	524.0	11.98mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 1:35:12 AM

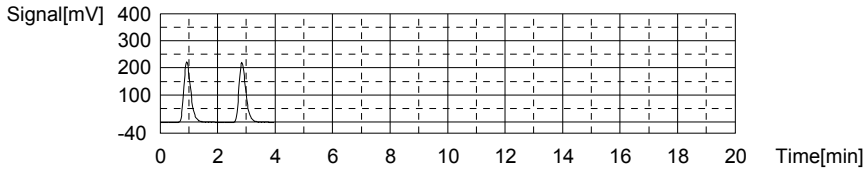
Mean Area 527.3
Mean Conc. 12.06mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	370.0	10.50mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 1:40:01 AM
2	369.5	10.48mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 1:44:40 AM

Mean Area 369.8
Mean Conc. 10.49mg/L



Sample

Sample Name: L17050421-11
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

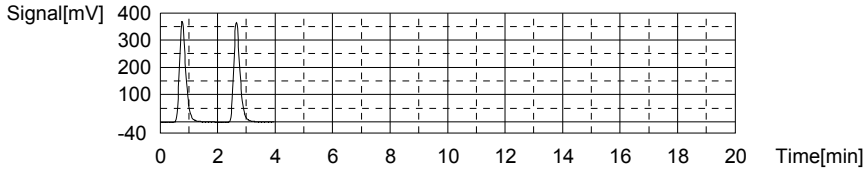
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.486mg/L TC:12.86mg/L IC:10.37mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	564.0	12.93mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 1:52:01 AM
2	558.1	12.79mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 1:56:32 AM

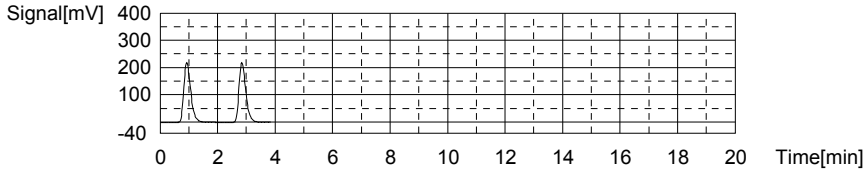
Mean Area 561.0
Mean Conc. 12.86mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	365.9	10.38mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 2:01:20 AM
2	365.5	10.37mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 2:05:55 AM

Mean Area 365.7
Mean Conc. 10.37mg/L



Sample

Sample Name: L17050421-13
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

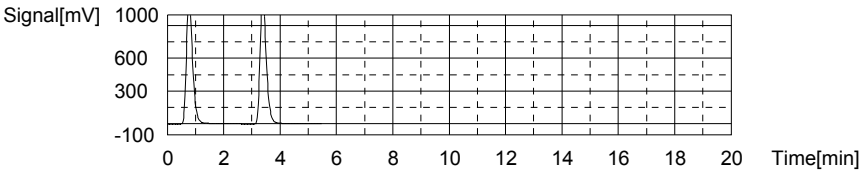
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.364mg/L TC:41.11mg/L IC:36.75mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1753	41.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 2:13:59 AM
2	1761	41.21mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 2:20:02 AM

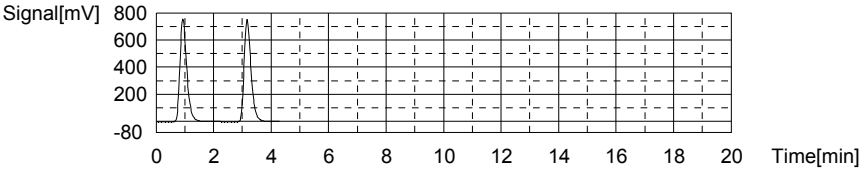
Mean Area 1757
Mean Conc. 41.11mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1249	36.75mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 2:25:13 AM
2	1249	36.75mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 2:30:05 AM

Mean Area 1249
Mean Conc. 36.75mg/L



Sample

Sample Name: L17050421-15
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

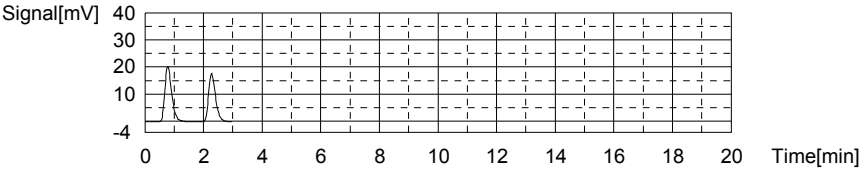
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.5648mg/L TC:0.3340mg/L IC:-0.2309mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	33.02	0.3817mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 2:37:02 AM
2	28.98	0.2862mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 2:40:47 AM

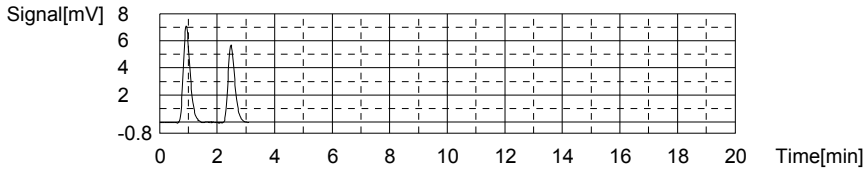
Mean Area 31.00
Mean Conc. 0.3340mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.82	-0.1969mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 2:45:12 AM
2	9.548	-0.2648mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 2:49:18 AM

Mean Area 10.68
Mean Conc. -0.2309mg/L



Sample

Sample Name: WG613086-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

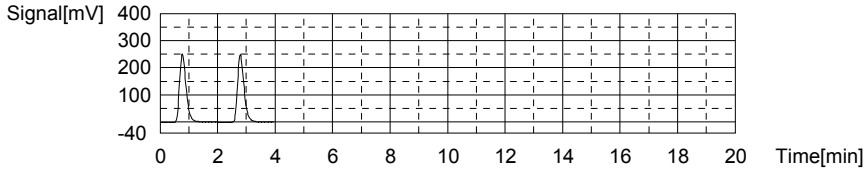
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.150mg/L TC:8.953mg/L IC:6.802mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	397.6	8.995mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 2:56:47 AM
2	394.0	8.910mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 3:01:01 AM

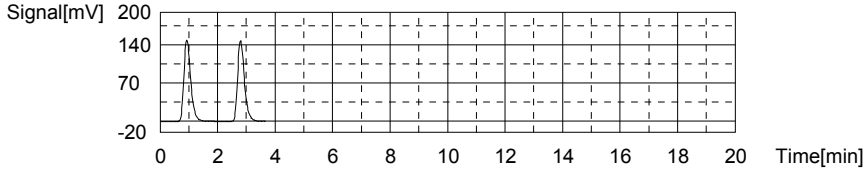
Mean Area 395.8
Mean Conc. 8.953mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	246.4	6.808mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 3:05:43 AM
2	246.0	6.796mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 3:10:09 AM

Mean Area 246.2
Mean Conc. 6.802mg/L



Sample

Sample Name: L17050184-11
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

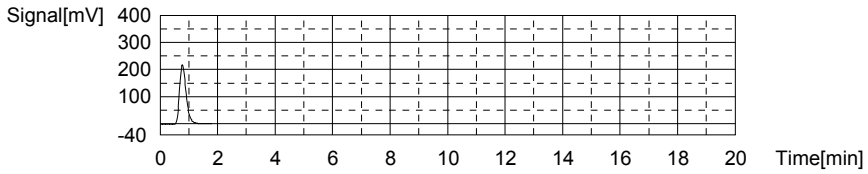
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.809mg/L TC:7.838mg/L IC:6.029mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	348.6	7.838mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 3:17:26 AM

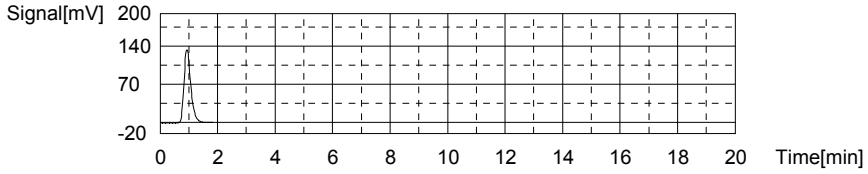
Mean Area 348.6
Mean Conc. 7.838mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	220.3	6.029mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 3:22:07 AM

Mean Area 220.3
Mean Conc. 6.029mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

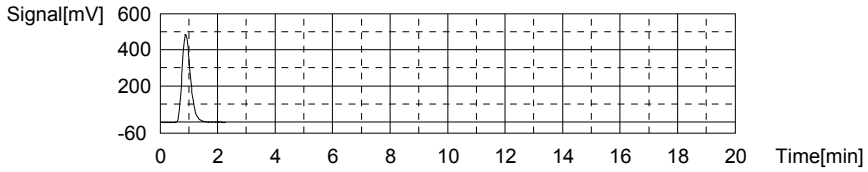
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.38mg/L TC:23.09mg/L IC:-0.2939mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	994.1	23.09mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 3:29:53 AM

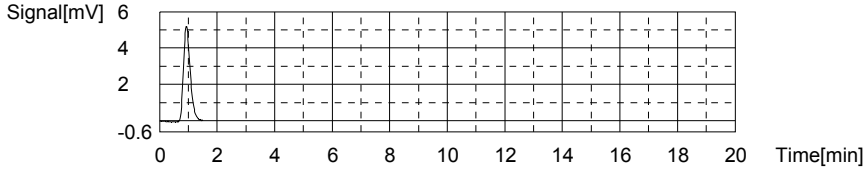
Mean Area 994.1
Mean Conc. 23.09mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.574	-0.2939mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 3:34:13 AM

Mean Area 8.574
Mean Conc. -0.2939mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

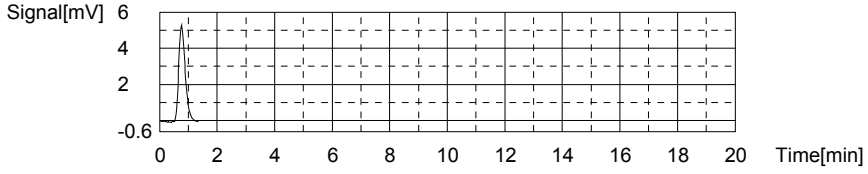
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1261mg/L TC:-0.1999mg/L IC:-0.3260mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.405	-0.1999mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 3:39:11 AM

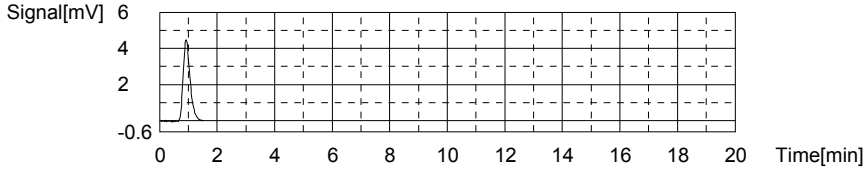
Mean Area 8.405
Mean Conc. -0.1999mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.499	-0.3260mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 3:43:04 AM

Mean Area 7.499
Mean Conc. -0.3260mg/L



Sample

Sample Name: L17050429-01 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

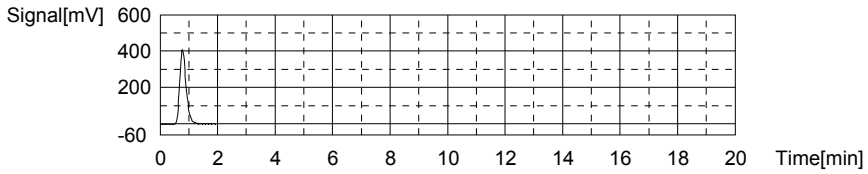
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.710mg/L TC:14.59mg/L IC:10.88mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	634.2	14.59mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 3:50:29 AM

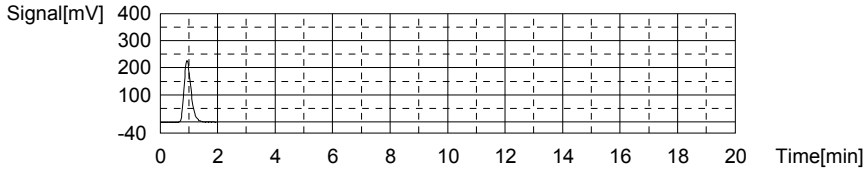
Mean Area 634.2
Mean Conc. 14.59mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	382.6	10.88mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 3:55:21 AM

Mean Area 382.6
Mean Conc. 10.88mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

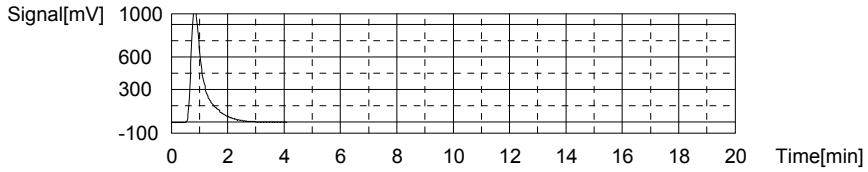
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:48.73mg/L TC:75.14mg/L IC:26.40mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3197	75.14mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 4:04:55 AM

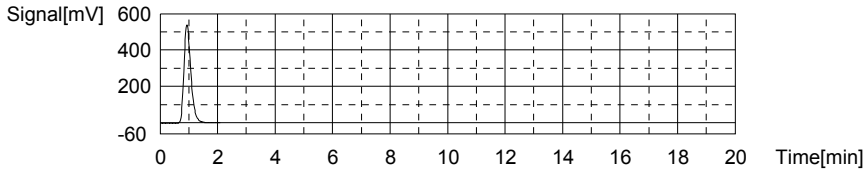
Mean Area 3197
Mean Conc. 75.14mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	902.5	26.40mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 4:10:01 AM

Mean Area 902.5
Mean Conc. 26.40mg/L



Sample

Sample Name: L17050429-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

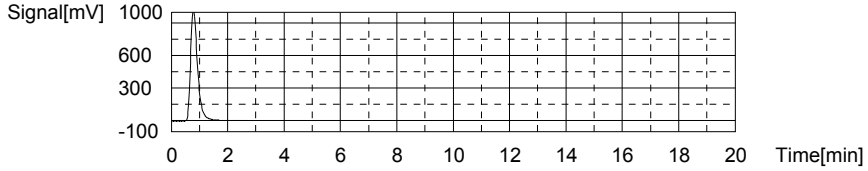
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:12.31mg/L TC:41.68mg/L IC:29.37mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1781	41.68mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 4:18:10 AM

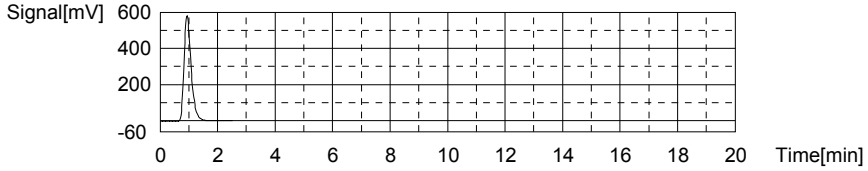
Mean Area 1781
Mean Conc. 41.68mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1002	29.37mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 4:23:42 AM

Mean Area 1002
Mean Conc. 29.37mg/L



Sample

Sample Name: L17050431-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

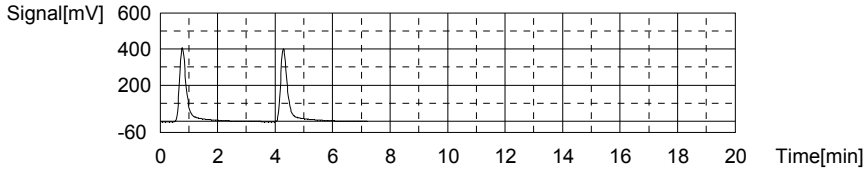
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.330mg/L TC:17.03mg/L IC:11.70mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	735.7	16.98mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 4:32:42 AM
2	739.5	17.07mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 4:38:45 AM

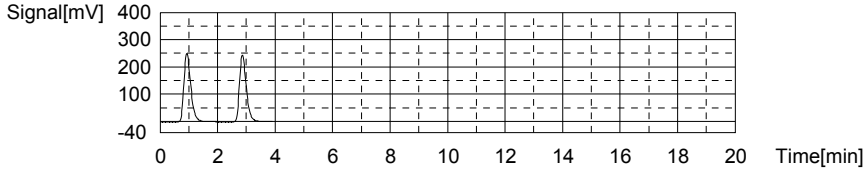
Mean Area 737.6
Mean Conc. 17.03mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	415.2	11.85mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 4:43:35 AM
2	405.1	11.55mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 4:48:14 AM

Mean Area 410.2
Mean Conc. 11.70mg/L



Sample

Sample Name: L17050431-03 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

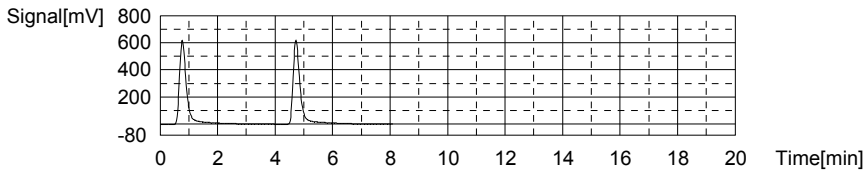
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.930mg/L TC:25.69mg/L IC:18.76mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1099	25.57mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 4:57:40 AM
2	1109	25.80mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 5:04:14 AM

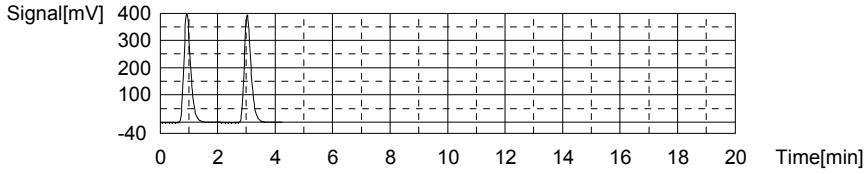
Mean Area 1104
Mean Conc. 25.69mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	649.3	18.84mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 5:09:17 AM
2	643.6	18.67mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 5:14:08 AM

Mean Area 646.5
Mean Conc. 18.76mg/L



Sample

Sample Name: <Untitled>
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

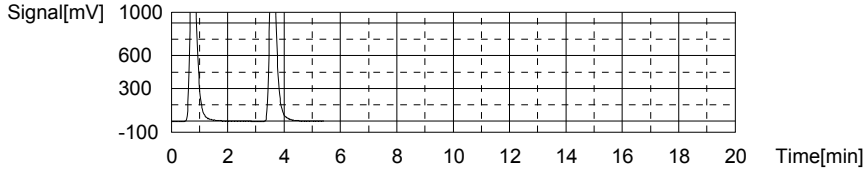
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-0.1381mg/L TC:58.34mg/L IC:58.48mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2479	58.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 5:22:27 AM
2	2493	58.50mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 5:27:19 AM

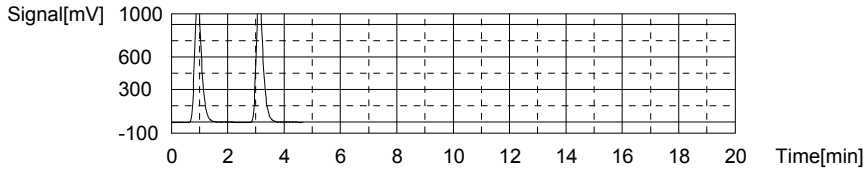
Mean Area 2486
Mean Conc. 58.34mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1962	58.04mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 5:32:35 AM
2	1991	58.91mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 5:38:01 AM

Mean Area 1977
Mean Conc. 58.48mg/L



Sample

Sample Name: <Untitled>
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

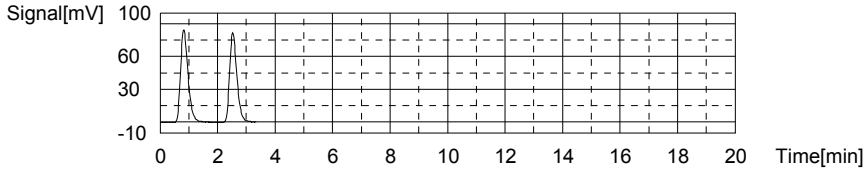
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.046mg/L TC:3.071mg/L IC:0.02510mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	151.3	3.176mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 5:45:12 AM
2	142.4	2.966mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 5:49:07 AM

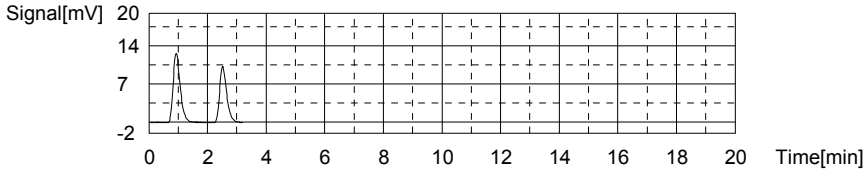
Mean Area 146.9
Mean Conc. 3.071mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	21.20	0.08318mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 5:53:35 AM
2	17.31	-0.03299mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 5:57:47 AM

Mean Area 19.26
Mean Conc. 0.02510mg/L



Sample

Sample Name: L17050440-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

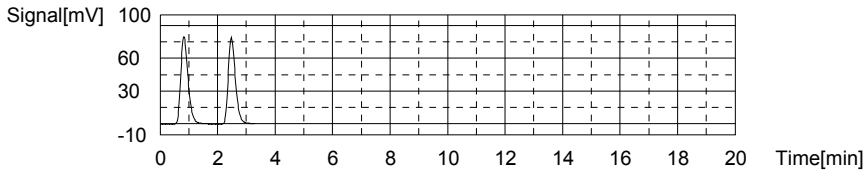
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:3.028mg/L TC:2.864mg/L IC:-0.1641mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	140.0	2.909mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 6:04:55 AM
2	136.2	2.819mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 6:08:50 AM

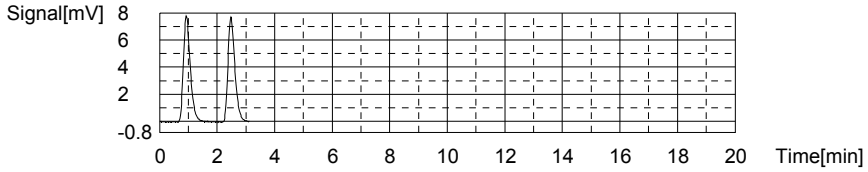
Mean Area 138.1
Mean Conc. 2.864mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	13.00	-0.1617mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 6:13:12 AM
2	12.84	-0.1665mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 6:17:22 AM

Mean Area 12.92
Mean Conc. -0.1641mg/L



Sample

Sample Name: L17050440-02
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

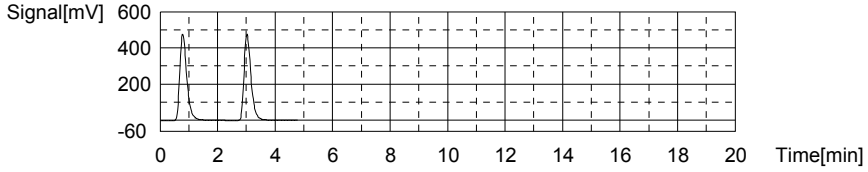
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:8.772mg/L TC:18.69mg/L IC:9.920mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	810.1	18.74mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 6:25:06 AM
2	805.9	18.64mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 6:30:50 AM

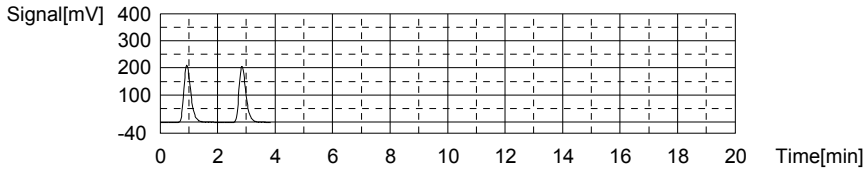
Mean Area 808.0
Mean Conc. 18.69mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	352.8	9.986mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 6:35:36 AM
2	348.4	9.855mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 6:40:10 AM

Mean Area 350.6
Mean Conc. 9.920mg/L



Sample

Sample Name: L17050440-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

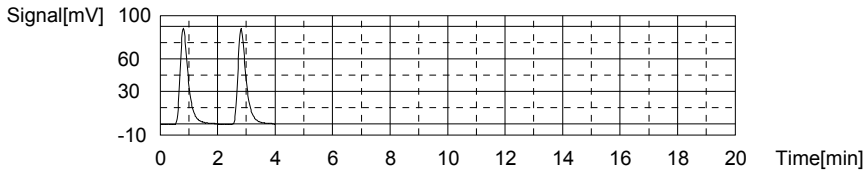
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.969mg/L TC:3.702mg/L IC:0.7326mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	172.6	3.679mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 6:47:40 AM
2	174.5	3.724mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 6:51:56 AM

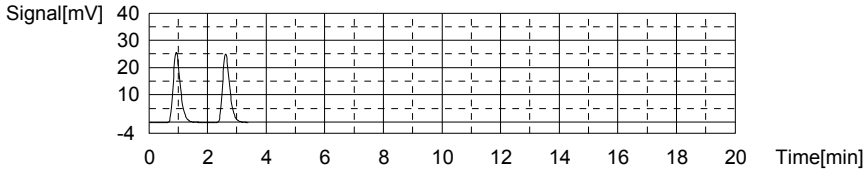
Mean Area 173.6
Mean Conc. 3.702mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	43.35	0.7447mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 6:56:25 AM
2	42.54	0.7205mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 7:00:43 AM

Mean Area 42.95
Mean Conc. 0.7326mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

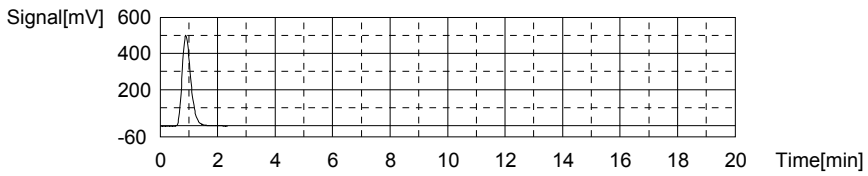
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:24.67mg/L TC:24.34mg/L IC:-0.3266mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1047	24.34mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 7:08:33 AM

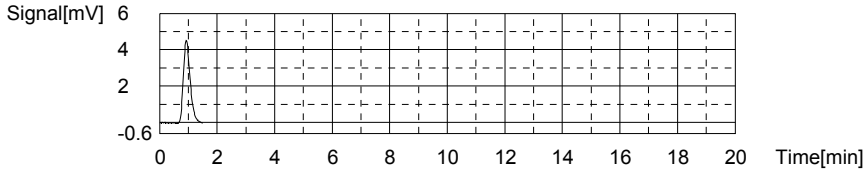
Mean Area 1047
Mean Conc. 24.34mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.478	-0.3266mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 7:12:51 AM

Mean Area 7.478
Mean Conc. -0.3266mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

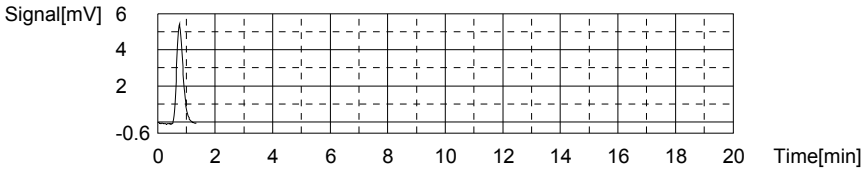
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1266mg/L TC:-0.1956mg/L IC:-0.3222mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.587	-0.1956mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 7:17:50 AM

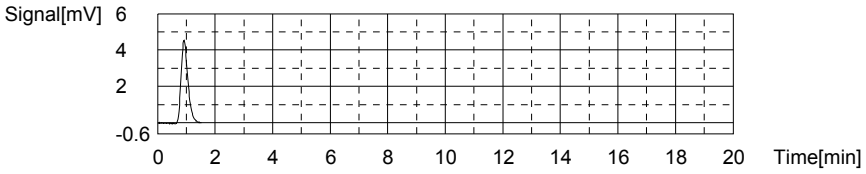
Mean Area 8.587
Mean Conc. -0.1956mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.627	-0.3222mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 7:21:42 AM

Mean Area 7.627
Mean Conc. -0.3222mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

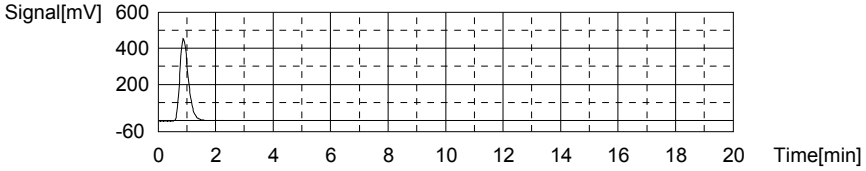
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:21.95mg/L TC:21.74mg/L IC:-0.2152mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	936.9	21.74mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 8:35:06 AM

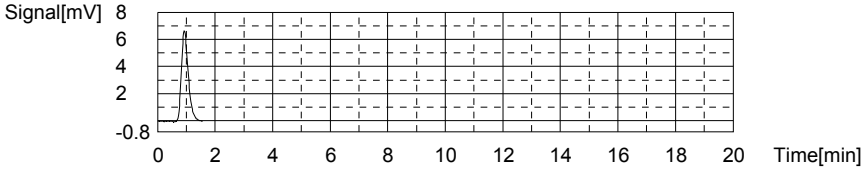
Mean Area 936.9
Mean Conc. 21.74mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.21	-0.2152mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 8:39:27 AM

Mean Area 11.21
Mean Conc. -0.2152mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

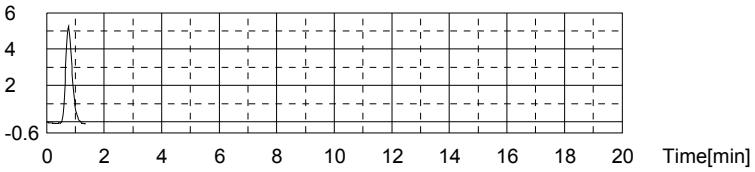
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1317mg/L TC:-0.1994mg/L IC:-0.3311mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.426	-0.1994mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 8:44:27 AM

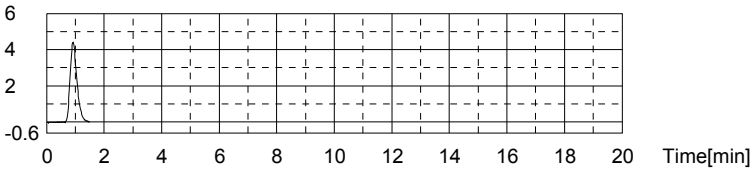
Mean Area 8.426
Mean Conc. -0.1994mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.328	-0.3311mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 8:48:17 AM

Mean Area 7.328
Mean Conc. -0.3311mg/L



Sample

Sample Name: L17050290-01 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

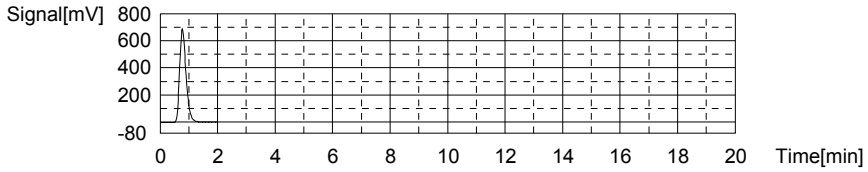
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.256mg/L TC:24.81mg/L IC:20.55mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1067	24.81mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 9:06:59 AM

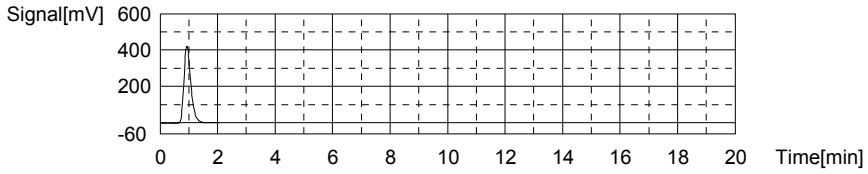
Mean Area 1067
Mean Conc. 24.81mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	706.7	20.55mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 9:11:58 AM

Mean Area 706.7
Mean Conc. 20.55mg/L



Sample

Sample Name: L17050290-02 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

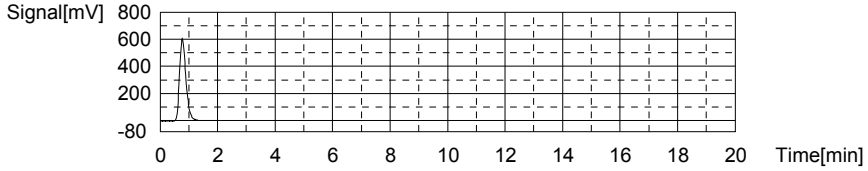
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.357mg/L TC:21.75mg/L IC:18.39mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	937.3	21.75mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 9:19:25 AM

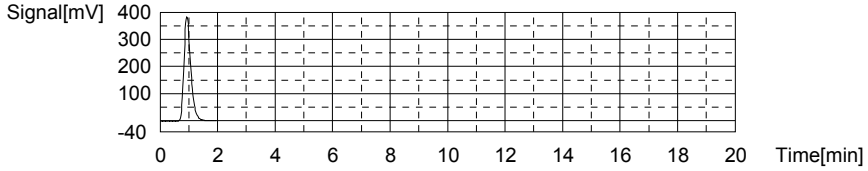
Mean Area 937.3
Mean Conc. 21.75mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	634.2	18.39mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 9:24:17 AM

Mean Area 634.2
Mean Conc. 18.39mg/L



Sample

Sample Name: L17050244-04 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

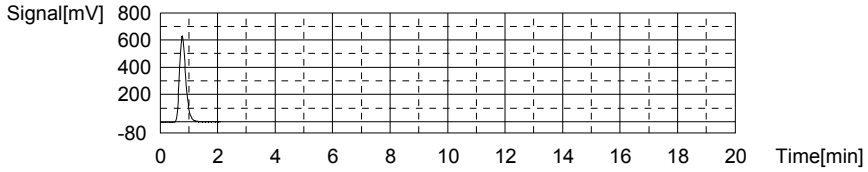
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.247mg/L TC:22.31mg/L IC:21.06mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	961.0	22.31mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 9:31:53 AM

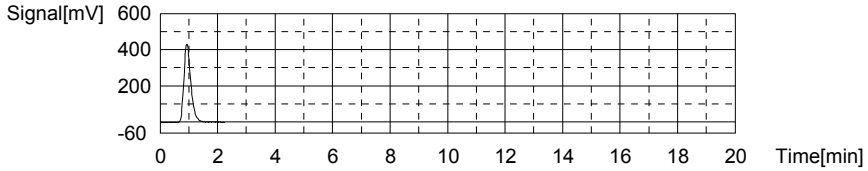
Mean Area 961.0
Mean Conc. 22.31mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	723.6	21.06mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 9:37:04 AM

Mean Area 723.6
Mean Conc. 21.06mg/L



Sample

Sample Name: L17050419-06 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

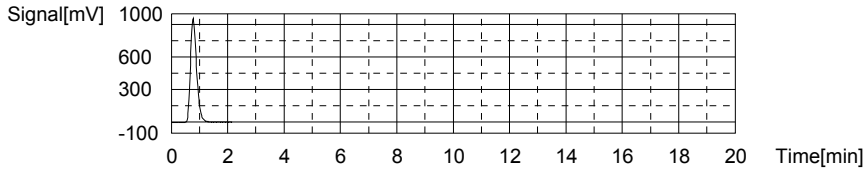
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.312mg/L TC:34.24mg/L IC:30.93mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1466	34.24mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 9:44:42 AM

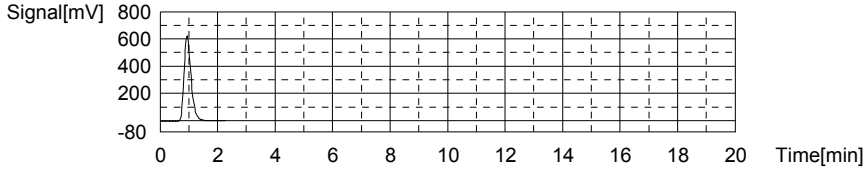
Mean Area 1466
Mean Conc. 34.24mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1054	30.93mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 9:49:57 AM

Mean Area 1054
Mean Conc. 30.93mg/L



Sample

Sample Name: L17050429-02 (25)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

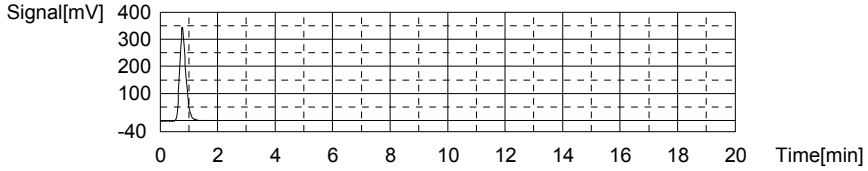
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.887mg/L TC:11.60mg/L IC:9.717mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	508.0	11.60mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 9:57:13 AM

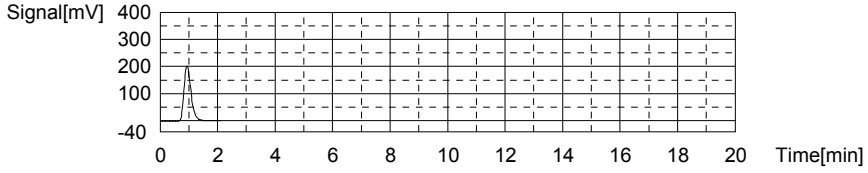
Mean Area 508.0
Mean Conc. 11.60mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	343.8	9.717mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/6/2017 10:02:13 AM

Mean Area 343.8
Mean Conc. 9.717mg/L



Sample

Sample Name: L1705431-05 (25)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

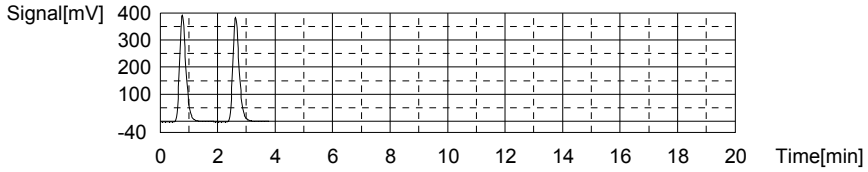
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.348mg/L TC:13.62mg/L IC:10.27mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	597.7	13.72mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 10:27:38 AM
2	588.6	13.51mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 10:31:51 AM

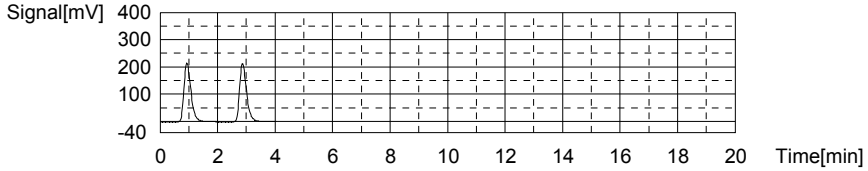
Mean Area 593.2
Mean Conc. 13.62mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	362.3	10.27mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 10:36:41 AM
2	362.2	10.27mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 10:41:27 AM

Mean Area 362.3
Mean Conc. 10.27mg/L



Sample

Sample Name: L17050427-01 (4)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

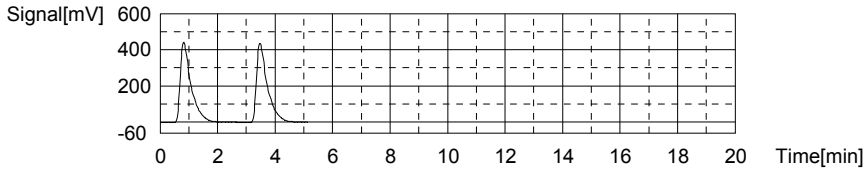
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:22.29mg/L TC:26.50mg/L IC:4.207mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1143	26.61mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 11:15:36 AM
2	1134	26.39mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 11:21:28 AM

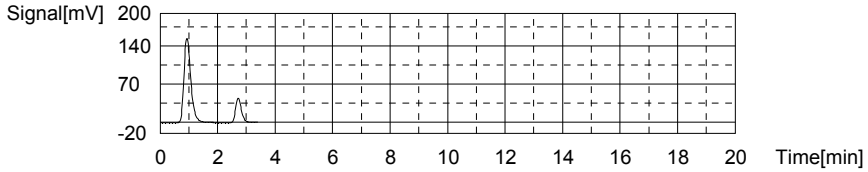
Mean Area 1139
Mean Conc. 26.50mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	255.5	7.080mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 11:26:10 AM
2	63.06	1.333mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 11:30:21 AM

Mean Area 159.3
Mean Conc. 4.207mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

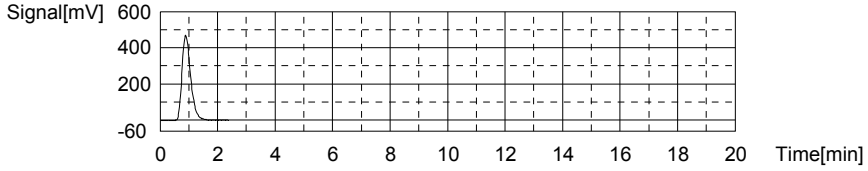
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.14mg/L TC:22.91mg/L IC:-0.2355mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	986.4	22.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 11:38:10 AM

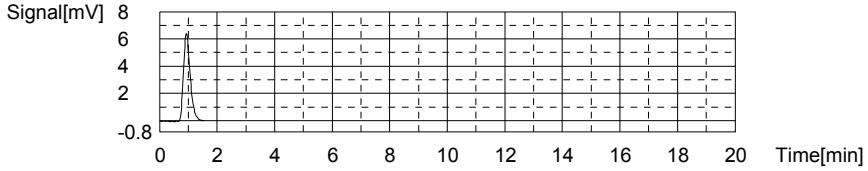
Mean Area 986.4
Mean Conc. 22.91mg/L



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_15	5/6/2017 11:42:31 AM

Mean Area 10.53
Mean Conc. -0.2355mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

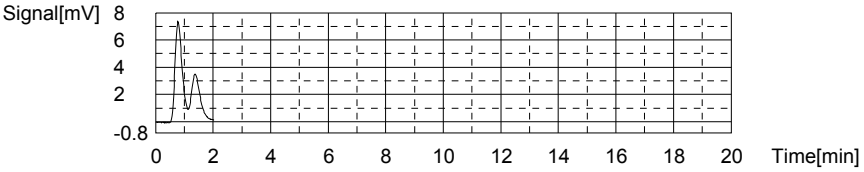
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.4073mg/L TC:0.07808mg/L IC:-0.3292mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	20.17	0.07808mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/6/2017 11:48:11 AM

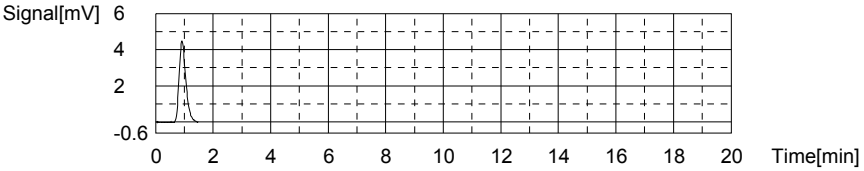
Mean Area 20.17
Mean Conc. 0.07808mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.390	-0.3292mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/6/2017 11:52:00 AM

Mean Area 7.390
Mean Conc. -0.3292mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
May 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
May 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
May 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 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-SP650-6437-Grab	Water	05/04/17 / 15:00		2	X		X		H2SO4	
LH18/24-SP650-6437-Grab	Water	05/04/17 / 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	05/04/17	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: 05/05/2017 09:35
By: CARA STRICKLER 221000100513

Cara Strickler

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC

COOLER TEMP >6° C LOG

Cooler ID 513

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

CWD 5/5/17

pH Exceptions

pH Lot # HC693124

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

CWD 5/5/17

PRESERVATIVE EXCEPTIONS

✓ NONE

__ AS NOTED

CWD 5/5/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17050427
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 16-MAY-2017

Samplenum	Container ID	Products
L17050427-01	905672	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-MAY-2017 12:50	BRG		
2	ANALYZ	W1	SEM	10-MAY-2017 19:33	JWR	AZH	
3	STORE	SEM	A1	16-MAY-2017 15:12	CLS	JWR	

Samplenum	Container ID	Products
L17050427-01	905673	PO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-MAY-2017 12:50	BRG		
2	ANALYZ	W1	WET	05-MAY-2017 13:03	DLP	BRG	
3	STORE	WET	A1	09-MAY-2017 08:14	CLS	DLP	

Samplenum	Container ID	Products
L17050427-01	905674	TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	F1	05-MAY-2017 12:50	BRG		<2
2	ANALYZ	F1	WET	05-MAY-2017 13:04	DCM	BRG	
3	STORE	WET	A1	11-MAY-2017 17:19	BRG	EPT	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-MAY-2017 12:50	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: L17050687

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 May 24 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 #: L17050687
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?
0013144	I	2.0		J4616881597	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 #: L17050687
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-SP140-7438-GRAB	L17050687-01	05/10/2017 15:00	05/11/2017 09:41

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:**	L17050687
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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	2017-05-16 20:19:57

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050687
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050687
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050687
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050687
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050687
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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.

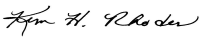
Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050687
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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
Kim Rhodes		Analyst III	2017-05-24 19:08:56

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050687
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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
Kim Rhodes		Analyst III	2017-05-24 19:12:49

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050687
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050687
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG613920	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-05-18 17:57:19

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050687
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG613920	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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					
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:**	L17050687
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG613920	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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:**	L17050687
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG613920	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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)			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:**	L17050687
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG613920	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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)	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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Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050687
Project Name:		**Method:**	CR-6
Prep Batch Number(s):	WG613920	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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 #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050687-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP140-7438-GRAB	**Prep Method:**	6850	**Prep Date:**	05/11/2017 10:45
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG613876	**Analyst:**	JWR	**Run Date:**	05/11/2017 22:35
Collect Date:	05/10/2017 15:00	**Dilution:**	10000	**File ID:**	1LM.LM39613
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	10800		4000	2000	1000

Certificate of Analysis

Sample #:	L17050687-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP140-7438-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/12/2017 09:11
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	05/15/2017 12:57
Workgroup #:	WG614242	**Analyst:**	KKB	**Run Date:**	05/15/2017 14:43
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	T4.051517.144307
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Selenium, Total	7782-49-2	0.0800	U	0.0800	0.0800	0.0400

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050687-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP140-7438-GRAB	**Prep Method:**	3015	**Prep Date:**	05/12/2017 08:38
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	05/12/2017 10:49
Workgroup #:	WG614072	**Analyst:**	JYH	**Run Date:**	05/12/2017 12:01
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	NI.051217.120107
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 #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050687-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP140-7438-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	03/10/2017 13:59
Workgroup #:	WG613920	**Analyst:**	ADG	**Run Date:**	05/11/2017 14:20
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	00.1705111420-06
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 #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Microbac

Lab Report #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

2.1 General Chromatography Data

2.1.1 LC/MS Data (6850)

2.1.1.1 Summary Data

Microbac

Lab Report #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050687-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP140-7438-GRAB	**Prep Method:**	6850	**Prep Date:**	05/11/2017 10:45
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG613876	**Analyst:**	JWR	**Run Date:**	05/11/2017 22:35
Collect Date:	05/10/2017 15:00	**Dilution:**	10000	**File ID:**	1LM.LM39613
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	10800		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: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)

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

Comments: ICAL WG611288 : Alternate Source STD80234
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39494	WG611288-01 CCB	1	1		04/24/17 13:27
2	1LM.LM39495	WG611288-02 STD (0.1 ug/L)	1	1	STD80232	04/24/17 13:46
3	1LM.LM39496	WG611288-03 STD (0.2 ug/L)	1	1	STD80232	04/24/17 14:05
4	1LM.LM39497	WG611288-04 STD (0.5 ug/L)	1	1	STD80232	04/24/17 14:24
5	1LM.LM39498	WG611288-05 STD (1.0 ug/L)	1	1	STD80232	04/24/17 14:43
6	1LM.LM39499	WG611288-06 STD (2.0 ug/L)	1	1	STD80232	04/24/17 15:02
7	1LM.LM39500	WG611288-07 STD (5.0 ug/L)	1	1	STD80232	04/24/17 15:21
8	1LM.LM39501	WG611288-08 STD (10 ug/L)	1	1	STD80232	04/24/17 15:40
9	1LM.LM39502	WG611288-09 SSCV (1.0 ug/L)	1	1	STD80234	04/24/17 15:59
10	1LM.LM39503	WG611330-01 CCB	1	1		04/24/17 16:18
11	1LM.LM39504	WG611330-02 CCV (1.0ug/L)	1	1	STD80232	04/24/17 16:37
12	1LM.LM39505	WG611327-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 16:56
13	1LM.LM39506	WG611327-01 MCT (0.2ug/L)	1	1	STD80234	04/24/17 17:14
14	1LM.LM39507	WG611327-02 BLANK	1	1		04/24/17 17:34
15	1LM.LM39508	WG611327-03 LCS (0.2ug/L)	1	1	STD80234	04/24/17 17:52
16	1LM.LM39509	L17040713-06 RS	1	1		04/24/17 18:11
17	1LM.LM39510	L17040713-07 MS	1	1	STD80234	04/24/17 18:30
18	1LM.LM39511	L17040713-08 MSD	1	1	STD80234	04/24/17 18:49
19	1LM.LM39512	L17040713-01	1	1		04/24/17 19:08
20	1LM.LM39513	L17040713-02	1	1		04/24/17 19:27
21	1LM.LM39514	L17040713-03	1	1		04/24/17 19:46
22	1LM.LM39515	L17040713-04	1	1		04/24/17 20:05
23	1LM.LM39516	WG611330-03 CCV (1.0ug/L)	1	1	STD80232	04/24/17 20:24
24	1LM.LM39517	WG611327-08 MRL (0.2ug/L)	1	1	STD80232	04/24/17 20:43
25	1LM.LM39518	WG611330-04 CCB	1	1		04/24/17 21:02
26	1LM.LM39519	L17040713-05	1	1		04/24/17 21:21
27	1LM.LM39520	L17040713-09	1	1		04/24/17 21:40
28	1LM.LM39521	L17040713-10	1	1		04/24/17 21:59
29	1LM.LM39522	L17040713-11	1	1		04/24/17 22:17
30	1LM.LM39523	L17040713-12	1	1		04/24/17 22:36
31	1LM.LM39524	L17040713-13	1	1		04/24/17 22:55
32	1LM.LM39525	WG611330-05 CCV (1.0ug/L)	1	1	STD80232	04/24/17 23:14
33	1LM.LM39526	WG611327-09 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:33

Page: 1 Approved: 25-APR-17

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 STD80234

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM39527	WG611328-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:52
35	1LM.LM39528	WG611330-06 CCB	1	1		04/25/17 00:11
36	1LM.LM39529	WG611328-01 MCT (0.2ug/L)	1	1	STD80234	04/25/17 00:30
37	1LM.LM39530	WG611328-02 BLANK	1	1		04/25/17 00:49
38	1LM.LM39531	WG611328-03 LCS (0.2ug/L)	1	1	STD80234	04/25/17 01:08
39	1LM.LM39532	L17040841-08 RS	1	1		04/25/17 01:27
40	1LM.LM39533	L17040841-09 MS	1	1	STD80234	04/25/17 01:46
41	1LM.LM39534	L17040841-10 MSD	1	1	STD80234	04/25/17 02:05
42	1LM.LM39535	L17040841-01	1	1		04/25/17 02:23
43	1LM.LM39536	L17040841-02	1	1		04/25/17 02:42
44	1LM.LM39537	L17040841-03	1	1		04/25/17 03:01
45	1LM.LM39538	L17040841-04	1	1		04/25/17 03:20
46	1LM.LM39539	WG611330-07 CCV (1.0ug/L)	1	1	STD80232	04/25/17 03:39
47	1LM.LM39540	WG611328-08 MRL (0.2ug/L)	1	1	STD80232	04/25/17 03:58
48	1LM.LM39541	WG611330-08 CCB	1	1		04/25/17 04:17
49	1LM.LM39542	L17040841-05	1	1		04/25/17 04:36
50	1LM.LM39543	L17040841-06	1	1		04/25/17 04:55
51	1LM.LM39544	L17040841-07	1	1		04/25/17 05:14
52	1LM.LM39545	L17040841-11	1	1		04/25/17 05:33
53	1LM.LM39546	L17040841-12	1	1		04/25/17 05:52
54	1LM.LM39547	L17040841-13	1	1		04/25/17 06:11
55	1LM.LM39548	WG611330-09 CCV (1.0ug/L)	1	1	STD80232	04/25/17 06:30
56	1LM.LM39549	WG611328-09 MRL (0.2ug/L)	1	1	STD80232	04/25/17 06:49
57	1LM.LM39550	WG611330-10 CCB	1	1		04/25/17 07:07

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 25-APR-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 051117_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 WG613813 (soils) Analytical WG613876 (waters)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments: Sample L17050687-01 was analyzed at a dilution based on its pre-run screen results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39606	WG613814-01 CCB	1	1		05/11/17 20:22
2	1LM.LM39607	WG613814-02 CCV (1.0ug/L)	1	1	STD80232	05/11/17 20:41
3	1LM.LM39608	WG613876-07 MRL (0.2ug/L)	1	1	STD80232	05/11/17 21:00
4	1LM.LM39609	WG613876-01 MCT (0.2ug/L)	1	1	STD80234	05/11/17 21:19
5	1LM.LM39610	WG613876-02 BLANK	1	1		05/11/17 21:38
6	1LM.LM39611	WG613876-03 LCS (0.2ug/L)	1	1	STD80234	05/11/17 21:57
7	1LM.LM39612	L17050427-01	1	1		05/11/17 22:16
8	1LM.LM39613	L17050687-01 (10,000x)	1	10000		05/11/17 22:35
9	1LM.LM39614	L17050688-01 REF	1	1		05/11/17 22:54
10	1LM.LM39615	L17050688-01 MS	1	1	STD80234	05/11/17 23:13
11	1LM.LM39616	L17050688-01 MSD	1	1	STD80234	05/11/17 23:32
12	1LM.LM39617	WG613814-03 CCV (1.0ug/L)	1	1	STD80232	05/11/17 23:51
13	1LM.LM39618	WG613876-08 MRL (0.2ug/L)	1	1	STD80232	05/12/17 00:10
14	1LM.LM39619	WG613813-07 MRL (2.0ug/kg)	7	1	STD80232	05/12/17 00:29
15	1LM.LM39620	WG613814-04 CCB	1	1		05/12/17 00:48
16	1LM.LM39621	WG613813-01 MCT (2.0ug/kg)	7	1	STD80234	05/12/17 01:07
17	1LM.LM39622	WG613813-02 BLANK	7	1		05/12/17 01:25
18	1LM.LM39623	WG613813-03 LCS (2.0ug/kg)	7	1	STD80234	05/12/17 01:44
19	1LM.LM39624	L17050554-03 REF	7	1		05/12/17 02:03
20	1LM.LM39625	L17050554-03 MS	7	1	STD80234	05/12/17 02:22
21	1LM.LM39626	L17050554-03 MSD	7	1	STD80234	05/12/17 02:41
22	1LM.LM39627	L17050554-01	7	1		05/12/17 03:00
23	1LM.LM39628	L17050554-02	7	1		05/12/17 03:19
24	1LM.LM39629	WG613814-05 CCV (1.0ug/L)	1	1	STD80232	05/12/17 03:38
25	1LM.LM39630	WG613813-08 MRL (2.0ug/kg)	7	1	STD80232	05/12/17 03:57
26	1LM.LM39631	WG613814-06 CCB	1	1		05/12/17 04:16

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 16-MAY-17

Microbac Laboratories Inc.

Data Checklist

Date: 24-APR-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG611288
Runlog ID: 81726
Analytical Workgroups: L17040713, L17040841

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	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:
25-APR-2017
John Richards

Secondary Reviewer:
25-APR-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: APR-25-2017 14:21:32

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 11-MAY-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 82195
Analytical Workgroups: L17050427, L17050687, L17050688, L17050554

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)	X
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	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:
16-MAY-2017
John Richards

Secondary Reviewer:
16-MAY-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-16-2017 16:24:13

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG613876

Login Number: L17050687

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-SP140-7438-GRAB	01	05/10/17					05/11/2017	.8	28		05/11/17	.5	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5296403
Report generated 05/23/2017 08:54

METHOD BLANK SUMMARY

Login Number: L17050687
Work Group: WG613876
Blank File ID: 1LM.LM39610
Blank Sample ID: WG613876-02
Prep Date: 05/11/17 10:45
Instrument ID: LCMS1
Analyzed Date: 05/11/17 21:38
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG613876-07	1LM.LM39608	05/11/17 21:00	01
MCT	WG613876-01	1LM.LM39609	05/11/17 21:19	01
LCS	WG613876-03	1LM.LM39611	05/11/17 21:57	01
LH18/24-SP140-7438-GRAB	L17050687-01	1LM.LM39613	05/11/17 22:35	DL01
QCMRL	WG613876-08	1LM.LM39618	05/12/17 00:10	01

Report Name: BLANK_SUMMARY
PDF File ID: 5296404
Report generated 05/23/2017 08:54

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17050687 Prep Date: 05/11/17 10:45 Sample ID: WG613876-02
Instrument ID: LCMS1 Run Date: 05/11/17 21:38 Prep Method: 6850
File ID: 1LM.LM39610 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-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: 5296405
23-MAY-2017 08:54

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050687 **Run Date:** 05/11/2017 **Sample ID:** WG613876-03
Instrument ID: LCMS1 **Run Time:** 21:57 **Prep Method:** 6850
File ID: 1LM.LM39611 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG613876 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD80234 **Cal ID:** LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.202	101	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5296406
Report generated: 05/23/2017 08:54

Login Number: L17050687
Analytical Method: 6850
ICAL Workgroup: WG611288

Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.286	4.98	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: 5305835
Report generated 05/23/2017 08:55

Login Number: L17050687
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-02			WG611288-03			WG611288-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	21000.0000	1.332	0.200	38200.0000	1.222	0.500	104000.000	1.335

INT_CAL - Modified 03/06/2008
PDF File ID: 5305835
Report generated 05/23/2017 08:55

Login Number: L17050687
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-05			WG611288-06			WG611288-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	206000.000	1.288	2.00	412000.000	1.312	5.00	955000.000	1.270

INT_CAL - Modified 03/06/2008
PDF File ID: 5305835
Report generated 05/23/2017 08:55

Login Number: L17050687
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-08		
	CONC	RESP	RF
Perchlorate	10.0	1860000.00	1.244

INT_CAL - Modified 03/06/2008
PDF File ID: 5305835
Report generated 05/23/2017 08:55

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17050687 Run Date: 04/24/2017 Sample ID: WG611288-09
Instrument ID: LCMS1 Run Time: 15:59 Method: 6850
File ID: 1LM.LM39502 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG611288 Cal ID: LCMS1 - 24-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.977	ug/L	1.24	2.30	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5305836
Report generated 05/23/2017 08:55

Login Number: L17050687 Run Date: 05/11/2017 Sample ID: WG613814-01
Instrument ID: LCMS1 Run Time: 20:22 Method: 6850
File ID: 1LM.LM39606 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG613876 Cal ID: LCMS1 - 24-APR-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: 5296409
Report generated 05/23/2017 08:55

Login Number: L17050687 | Run Date: 05/12/2017 | Sample ID: WG613814-04
Instrument ID: LCMS1 | Run Time: 00:48 | Method: 6850
File ID: 1LM.LM39620 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG613876 | Cal ID: LCMS1 - 24-APR-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: 5296409
Report generated 05/23/2017 08:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 **Run Date:** 05/11/2017 **Sample ID:** WG613814-02
Instrument ID: LCMS1 **Run Time:** 20:41 **Method:** 6850
File ID: 1LM.LM39607 **Analyst:** JWR **QC Key:** DOD4
Workgroup (AAB#): WG613876 **Cal ID:** LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.01	ug/L	1.29	1.00	15	

*** Exceeds %D Criteria**

CCV - Modified 03/05/2008
PDF File ID: 5296408
Report generated 05/23/2017 08:55

Login Number: L17050687 Run Date: 05/11/2017 Sample ID: WG613814-03
Instrument ID: LCMS1 Run Time: 23:51 Method: 6850
File ID: 1LM.LM39617 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG613876 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.30	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5296408
Report generated 05/23/2017 08:55

Login Number: L17050687 Run Date: 05/11/2017 Sample ID: WG613876-07
Instrument ID: LCMS1 Run Time: 21:00 Prep Method: 6850
File ID: 1LM.LM39608 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.203	102	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5296407
Report generated 05/23/2017 08:54

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG613876-08
Instrument ID: LCMS1 Run Time: 00:10 Prep Method: 6850
File ID: 1LM.LM39618 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5296407
Report generated 05/23/2017 08:54

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

Login Number:L17050687
Instrument ID:LCMS1
Workgroup (AAB#):WG613876

ICAL CCV Number:WG611288-05
CAL ID: LCMS1-24-APR-17
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG611288	NA	NA	777000
Upper Limit	NA	NA	1165500
Lower Limit	NA	NA	388500
L17050687-01	10000	DL01	769000
WG613876-02	1.00	01	722000
WG613876-03	1.00	01	716000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5296410
Report generated 05/23/2017 08:55

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**	6850	**Samplenum:**	L17050687-01
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39613
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 22:35	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	212000	69400	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG611288-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39495
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 13:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21000	6820	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG611288-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39496
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38200	13500	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG611288-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39497
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	104000	33400	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG611288-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39498
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	65300	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG611288-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39499
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	412000	130000	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG611288-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39500
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	955000	298000	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG611288-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39501
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1860000	603000	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG611288-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39502
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	65000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG613814-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39606
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 20:22	**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 #:	L17050687	**Prep Method:**		**Samplenum:**	WG613814-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39607
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 20:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	179000	57600	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG613814-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39617
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 23:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	64200	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**		**Samplenum:**	WG613814-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39620
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 00:48	**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 #:	L17050687	**Prep Method:**		**Samplenum:**	WG613814-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39629
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 03:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	70200	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**	6850	**Samplenum:**	WG613876-01
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39609
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40100	12100	3.31	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**	6850	**Samplenum:**	WG613876-02
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39610
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	849	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**	6850	**Samplenum:**	WG613876-03
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39611
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	37800	11800	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**	6850	**Samplenum:**	WG613876-07
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39608
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36900	12800	2.88	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050687	**Prep Method:**	6850	**Samplenum:**	WG613876-08
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39618
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 00:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44200	14400	3.07	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 #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Microbac

Lab Report #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050687-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP140-7438-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/12/2017 09:11
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	05/15/2017 12:57
Workgroup #:	WG614242	**Analyst:**	KKB	**Run Date:**	05/15/2017 14:43
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	T4.051517.144307
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Selenium, Total	7782-49-2	0.0800	U	0.0800	0.0800	0.0400

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17050687
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:

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

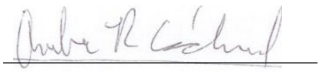
Where:	**Example:**
Cx = Concentration calculated as received (wet basis)	5
Px = Percent solids of sample (%wt)	80
$Cdry$ = Concentration calculated as dry weight (mg/kg)	6.25

Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup:	WG614006	SOP:	ME407 Revison 19
Analyst:	AC	Spike Solution:	STD81778
Spike Analyst:	AC	Spike Witness:	VC
Run Date:	05/12/2017 09:11	HNO3 Lot #:	COA19718
Method:	3015A	HCL Lot #:	COA19685
Balance:	BAL019	ICP FILTERS LOT#R6sa4256	RGT40011
Instrument:	MW-4	40 & 50 ML. DIGESTION TU	COA19487
Instrument Start:	05/12/2017 09:11		

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG614006-02	BLANK	1	40 mL	50 mL	204.629 g	204.61 g		
2	WG613917-01	FBLK1	17	5 mL	50 mL	205.815 g	205.8 g		
3	WG614006-03	LCS	1	40 mL	50 mL	211.633 g	211.624 g	5 mL	
4	L17050679-01	SAMP	1	40 mL	50 mL	206.484 g	206.468 g		05/18/17
5	L17050679-02	SAMP	1	40 mL	50 mL	204.501 g	204.488 g		05/18/17
6	L17050679-03	SAMP	1	40 mL	50 mL	206.753 g	206.742 g		05/18/17
7	L17050679-04	SAMP	1	40 mL	50 mL	203.905 g	203.893 g		05/18/17
8	L17050680-01	SAMP	1	40 mL	50 mL	205.397 g	205.385 g		05/18/17
9	L17050680-02	SAMP	1	40 mL	50 mL	205.783 g	205.772 g		05/18/17
10	L17050687-01	SAMP	1	40 mL	50 mL	206.168 g	206.158 g		05/22/17
11	L17050688-01	SAMP	1	40 mL	50 mL	206.464 g	206.45 g		05/22/17
12	L17050700-01	SAMP	17	5 mL	50 mL	203.397 g	203.372 g		05/22/17
13	WG614006-01	REF	17	5 mL	50 mL	205.729 g	205.711 g		
14	L17050712-01	SAMP	17	5 mL	50 mL	205.729 g	205.711 g		05/18/17
15	L17050713-01	SAMP	17	5 mL	50 mL	206.674 g	206.644 g		05/18/17
16	L17050732-01	SAMP	1	40 mL	50 mL	207.786 g	207.739 g		05/18/17
17	L17050732-02	SAMP	1	40 mL	50 mL	206.219 g	206.178 g		05/18/17
18	L17050732-03	SAMP	1	40 mL	50 mL	207.228 g	207.196 g		05/18/17
19	L17050760-02	SAMP	1	40 mL	50 mL	206.132 g	206.095 g		05/23/17
20	L17050760-03	SAMP	1	40 mL	50 mL	205.289 g	205.258 g		05/23/17
21	L17050760-04	SAMP	1	40 mL	50 mL	206.381 g	206.364 g		05/23/17
22	L17050760-05	SAMP	1	40 mL	50 mL	203.746 g	203.676 g		05/23/17
23	WG614006-04	MS	1	5 mL	50 mL	211.627 g	211.586 g	5 mL	
24	WG614006-05	MSD	1	5 mL	50 mL	209.108 g	209.086 g	5 mL	

L17050732-01	Filtered Digestate

Analyst: 

Reviewer: 

MW_DIG - Modified 09/30/2009
PDF ID: 5290646
Report generated: 05/12/2017 10:06

TCLP Non-Volatile

Analyst(s): BNB
Date: 5-11-17
Filter Lot #: 94810030
Microbac SOP: TCLP01 Rev #: 12

Balance ID: BAL020
pH Probe ID: T5
Temp probe ID: ☒1025 ☐1023

Analyst / Date		Analyst / Date	
BNB 5-11-17		BNB 5-12-17	
Time On	Temp On °C	Time Off	Temp Off °C
1522	23.0	805	22.5

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	05-0700-01	Me, CR-6	1311	F-235	S	100	7.09	1.54	100.47	2009	4.89
D	05-0712-01	Me	〃	〃	〃	〃	9.51	1.64	100.29	2005	4.92
D	05-0713-01	Me	〃	〃	〃	〃	9.44	3.67	100.40	2008	4.93
NA	FB1K-1	Me, CR-6	1311	〃	NA	NA	NA	NA	100	100	4.92

BNB 5-12-17

*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: [signature]

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 051517T4.1R.TXT
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81715 ICV Std: STD81716 Post Spike: STD81528
ICSA: STD81649 ICSAB: STD81581 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19158 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 614242,614249

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T4.051517.124245	WG614366-01	Calibration Point		1		05/15/17 12:42
2	T4.051517.124627	WG614366-02	Calibration Point		1		05/15/17 12:46
3	T4.051517.125009	WG614366-03	Calibration Point		1		05/15/17 12:50
4	T4.051517.125351	WG614366-04	Calibration Point		1		05/15/17 12:53
5	T4.051517.125719	WG614366-05	Calibration Point		1		05/15/17 12:57
6	T4.051517.130044	WG614366-06	Initial Calibration Verification		1		05/15/17 13:00
7	T4.051517.130413	WG614366-07	Initial Calib Blank		1		05/15/17 13:04
8	T4.051517.130755	WG614366-08	Low Level Initial Calibration V		1		05/15/17 13:07
9	T4.051517.131130	WG614366-09	LLICV		1		05/15/17 13:11
10	T4.051517.131505	WG614366-10	LLICV		1		05/15/17 13:15
11	T4.051517.131841	WG614366-11	Interference Check		1		05/15/17 13:18
12	T4.051517.132225	WG614366-12	Interference Check		1		05/15/17 13:22
13	T4.051517.132604	WG614366-13	CCV		1		05/15/17 13:26
14	T4.051517.132932	WG614366-14	CCB		1		05/15/17 13:29
15	T4.051517.135558	WG614006-02	Method/Prep Blank	40/50	1		05/15/17 13:55
16	T4.051517.135940	WG614006-03	Laboratory Control S	40/50	1		05/15/17 13:59
17	T4.051517.140308	WG613917-01	Fluid Blank 1		1		05/15/17 14:03
18	T4.051517.140651	L17050679-01	1804-109 W1	40/50	1		05/15/17 14:06
19	T4.051517.141029	L17050679-02	1804-109 S3	40/50	1		05/15/17 14:10
20	T4.051517.141408	L17050679-03	1804-109 S1	40/50	1		05/15/17 14:14
21	T4.051517.141748	L17050679-04	1804-109 S2	40/50	1		05/15/17 14:17
22	T4.051517.142127	L17050680-01	45-20-1.01 W1	40/50	1		05/15/17 14:21
23	T4.051517.142507	WG614242-01	Post Digestion Spike		1	L17050680-01	05/15/17 14:25
24	T4.051517.142835	WG614242-02	Serial Dilution		5	L17050680-01	05/15/17 14:28
25	T4.051517.143215	WG614366-15	CCV		1		05/15/17 14:32
26	T4.051517.143543	WG614366-16	CCB		1		05/15/17 14:35
27	T4.051517.143927	L17050680-02	45-20-1.01 P1	40/50	1		05/15/17 14:39
28	T4.051517.144307	L17050687-01	LH18/24-SP140-7438-GRAB	40/50	1		05/15/17 14:43
29	T4.051517.144645	L17050688-01	LH18/24-SP650-6438-GRAB	40/50	1		05/15/17 14:46
30	T4.051517.145031	L17050700-01	C SECTIONS	5/50	1		05/15/17 14:50
31	T4.051517.145409	WG614006-01	Reference Sample		1	L17050712-01	05/15/17 14:54
32	T4.051517.145750	WG614006-04	Matrix Spike	5/50	1	L17050712-01	05/15/17 14:57
33	T4.051517.150117	WG614006-05	Matrix Spike Duplica	5/50	1	L17050712-01	05/15/17 15:01
34	T4.051517.150445	L17050713-01	J7E0752-01	5/50	1		05/15/17 15:04

Page: 1 Approved: May 16, 2017

Kym H. Rhoden

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 051517T4.1R.TXT
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81715 ICV Std: STD81716 Post Spike: STD81528
ICSA: STD81649 ICSAB: STD81581 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19158 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 614242,614249

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T4.051517.150825	L17050732-01	SW01-GW-051017	40/50	1		05/15/17 15:08
36	T4.051517.151201	L17050732-02	WVU04-GW-051017	40/50	1		05/15/17 15:12
37	T4.051517.151541	WG614366-17	CCV		1		05/15/17 15:15
38	T4.051517.151909	WG614366-18	CCB		1		05/15/17 15:19
39	T4.051517.152252	L17050732-03	TCF-EB-051017	40/50	1		05/15/17 15:22
40	T4.051517.152635	L17050760-02	MW-38D-051117	40/50	1		05/15/17 15:26
41	T4.051517.153013	L17050760-03	DUP-051117	40/50	1		05/15/17 15:30
42	T4.051517.153351	L17050760-04	BW-5-051117	40/50	1		05/15/17 15:33
43	T4.051517.153729	L17050760-05	BW-1-051117	40/50	1		05/15/17 15:37
44	T4.051517.154109	WG614366-19	CCV		1		05/15/17 15:41
45	T4.051517.154436	WG614366-20	CCB		1		05/15/17 15:44
46	T4.051517.154820	WG614166-02	Method/Prep Blank	40/50	1		05/15/17 15:48
47	T4.051517.155201	WG614166-03	Laboratory Control S	40/50	1		05/15/17 15:52
48	T4.051517.155529	WG614166-04	Filter Blank		1		05/15/17 15:55
49	T4.051517.155911	L17050758-01	54095-06-13-38-WW1	40/50	1		05/15/17 15:59
50	T4.051517.160246	L17050758-02	54095-06-13-38-WW1	40/50	1		05/15/17 16:02
51	T4.051517.160624	L17050792-01	BSUMP-SW-051117	40/50	1		05/15/17 16:06
52	T4.051517.161004	L17050792-02	BSUMP-SW-051117	40/50	1		05/15/17 16:10
53	T4.051517.161343	L17050792-04	PZ101-GW-051117	40/50	1		05/15/17 16:13
54	T4.051517.161727	WG614249-01	Post Digestion Spike		1	L17050792-04	05/15/17 16:17
55	T4.051517.162104	WG614249-02	Serial Dilution		5	L17050792-04	05/15/17 16:21
56	T4.051517.162441	WG614366-21	CCV		1		05/15/17 16:24
57	T4.051517.162807	WG614366-22	CCB		1		05/15/17 16:28
58	T4.051517.163151	L17050792-06	PZ104-GW-051117	40/50	1		05/15/17 16:31
59	T4.051517.163535	L17050792-08	PZ105-GW-051117	40/50	1		05/15/17 16:35
60	T4.051517.163917	L17050843-01	12402-F01-WQ-W0003	40/50	1		05/15/17 16:39
61	T4.051517.164259	L17050843-02	15403-G03-WQ-W0019	40/50	1		05/15/17 16:42
62	T4.051517.164640	L17050843-03	45005-G02-WQ-W0007	40/50	1		05/15/17 16:46
63	T4.051517.165022	L17050843-04	50401-F01-WQ-W0017	40/50	1		05/15/17 16:50
64	T4.051517.165401	L17050843-05	51109-B01-WQ-W0003	40/50	1		05/15/17 16:54
65	T4.051517.165744	L17050848-02	SW1A-333-14	40/50	1		05/15/17 16:57
66	T4.051517.170125	WG614366-23	CCV		1		05/15/17 17:01
67	T4.051517.170453	WG614366-24	CCB		1		05/15/17 17:04
68	T4.051517.170837	L17050848-07	SW2A-333-14		1	WG614166-01	05/15/17 17:08

Page: 2 Approved: May 16, 2017

Kym H. Rhoden

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 051517T4.1R.TXT
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81715 ICV Std: STD81716 Post Spike: STD81528
ICSA: STD81649 ICSAB: STD81581 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19158 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 614242,614249

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	T4.051517.171218	L17050848-08	SW2A-333-14	40/50	1	WG614166-05	05/15/17 17:12
70	T4.051517.171546	L17050848-09	SW2A-333-14	40/50	1	WG614166-06	05/15/17 17:15
71	T4.051517.171914	L17050848-14	SW3A-333-14	40/50	1		05/15/17 17:19
72	T4.051517.172254	L17050848-17	SW3B-333-14	40/50	1		05/15/17 17:22
73	T4.051517.172634	L17050848-20	SW4A-333-14	40/50	1		05/15/17 17:26
74	T4.051517.173015	L17050848-23	SW5A-333-14	40/50	1		05/15/17 17:30
75	T4.051517.173358	WG614366-25	CCV		1		05/15/17 17:33
76	T4.051517.173726	WG614366-26	CCB		1		05/15/17 17:37
77	T4.051517.174111	WG614366-27	LLCCV		1		05/15/17 17:41
78	T4.051517.174445	WG614366-28	Low Level Continuing Calibra		1		05/15/17 17:44
79	T4.051517.174821	WG614366-29	LLCCV		1		05/15/17 17:48
80	T4.051517.175156	WG614366-30	Interference Check		1		05/15/17 17:51
81	T4.051517.175540	WG614366-31	Interference Check		1		05/15/17 17:55
82	T4.051517.175919	WG614366-32	CCV		1		05/15/17 17:59
83	T4.051517.180247	WG614366-33	CCB		1		05/15/17 18:02

Page: 3 Approved: May 16, 2017

Microbac Laboratories Inc.

Data Checklist

Date: 15-MAY-2017
Analyst: KKB
Analyst: NA
Method: 6010B/6010C/200.7
Instrument: ICP-THERMO4
Curve Workgroup: 614366
Runlog ID: 82168
Analytical Workgroups: 614242,614249

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	X
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	X
Client Forms	X
Level X	
Level 3	732,792
Level 4	687,688,760,843
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	KKB
Secondary Reviewer	KHR
Comments	

Primary Reviewer:
16-MAY-2017

Secondary Reviewer:
16-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-16-2017 12:12:54

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C AAB#: WG614242

Login Number: L17050687

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-SP140-7438-GRAB	01	05/10/17					05/12/2017	1.8	180		05/15/17	5	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5295452
Report generated 05/16/2017 10:03

METHOD BLANK SUMMARY

Login Number:	L17050687	**Work Group:**	WG614242
Blank File ID:	T4.051517.135558	**Blank Sample ID:**	WG614006-02
Prep Date:	05/12/17 09:11	**Instrument ID:**	ICP-THERMO4
Analyzed Date:	05/15/17 13:55	**Method:**	6010C
Analyst:	KKB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG614006-03	T4.051517.135940	05/15/17 13:59	01
LH18/24-SP140-7438-GRAB	L17050687-01	T4.051517.144307	05/15/17 14:43	01

Report Name: BLANK_SUMMARY
PDF File ID: 5295453
Report generated 05/16/2017 10:10

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17050687 Prep Date: 05/12/17 09:11 Sample ID: WG614006-02
Instrument ID: ICP-THERMO4 Run Date: 05/15/17 13:55 Prep Method: 3015A
File ID: T4.051517.135558 Analyst: KKB Method: 6010C
Workgroup (AAB#): WG614242 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-TH-15-MAY-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Selenium, Total	0.0400	0.0800	0.0400	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: 5295454
16-MAY-2017 10:03

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050687 **Run Date:** 05/15/2017 **Sample ID:** WG614006-03
Instrument ID: ICP-THERMO4 **Run Time:** 13:59 **Prep Method:** 3015A
File ID: T4.051517.135940 **Analyst:** KKB **Method:** 6010C
Workgroup (AAB#): WG614242 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD81778 **Cal ID:** ICP-TH-15-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Selenium, Total	0.250	0.232	92.6	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5295455
Report generated: 05/16/2017 10:03

Loginnum:L17050687 Cal ID:ICP-THERMO4- Worknum:WG614242
Instrument ID:ICP-THERMO4 Contract #: Method:6010C
Parent ID:WG614006-01 File ID:T4.051517.145409 Dil:1 Matrix:WATER
Sample ID:WG614006-04 MS File ID:T4.051517.145750 Dil:1 Units:mg/L
Sample ID:WG614006-05 MSD File ID:T4.051517.150117 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	1.96	97.8	2.00	2.01	101	2.83	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: 5295456
Report generated 05/16/2017 10:03

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17050687 **Worknum:** WG614242
Instrument: ICP-THERMO4 **Method:** 6010C
Serial Dil: WG614242-02 **File ID:** T4.051517.142835 **Dil:** 5 **Units:** ug/L
Sample: L17050680-01 **File ID:** T4.051517.142127 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Selenium	2.58		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: 5295450
05/16/2017 10:03

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17050687 **Worknum:** WG614242
Instrument ID: ICP-THERMO4 **Method:** 6010C
Post Spike ID: WG614242-01 **File ID:** T4.051517.142507 **Dil:** 1 **Units:** ug/L
Sample ID: L17050680-01 **File ID:** T4.051517.142127 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
SELENIUM	191		0	U	200	95.6	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: 5295451
Report generated: 05/16/2017 10:03

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17050687**	Workgroup (AAB#):	**WG614242**
Analytical Method:	**6010C**	Instrument ID:	**ICP-THERMO4**
ICAL Worknum:	**WG614366**	Initial Calibration Date:	**15-MAY-2017 12:57**

	WG614366-01		WG614366-02		WG614366-03		WG614366-04		WG614366-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
SELENIUM	0	-0.0000800	NA	NA	.008	-0.0000300	.4	0.00604	.8	0.0122	.999334	

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: 5295459
Report generated: 16-MAY-2017 10:04

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-07
Instrument ID: ICP-THERMO4 Run Time: 13:04 Method: 6010C
File ID: T4.051517.130413 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG614242 Cal ID: ICP-THERI - 15-MAY-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SELENIUM	.032	.064	.032	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: 5295461
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-14
Instrument ID: ICP-THERMO4 Run Time: 13:29 Method: 6010C
File ID: T4.051517.132932 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.0320	0.0640	0.0320	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: 5295464
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050687	Run Date:	05/15/2017	Sample ID:	WG614366-16
Instrument ID:	ICP-THERMO4	Run Time:	14:35	Method:	6010C
File ID:	T4.051517.143543	Analyst:	KKB	Units:	mg/L
Workgroup (AAB#):	WG614242	Cal ID:	ICP-TH - 15-MAY-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.0320	0.0640	0.0320	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: 5295464
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050687	Run Date:	05/15/2017	Sample ID:	WG614366-18
Instrument ID:	ICP-THERMO4	Run Time:	15:19	Method:	6010C
File ID:	T4.051517.151909	Analyst:	KKB	Units:	mg/L
Workgroup (AAB#):	WG614242	Cal ID:	ICP-TH - 15-MAY-17		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.0320	0.0640	0.0320	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: 5295464
Report generated 05/16/2017 10:04

Login Number: L17050687 | Run Date: 05/15/2017 | Sample ID: WG614366-26
Instrument ID: ICP-THERMO4 | Run Time: 17:37 | Method: 6010C
File ID: T4.051517.173726 | Analyst: KKB | Units: mg/L
Workgroup (AAB#): WG614242 | Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.0320	0.0640	0.0320	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: 5295464
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-33
Instrument ID: ICP-THERMO4 Run Time: 18:02 Method: 6010C
File ID: T4.051517.180247 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Selenium	0.0320	0.0640	0.0320	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: 5295464
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-06
Instrument ID: ICP-THERMO4 Run Time: 13:00 Method: 6010C
File ID: T4.051517.130044 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Selenium		.4	0.392	98.1	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5295460
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-13
Instrument ID: ICP-THERMO4 Run Time: 13:26 Method: 6010C
File ID: T4.051517.132604 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.398	mg/L	99.5	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5295463
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-15

Instrument ID: ICP-THERMO4 Run Time: 14:32 Method: 6010C

File ID: T4.051517.143215 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.403	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5295463

Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-17

Instrument ID: ICP-THERMO4 Run Time: 15:15 Method: 6010C

File ID: T4.051517.151541 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.406	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5295463

Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-25

Instrument ID: ICP-THERMO4 Run Time: 17:33 Method: 6010C

File ID: T4.051517.173358 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-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: 5295463

Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-32
Instrument ID: ICP-THERMO4 Run Time: 17:59 Method: 6010C
File ID: T4.051517.175919 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.408	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5295463
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-08
Instrument ID: ICP-THERMO4 Run Time: 13:07 Method: 6010C
File ID: T4.051517.130755 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0126	mg/L	79.0	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5295465
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.

LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17050687 Run Date: 05/15/2017 Sample ID: WG614366-28

Instrument ID: ICP-THERMO4 Run Time: 17:44 Method: 6010C

File ID: T4.051517.174445 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0181	mg/L	113	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010

PDF File ID: 5295465

Report generated 05/16/2017 10:04

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17050687 **Workgroup (AAB#):** WG614242
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG614366-11 **File ID:** T4.051517.131841 **Units:** mg/L
Sol. AB : WG614366-12 **File ID:** T4.051517.132225 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Selenium	NS	0.000460	NS	0.250	0.240	96.0	

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: 5295462
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17050687 **Workgroup (AAB#):** WG614242
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG614366-30 **File ID:** T4.051517.175156 **Units:** mg/L
Sol. AB : WG614366-31 **File ID:** T4.051517.175540 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Selenium	NS	-0.00646	NS	0.250	0.243	97.2	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).
+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5295462
Report generated 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050687 **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: 5295458
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050687 **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: 5295458
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050687 **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: 5295458
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050687 **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: 5295458
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050687 **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: 5295458
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050687 **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: 5295458
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050687 **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: 5295458
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17050687 **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: 5295457
Report generated: 05/16/2017 10:03

2.2 Metals Data

2.2.2 Metals ICP-MS Data

2.2.2.1 Summary Data

Microbac

Lab Report #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050687-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP140-7438-GRAB	**Prep Method:**	3015	**Prep Date:**	05/12/2017 08:38
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	05/12/2017 10:49
Workgroup #:	WG614072	**Analyst:**	JYH	**Run Date:**	05/12/2017 12:01
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	NI.051217.120107
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 #: L17050687
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: WG614007
Analyst: VC
Spike Analyst: VC
Run Date: 05/12/2017 08:38
Method: 3015
Balance: BAL016
Instrument: MW-3
Instrument Start: 05/12/2017 08:46

SOP: ME407 Revison 19
Spike Solution: STD80296
Spike Witness: ERP
HNO3 Lot #: COA19718
40 & 50 ML. DIGESTION TU COA19487
MS Filters- fisher-Lot#R RGT38288

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG614007-02	BLANK	1	20 mL	50 mL	184.725 g	184.724 g		
2	WG614007-03	LCS	1	20 mL	50 mL	184.998 g	184.994 g	.25 mL	
3	L17050615-10	SAMP	1	20 mL	50 mL	183.938 g	183.928 g		05/24/17
4	L17050645-01	SAMP	1	20 mL	50 mL	183.649 g	183.644 g		05/17/17
5	WG614007-01	REF	1	20 mL	50 mL	184.894 g	184.888 g		
6	L17050645-02	SAMP	1	20 mL	50 mL	184.894 g	184.888 g		05/17/17
7	L17050687-01	SAMP	1	20 mL	50 mL	184.238 g	184.229 g		05/22/17
8	L17050688-01	SAMP	1	20 mL	50 mL	181.901 g	181.897 g		05/22/17
9	WG614007-04	MS	1	20 mL	50 mL	186.123 g	186.121 g	.25 mL	
10	WG614007-05	MSD	1	20 mL	50 mL	184.254 g	184.249 g	.25 mL	

Analyst: Vicki Collins

Reviewer: Erin Potter

MW_DIG - Modified 09/30/2009
PDF ID: 5290488
Report generated: 05/12/2017 09:21

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 051217A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

Calibration Std: STD81804 ICV Std: STD81801 Post Spike: STD79415
ICSA: STD81802 ICSAB: STD81803 Int. Std: RGT39300
CCV: STD81800 LLCCV: STD81819 Tuning Sol : STD81805
Stannous : Hydroxylamine :

Workgroups: 614072

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.051217.103736	Blank	Blank		1		05/12/17 10:37
2	NI.051217.104041	WG614119-01	Calibration Point		1		05/12/17 10:40
3	NI.051217.104347	WG614119-02	Calibration Point		1		05/12/17 10:43
4	NI.051217.104653	WG614119-03	Calibration Point		1		05/12/17 10:46
5	NI.051217.104958	WG614119-04	Calibration Point		1		05/12/17 10:49
6	NI.051217.105304	WG614119-05	Initial Calibration Verification		1		05/12/17 10:53
7	NI.051217.105611	WG614119-06	Initial Calib Blank		1		05/12/17 10:56
8	NI.051217.105918	WG614119-07	Low Level Initial Calibration V		1		05/12/17 10:59
9	NI.051217.110223	WG614119-08	Interference Check		1		05/12/17 11:02
10	NI.051217.110529	WG614119-09	Interference Check		1		05/12/17 11:05
11	NI.051217.110836	WG614119-10	CCV		1		05/12/17 11:08
12	NI.051217.111141	WG614119-11	CCB		1		05/12/17 11:11
13	NI.051217.112400	WG614007-02	Method/Prep Blank	20/50	1		05/12/17 11:24
14	NI.051217.112705	WG614007-03	Laboratory Control S	20/50	1		05/12/17 11:27
15	NI.051217.113010	L17050615-10	P267-500	20/50	1		05/12/17 11:30
16	NI.051217.113316	L17050615-10	P267-500		5		05/12/17 11:33
17	NI.051217.113621	L17050615-10	P267-500		25		05/12/17 11:36
18	NI.051217.113927	WG614072-03	Serial Dilution		125	L17050615-10	05/12/17 11:39
19	NI.051217.114233	WG614119-12	CCV		1		05/12/17 11:42
20	NI.051217.114538	WG614119-13	CCB		1		05/12/17 11:45
21	NI.051217.114845	L17050645-01	1705063-01	20/50	1		05/12/17 11:48
22	NI.051217.115151	WG614007-01	Reference Sample		1	L17050645-02	05/12/17 11:51
23	NI.051217.115457	WG614007-04	Matrix Spike	20/50	1	L17050645-02	05/12/17 11:54
24	NI.051217.115802	WG614007-05	Matrix Spike Duplica	20/50	1	L17050645-02	05/12/17 11:58
25	NI.051217.120107	L17050687-01	LH18/24-SP140-7438-GRAB	20/50	1		05/12/17 12:01
26	NI.051217.120411	L17050688-01	LH18/24-SP650-6438-GRAB	20/50	1		05/12/17 12:04
27	NI.051217.120717	WG614072-01	Post Digestion Spike		1	L17050688-01	05/12/17 12:07
28	NI.051217.121023	WG614072-02	Serial Dilution		5	L17050688-01	05/12/17 12:10
29	NI.051217.121328	WG614072-02	Serial Dilution		25	L17050688-01	05/12/17 12:13
30	NI.051217.121634	WG614119-14	CCV		1		05/12/17 12:16
31	NI.051217.121940	WG614119-15	CCB		1		05/12/17 12:19
32	NI.051217.122253	WG614119-16	Low Level Continuing Calibra		1		05/12/17 12:22

Comments

Page: 1 Approved: May 15, 2017

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 051217A.REP

Analyst1: JYH Analyst2: N/A

Method: 6020/6020A/200.8 SOP: ME700A Rev: 3

Maintenance Log ID:

Calibration Std: STD81804 ICV Std: STD81801 Post Spike: STD79415

ICSA: STD81802 ICSAB: STD81803 Int. Std: RGT39300

CCV: STD81800 LLCCV: STD81819 Tuning Sol : STD81805

Stannous : Hydroxylamine :

Workgroups: 614072

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time

Seq.	Rerun	Dil.	Reason	Analytes
15			Seq. 15-18: wrong sample label. JYH	
26			Wrong sample label. JYH	

Page: 2 Approved: May 15, 2017

Microbac Laboratories Inc.

Data Checklist

Date: 12-MAY-2017
Analyst: JYH
Analyst: NA
Method: 6020/6020A/200.8
Instrument: ICP-MS2
Curve Workgroup: 614119
Runlog ID: 82130
Analytical Workgroups: 614072

STD ID#s on Runlog	X
Calibration/Linearity	X
ICV/CCV	X
ICV RSD < 3% (EPA 200.7 only)	X
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	615,645,687,688
Client Forms	X
Level X	
Level 3	
Level 4	615,645,687,688
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:
15-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-15-2017 12:52:05

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6020A AAB#: WG614072

Login Number: L17050687

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-SP140-7438-GRAB	01	05/10/17					05/12/2017	1.7	180		05/12/17	1.9	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5292373
Report generated 05/12/2017 14:21

METHOD BLANK SUMMARY

Login Number:	L17050687	**Work Group:**	WG614072
Blank File ID:	NI.051217.112400	**Blank Sample ID:**	WG614007-02
Prep Date:	05/12/17 08:38	**Instrument ID:**	ICP-MS2
Analyzed Date:	05/12/17 11:24	**Method:**	6020A
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG614007-03	NI.051217.112705	05/12/17 11:27	01
LH18/24-SP140-7438-GRAB	L17050687-01	NI.051217.120107	05/12/17 12:01	01

Report Name: BLANK_SUMMARY
PDF File ID: 5292374
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17050687 Prep Date: 05/12/17 08:38 Sample ID: WG614007-02
Instrument ID: ICP-MS2 Run Date: 05/12/17 11:24 Prep Method: 3015
File ID: NI.051217.112400 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG614072 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-MS-12-MAY-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: 5292375
12-MAY-2017 14:21

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050687 **Run Date:** 05/12/2017 **Sample ID:** WG614007-03
Instrument ID: ICP-MS2 **Run Time:** 11:27 **Prep Method:** 3015
File ID: NI.051217.112705 **Analyst:** JYH **Method:** 6020A
Workgroup (AAB#): WG614072 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80296 **Cal ID:** ICP-MS-12-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Silver, Total	0.125	0.129	103	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5292376
Report generated: 05/12/2017 14:21

Loginnum:L17050687 Cal ID:ICP-MS2- Worknum:WG614072
Instrument ID:ICP-MS2 Contract #: Method:6020A
Parent ID:WG614007-01 File ID:NI.051217.115151 Dil:1 Matrix:WATER
Sample ID:WG614007-04 MS File ID:NI.051217.115457 Dil:1 Units:mg/L
Sample ID:WG614007-05 MSD File ID:NI.051217.115802 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	0.124	99.0	0.125	0.122	97.9	1.13	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: 5292377
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17050687 **Worknum:** WG614072
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG614072-02 **File ID:** NI.051217.121023 **Dil:** 5 **Units:** ug/L
Sample: L17050688-01 **File ID:** NI.051217.120411 **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: 5292371
05/12/2017 14:21

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17050687 **Worknum:** WG614072
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG614072-03 **File ID:** NI.051217.113316 **Dil:** 5 **Units:** ug/L
Sample: L17050615-10 **File ID:** NI.051217.113010 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Silver	161		163		1.38	

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: 5292371
05/12/2017 14:21

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17050687 **Worknum:** WG614072
Instrument ID: ICP-MS2 **Method:** 6020A
Post Spike ID: WG614072-01 **File ID:** NI.051217.120717 **Dil:** 1 **Units:** ug/L
Sample ID: L17050688-01 **File ID:** NI.051217.120411 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
SILVER	44.1		0	U	50	88.2	75 - 125	

N = % Recovery exceeds control limits
F = Result is between MDL and RL
U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 5292372
Report generated: 05/12/2017 14:21

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17050687**	Workgroup (AAB#):	**WG614072**
Analytical Method:	**6020A**	Instrument ID:	**ICP-MS2**
ICAL Worknum:	**WG614119**	Initial Calibration Date:	**12-MAY-2017 10:49**

	WG614119-01		WG614119-02		WG614119-03		WG614119-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
SILVER	0	152	.4	515	50	331000	100	646000	.999998	

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: 5292380
Report generated: 12-MAY-2017 14:21

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG614119-06
Instrument ID: ICP-MS2 Run Time: 10:56 Method: 6020A
File ID: NI.051217.105611 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG614072 Cal ID: ICP-MS2 - 12-MAY-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: 5292382
Report generated 05/12/2017 14:21

Login Number: L17050687 | Run Date: 05/12/2017 | Sample ID: WG614119-11
Instrument ID: ICP-MS2 | Run Time: 11:11 | Method: 6020A
File ID: NI.051217.111141 | Analyst: JYH | Units: ug/L
Workgroup (AAB#): WG614072 | Cal ID: ICP-MS - 12-MAY-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: 5292385
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050687	Run Date:	05/12/2017	Sample ID:	WG614119-13
Instrument ID:	ICP-MS2	Run Time:	11:45	Method:	6020A
File ID:	NI.051217.114538	Analyst:	JYH	Units:	ug/L
Workgroup (AAB#):	WG614072	Cal ID:	ICP-MS - 12-MAY-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: 5292385
Report generated 05/12/2017 14:21

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG614119-15
Instrument ID: ICP-MS2 Run Time: 12:19 Method: 6020A
File ID: NI.051217.121940 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-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: 5292385
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG614119-05
Instrument ID: ICP-MS2 Run Time: 10:53 Method: 6020A
File ID: NI.051217.105304 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Silver		50	49.5	98.9	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5292381
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG614119-10

Instrument ID: ICP-MS2 Run Time: 11:08 Method: 6020A

File ID: NI.051217.110836 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.0500	0.0496	mg/L	99.2	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5292384

Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG614119-12

Instrument ID: ICP-MS2 Run Time: 11:42 Method: 6020A

File ID: NI.051217.114233 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.0500	0.0504	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5292384

Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG614119-14

Instrument ID: ICP-MS2 Run Time: 12:16 Method: 6020A

File ID: NI.051217.121634 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.0500	0.0501	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5292384

Report generated 05/12/2017 14:21

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG614119-07
Instrument ID: ICP-MS2 Run Time: 10:59 Method: 6020A
File ID: NI.051217.105918 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.400	0.380	ug/L	94.9	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5294045
Report generated 05/15/2017 13:57

Login Number: L17050687 Run Date: 05/12/2017 Sample ID: WG614119-16
Instrument ID: ICP-MS2 Run Time: 12:22 Method: 6020A
File ID: NI.051217.122253 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Silver		0.400	0.367	ug/L	91.7	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5294045
Report generated 05/15/2017 13:57

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17050687 **Workgroup (AAB#):** WG614072
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG614119-08 **File ID:** NI.051217.110223 **Units:** ug/L
Sol. AB : WG614119-09 **File ID:** NI.051217.110529 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Silver	NS	-0.000200	NS	100	85.7	85.7	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).
+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5292383
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L17050687 **Analytical Method:** 6020
Analytical Workgroup: WG614072 **Matrix:** 1
Instrument: ICP-MS2 **Analyst:** JYH
ICAL Date: 12-MAY-2017 10:40

			BISMUTH	GERMANIUM	INDIUM
Sample	Type	Run Date	% Rec	% Rec	% Rec
L17050615-10	SAMP	12-MAY-2017 11:30	98.013	100.452	97.724
L17050687-01	SAMP	12-MAY-2017 12:01	91.278	96.688	95.009
L17050688-01	SAMP	12-MAY-2017 12:04	90.619	95.961	95.26
WG614007-02	BLANK	12-MAY-2017 11:24	98.605	102.166	99.815
WG614007-03	LCS	12-MAY-2017 11:27	97.376	100.972	97.551
WG614072-01	PSPK	12-MAY-2017 12:07	91.646	96.79	95.299
WG614072-02	SERIAL	12-MAY-2017 12:10	90.82	93.501	91.536
WG614072-03	SERIAL	12-MAY-2017 11:33	96.448	99.641	96.744
WG614119-05	ICV	12-MAY-2017 10:53	95.675	97.755	96.668
WG614119-06	ICB	12-MAY-2017 10:56	96.373	98.003	96.062
WG614119-07	LLICV	12-MAY-2017 10:59	95.538	95.364	93.765
WG614119-08	ICS	12-MAY-2017 11:02	95.119	100.268	96.56
WG614119-09	ICS	12-MAY-2017 11:05	97.912	102.113	100.443
WG614119-10	CCV	12-MAY-2017 11:08	98.236	102.2	100.579
WG614119-11	CCB	12-MAY-2017 11:11	98.317	101.441	99.309
WG614119-12	CCV	12-MAY-2017 11:42	95.116	99.994	96.168
WG614119-13	CCB	12-MAY-2017 11:45	95.495	99.705	95.97
WG614119-14	CCV	12-MAY-2017 12:16	95.695	100.705	97.785
WG614119-15	CCB	12-MAY-2017 12:19	95.667	99.96	96.586
WG614119-16	LLCCV	12-MAY-2017 12:22	95.376	98.034	95.149

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: 5292379
Report generated: 05/12/2017 14:21

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17050687 **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: 5292378
Report generated: 05/12/2017 14:21

2.3 General Chemistry Data

2.3.1 Hexavalent Chromium Data

2.3.1.1 Summary Data

Microbac

Lab Report #: L17050687
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050687-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP140-7438-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	03/10/2017 13:59
Workgroup #:	WG613920	**Analyst:**	ADG	**Run Date:**	05/11/2017 14:20
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	00.1705111420-06
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 #: L17050687
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: 11-MAY-2017
Analyst: ADG
Analyst: NA
Method: CR-6
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG613920

Calibration/Linearity	05/11/17
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:
12-MAY-2017

Secondary Reviewer:
18-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-18-2017 15:26:13

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 7196A **AAB#:** WG613920

Login Number: L17050687

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-SP140-7438-GRAB	01	05/10/17					05/11/2017	1	1		05/11/17	1	1	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5300214
Report generated 05/18/2017 13:55

METHOD BLANK SUMMARY

Login Number: L17050687
Work Group: WG613920
Blank File ID: 00.1705111420-03
Blank Sample ID: WG613920-01
Prep Date: 05/11/17 14:20
Instrument ID: UV-2600
Analyzed Date: 05/11/17 14:20
Method: 7196A
Analyst: ADG

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG613920-02	00.1705111420-04	05/11/17 14:20	
LCS2	WG613920-03	00.1705111420-05	05/11/17 14:20	
LH18/24-SP140-7438-GRAB	L17050687-01	00.1705111420-06	05/11/17 14:20	
DUP	WG613920-05	00.1705111420-08	05/11/17 14:20	

Report Name: BLANK_SUMMARY
PDF File ID: 5300215
Report generated 05/18/2017 13:55

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050687 Prep Date: 05/11/17 14:20 Sample ID: WG613920-01
Instrument ID: UV-2600 Run Date: 05/11/17 14:20 Prep Method: 7196A
File ID: 00.1705111420-03 Analyst: ADG Method: 7196A
Workgroup (AAB#): WG613920 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-11-MAY-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: 5300216
18-MAY-2017 13:55

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050687 Analyst: ADG Prep Method: 7196A
Instrument ID: UV-2600 Matrix: Water Method: 7196A
Workgroup (AAB#): WG613920 Units: mg/L
QC Key: DOD4 Lot #: STD80875

Sample ID: WG613920-02 LCS File ID: 00.1705111420-04 Run Date: 05/11/2017 14:20
Sample ID: WG613920-03 LCS2 File ID: 00.1705111420-05 Run Date: 05/11/2017 14:20

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chromium, Hexavalent	0.100	0.103	103	0.100	0.104	104	0.482	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5300217
Report generated: 05/18/2017 13:55

2.3.1.3 Raw Data

WG 1105850 00855322

Curves

Parameter: Cole-Low

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: IR 80872, 80873

Concentration: 50mg/L, 5mg/L

Recipe for preparation of curve standards found in:
SOP: K2180 Revision: 22 Page: 12

Second Source Stock: 30875 (concentration: 2mg/L)

Daily Preparation: 10(2)/100

concentration = 0.01

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
0.2	100	5cm	540	0.808
0.1	100	5cm	540	0.408
0.05	100	5cm	540	0.206
0.02	100	5cm	540	0.084
0.01	100	5cm	540	0.052
0.00	100	5cm	540	0.003
2nd source 0.1	100	5cm	540	0.418

Analyst: Jamie Greene Date/Time: 3/01/17 1355

DCN#124473

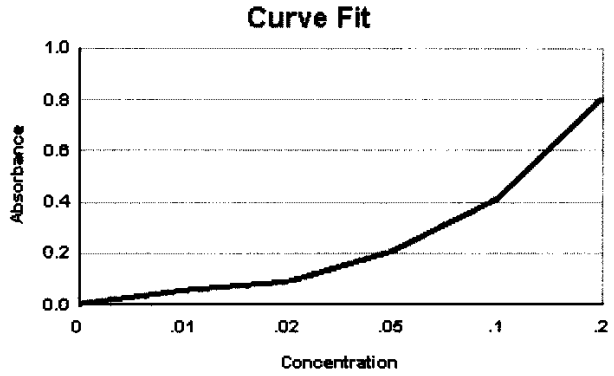
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG605850
Analytical Method:3500CR
Instrument ID:UV-2600

Analyst:ADG
Initial Calibration Date:03/10/2017

Analyte: CHROMIUM, HEXAVALENT
Number of Points: 6
Slope: 4.01048
Y-Intercept: 0.00616935
Coef. Of Correlation (R^2): 0.999893
Coef. Of Correlation (R): 0.999947

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00300	0.00	0.00	0.00616935
0.0100	0.0520	0.000100	0.000520	0.0462742
0.0200	0.0840	0.000400	0.00168	0.0863790
0.0500	0.206	0.00250	0.0103	0.206694
0.100	0.408	0.0100	0.0408	0.407218
0.200	0.808	0.0400	0.162	0.808266



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 03/10/2017 15:28

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG605850
File ID: 00.1703101359-07
CCV ID: WG605850-07
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 03/10/2017
Run Time: 13:59
Analyst: ADG
Cal ID: UV-260 - 10-MAR-17 13:59:06

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.1	0.103	4.18	3.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 03/10/2017 15:29

[redacted]

WORKGROUP: WG613920

CHROMIUM (6)

(cr6)

Standard Methods 3500 Cr-D (18th, 19th), 3500Cr-B(20th) SPEC: UV-2600

SOP K2186 Rev. # 22 SW846 7196A Curve ID: 3-10-17

SOP OVAP K3500-Cr Rev. #____ CCV: 80873 LCS: 80875 Spike: 80874 RGT 44113

Matrix: Liquid (mg/L) Daily dilution: 1(5)/100 Daily dilution: 10(2)/200 Daily dilution: 6.2(50)/100 RGT 18997

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			~~5~~	
CCV: mg/L(5 cm)	100	✓		5	0.214
Blank/CCB:	100	✓		5	0.000
LCS: ppm	100	✓		5	0.420
LCSDUP: ppm	100	✓		5	0.422
687-01	100	✓		5	0.004
688-01	100	✓		5	0.005
	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: 687-01	100	✓		5	0.002
MS: ( ) 687-01	100	✓		5	0.006
MSD: ( )	100				
CCV: (1 cm)	100				
CCV: (5 cm)	100	✓		5	0.213
CCB:	100	✓		5	0.000

Analyst: April Greene Date / Time: 5/11/17 @ 1420

SW846 7196 (Dup and/or MS every 10 samples) **SM3500 Cr (Dup and MS/MSD every 20 samples)**

DCN#125807

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG613920
Analyte: CHROMIUM, HEXAVALENT

Analyst: ADG
Date: 05/11/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG613920-01	100	100	0	4.010	0.006169	-0.0015383	-0.0015383	1	mg/L
WG613920-02	100	100	0.420	4.010	0.006169	0.10319	0.10319	1	mg/L
WG613920-03	100	100	0.422	4.010	0.006169	0.10369	0.10369	1	mg/L
L17050687-01	100	100	0.00400	4.010	0.006169	-0.00054092	ND	1	mg/L
WG613920-04	100	100	0.00400	4.010	0.006169	-0.00054092	-0.00054092	1	mg/L
L17050688-01	100	100	0.00500	4.010	0.006169	-0.00029157	ND	1	mg/L
WG613920-05	100	100	0.00200	4.010	0.006169	-0.0010396	-0.0010396	1	mg/L
WG613920-06	100	100	0.00600	4.010	0.006169	-0.000042228	-0.000042228	1	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 05/12/2017 10:11

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG614071
File ID: 00.1705111420-01
CCV ID: WG614071-01
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 05/11/2017
Run Time: 14:20
Analyst: ADG
Cal ID: UV-260 - 11-MAY-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0518	4.28	3.6	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/12/2017 10:10

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG614071
File ID: 00.1705111420-10
CCV ID: WG614071-03
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 05/11/2017
Run Time: 14:20
Analyst: ADG
Cal ID: UV-260 - 11-MAY-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0516	4.26	3.2	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/12/2017 10:10

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
May 24, 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
May 24, 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
May 24, 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	HEXAVALENT CHROMIUM	PERCHLORATE	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP140-7438-Grab	Water	05/10/17 / 15:00		1	X			HNO3	
LH18/24-SP140-7438-Grab	Water	05/10/17 / 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	05/10/17	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: 05/11/2017 09:41
By: CARA STRICKLER 221000100748

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC

COOLER TEMP >6° C LOG

Cooler ID 748

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

CWD 5/11/17

pH Exceptions

pH Lot # HC193124

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

CWD 5/11/17

PRESERVATIVE EXCEPTIONS

✓ NONE

__ AS NOTED

CWD 5/11/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17050687
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 22-MAY-2017

Samplenum	Container ID	Products
L17050687-01	907682	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	11-MAY-2017 10:06	CLS		
2	ANALYZ	W1	SEM	11-MAY-2017 10:42	JWR	BRG	
3	STORE	SEM	A1	16-MAY-2017 15:12	CLS	JWR	

Samplenum	Container ID	Products
L17050687-01	907683	AG-MS SE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	11-MAY-2017 10:06	CLS		
2	PREP	W1	DIG	11-MAY-2017 10:51	ERP	BRG	
3	ANALYZ*	DIG	METALS	12-MAY-2017 10:24	JYH	ERP	
4	STORE	DIG	A1	12-MAY-2017 12:34	BRG	ERP	

***Sample extract/digestate/leachate**

Samplenum	Container ID	Products
L17050687-01	907684	CR-6

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	11-MAY-2017 10:06	CLS		
2	ANALYZ	W1	WET	11-MAY-2017 10:20	ADG	CLS	
3	STORE	DIG	A1	16-MAY-2017 08:38	CLS	ADG	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

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: L17050688

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 May 24 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 #: L17050688
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?
0013144	I	2.0		J4616881597	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 #: L17050688
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-SP650-6438-GRAB	L17050688-01	05/10/2017 15:00	05/11/2017 09:41
TRIP BLANK	L17050688-02	05/10/2017 00:01	05/11/2017 09:41

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:**	L17050688
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG613886	**Reviewer Name:**	Franci Bolden
LRC Date:	2017-05-15 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
Franci Bolden		Analyst I	2017-05-15 20:56:11

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050688
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG613886	**Reviewer Name:**	Franci Bolden
LRC Date:	2017-05-15 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:**	L17050688
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG613886	**Reviewer Name:**	Franci Bolden
LRC Date:	2017-05-15 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:**	L17050688
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG613886	**Reviewer Name:**	Franci Bolden
LRC Date:	2017-05-15 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:**	L17050688
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG613886	**Reviewer Name:**	Franci Bolden
LRC Date:	2017-05-15 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:**	L17050688
Project Name:		**Method:**	8260
Prep Batch Number(s):	WG613886	**Reviewer Name:**	Franci Bolden
LRC Date:	2017-05-15 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:**	L17050688
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG613903	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-17 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	2017-05-17 14:47:44

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050688
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG613903	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-17 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:**	L17050688
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG613903	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-17 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:**	L17050688
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG613903	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-17 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:**	L17050688
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG613903	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-17 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:**	L17050688
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG613903	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-17 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:**	L17050688
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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	2017-05-16 20:21:13

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050688
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050688
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050688
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050688
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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:**	L17050688
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG613876	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-16 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.

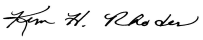
Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050688
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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
Kim Rhodes		Analyst III	2017-05-24 19:21:16

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050688
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050688
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050688
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050688
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050688
Project Name:		**Method:**	6010
Prep Batch Number(s):	WG614006	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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

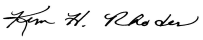
Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050688
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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
Kim Rhodes		Analyst III	2017-05-24 19:22:37

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050688
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050688
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050688
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050688
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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:**	L17050688
Project Name:		**Method:**	6020
Prep Batch Number(s):	WG614007	**Reviewer Name:**	Kim Rhodes
LRC Date:	2017-05-24 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

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	04/17/2017 18:24
Workgroup #:	WG613886	**Analyst:**	TMB	**Run Date:**	05/11/2017 17:29
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	8M419612
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	13.3		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	0.729	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	3.23		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	97.2	70	120	
4-Bromofluorobenzene	110	75	120	
Dibromofluoromethane	98.4	85	115	
Toluene-d8	112	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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	3520C	**Prep Date:**	05/11/2017 15:39
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG614147	**Analyst:**	SCB	**Run Date:**	05/15/2017 13:47
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	15M21204
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	21.8	J	2.30	1.15	0.575

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	58.0	20	129	

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

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	3520C	**Prep Date:**	05/11/2017 15:39
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG614147	**Analyst:**	SCB	**Run Date:**	05/15/2017 14:09
Collect Date:	05/10/2017 15:00	**Dilution:**	5	**File ID:**	15M21205
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	20.8		11.5	5.74	2.87

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	56.4	20	129	

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	6850	**Prep Date:**	05/11/2017 10:45
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG613876	**Analyst:**	JWR	**Run Date:**	05/11/2017 22:54
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39614
Sample Tag:	01	**Units:**	ug/L		

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

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/12/2017 09:11
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	05/15/2017 12:57
Workgroup #:	WG614242	**Analyst:**	KKB	**Run Date:**	05/15/2017 14:46
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	T4.051517.144645
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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	3015	**Prep Date:**	05/12/2017 08:38
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	05/12/2017 10:49
Workgroup #:	WG614072	**Analyst:**	JYH	**Run Date:**	05/12/2017 12:04
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	NI.051217.120411
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Barium, Total	7440-39-3	0.130		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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	03/10/2017 13:59
Workgroup #:	WG613920	**Analyst:**	ADG	**Run Date:**	05/11/2017 14:20
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	00.1705111420-07
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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-02	**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:**	04/17/2017 18:24
Workgroup #:	WG613886	**Analyst:**	TMB	**Run Date:**	05/11/2017 17:00
Collect Date:	05/10/2017 00:01	**Dilution:**	1	**File ID:**	8M419611
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	2.69	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	95.9	70	120	
4-Bromofluorobenzene	110	75	120	
Dibromofluoromethane	97.0	85	115	
Toluene-d8	112	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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Microbac

Lab Report #: L17050688
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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	04/17/2017 18:24
Workgroup #:	WG613886	**Analyst:**	TMB	**Run Date:**	05/11/2017 17:29
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	8M419612
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	13.3		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	0.729	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	3.23		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	97.2	70	120	
4-Bromofluorobenzene	110	75	120	
Dibromofluoromethane	98.4	85	115	
Toluene-d8	112	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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-02	**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:**	04/17/2017 18:24
Workgroup #:	WG613886	**Analyst:**	TMB	**Run Date:**	05/11/2017 17:00
Collect Date:	05/10/2017 00:01	**Dilution:**	1	**File ID:**	8M419611
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	2.69	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	95.9	70	120	
4-Bromofluorobenzene	110	75	120	
Dibromofluoromethane	97.0	85	115	
Toluene-d8	112	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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
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Lab Report #: L17050688
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): BNB
Date: 5-10-17
Filter Lot #: 9803210

Agitator Speed 30 ± 2 rpm ☑

Balance ID: BAL020
pH Probe ID: 15
Temp probe ID: ☒ 1025 ☐ 1023

Analyst / Date		Analyst / Date	
BNB 5-10-17		BNB 5-11-17	
Time On	Temp On °C	Time Off	Temp Off °C
15:32	23.2	809	21.8

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												
P	05-01001-02	✓	10	10	1311	F-233	S	100		✓	25.02	500
Q	05-01004-01	✓	〃	〃	〃	〃	〃	〃		✓	25.01	500
R	05-01046-01	✓	10	10	1311	F-233	S	100		✓	25.01	500
S					BNB 5-11-17							
NA	FBLK-1	NA	NA	NA	1311	F-233	NA	NA	NA	NA	40	40

BNB 5-11-17

BNB 5-11-17

*Matrix Code = (S-solid) (SS-sand, soil or sludge) (P-paint) (O-organic) (W-water or waste)

Comments: NA

Peer Review By: [signature]

Analyst(s): BNB
Date: 5-9-17
Filter Lot #: 9803210

Agitator Speed 30 ± 2 rpm ☑

Balance ID: BAL020
pH Probe ID: T5
Temp probe ID: ☒ 1025 ☐ 1023

Analyst / Date		Analyst / Date	
BNB 5-9-17		BNB 5-10-17	
Time On	Temp On °C	Time Off	Temp Off °C
1526	22.9	808	21.9

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	050559-01	✓	10	10	1311	F-233	S	100		✓	25.00	500
P												
Q												
R												
S												
NA	FBLK-1	NA	NA	NA	1311	F-233	NA	NA	NA	NA	40	40

BNB 5-10-17

BNB 5-10-17

BNB 5-10-17

*Matrix Code = (S-solid) (SS-sand, soil or sludge) (P-paint) (O-organic) (W-water or waste)

Comments: NA

Peer Review By: [signature]

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: HPMS8 Dataset: 041717
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 Rev: 18/1
Maintenance Log ID: 54132

Internal Standard: STD81235 Surrogate Standard: STD81235
CCV: STD81447 LCS: STD81461 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG610410

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
8M418996	WG610373-01 50ng BFB STD 8260	NA	1	1	STD80989	04/17/17 09:44
8M418997	WG610373-02 50ug/L CCV STD 8260	NA	1	1	STD81375	04/17/17 10:10
8M418998	WG610373-02 50ug/L CCV STD 8260	NA	1	1	STD81375	04/17/17 10:42
8M418999	WG000000-01 100ug/L A9 CCV STD 8260	NA	1	1	STD81397	04/17/17 11:13
8M419000	WG610410-01 50ng BFB STD 8260	NA	1	1	STD80989	04/17/17 12:58
8M419001	RINSE	NA	1	1		04/17/17 13:21
8M419002	WG610410-02 0.3ug/L STD 8260	NA	1	1	STD81447	04/17/17 13:51
8M419003	WG610410-03 0.4ug/L STD 8260	NA	1	1	STD81447	04/17/17 14:25
8M419004	WG610410-04 1ug/L STD 8260	NA	1	1	STD81447	04/17/17 14:55
8M419005	WG610410-05 2ug/L STD 8260	NA	1	1	STD81447	04/17/17 15:25
8M419006	WG610410-06 5ug/L STD 8260	NA	1	1	STD81447	04/17/17 15:54
8M419007	WG610410-07 20ug/L STD 8260	NA	1	1	STD81447	04/17/17 16:24
8M419008	WG610410-08 50ug/L STD 8260	NA	1	1	STD81447	04/17/17 16:54
8M419009	WG610410-09 100ug/L STD 8260	NA	1	1	STD81447	04/17/17 17:23
8M419010	WG610410-10 200ug/L STD 8260	NA	1	1	STD81447	04/17/17 17:54
8M419011	WG610410-11 300ug/L STD 8260	NA	1	1	STD81447	04/17/17 18:24
8M419012	RINSE	NA	1	1		04/17/17 18:53
8M419013	RINSE	NA	1	1		04/17/17 19:23
8M419014	WG610410-12 50ug/L ALT SRC STD 8260	NA	1	1	STD81461	04/17/17 19:53
8M419015	RINSE	NA	1	1		04/17/17 20:23

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2	X			
File ID: 8M418997				
			Bromomethane was low, DNR.	
3	X			
File ID: 8M418998				
			Bromomethane and iodomethane were low, DNR.	
4				
File ID: 8M418999				
			Not needed, DNR.	

Approved: April 20, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS8 Dataset: 051117
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: 54162

Internal Standard: STD81815 Surrogate Standard: STD81815
CCV: STD81840 LCS: STD81861 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG613886

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
8M419599	WG613885-01 50ng BFB STD 8260	NA	1	1	STD81491	05/11/17 11:22
8M419600	WG613885-02 50ug/L CCV STD 8260	NA	1	1	STD81840	05/11/17 11:45
8M419601	WG613885-02 50ug/L CCV STD 8260	NA	1	1	STD81840	05/11/17 12:15
8M419602	WG000000-01 100ug/L A9 CCV STD 8260	NA	1	1	STD81708	05/11/17 12:44
8M419603	WG613886-01 VBLK0511 BLANK STD 826	NA	1	1		05/11/17 13:12
8M419604	WG613886-02 20ug/L LCS STD 8260	NA	1	1	STD81861	05/11/17 13:41
8M419605	WG613886-03 20ug/L LCS2 STD 8260	NA	1	1	STD81861	05/11/17 14:09
8M419606	L17050601-02 A 826-TC	NA	17	10		05/11/17 14:38
8M419607	L17050494-01 A 826-SPE	<2	1	1		05/11/17 15:06
8M419608	L17050494-02 A TB 826-SPE	<2	1	1		05/11/17 15:35
8M419609	L17050554-04 A TB 826-SPE	<2	1	1		05/11/17 16:03
8M419610	L17050626-08 A TB 826-SPE	<2	1	1		05/11/17 16:32
8M419611	L17050688-02 A TB 826-SPE	<2	1	1		05/11/17 17:00
8M419612	L17050688-01 A 826-SPE	<2	1	1		05/11/17 17:29
8M419613	L17050617-01 A 826-BETX	<2	1	1		05/11/17 17:58
8M419614	L17050626-01 A 826-SPE	<2	1	1		05/11/17 18:27
8M419615	L17050626-02 A 826-SPE	5	1	1		05/11/17 18:55
8M419616	L17050626-03 A 826-SPE	<2	1	1		05/11/17 19:24
8M419617	L17050626-04 A 826-SPE	<2	1	1		05/11/17 19:52
8M419618	L17050626-05 A 826-SPE	<2	1	1		05/11/17 20:21
8M419619	L17050626-06 A 826-SPE	<2	1	1		05/11/17 20:50
8M419620	L17050626-07 A 826-SPE	<2	1	1		05/11/17 21:19
8M419621	L17050646-01 A 10X 826-TC	NA	17	10		05/11/17 21:48
8M419622	L17050604-01 A 10X 826-TC	NA	17	10		05/11/17 22:16
8M419623	L17050559-01 A 10X 826-TC	NA	17	10		05/11/17 22:45
8M419624	RINSE	NA	1	1		05/11/17 23:14
8M419625	WG613886-04 VBLK0511 BLANK STD 624	NA	2	1		05/11/17 23:42
8M419626	L17050650-01 B 624	<2	2	1		05/12/17 00:11
8M419627	L17050651-01 B 624	<2	2	1		05/12/17 00:39
8M419628	WG613571-01 A FBLK 10X 826-TC	NA	17	10		05/12/17 01:08
8M419629	WG613684-01 A FBLK 10X 826-TC	NA	17	10		05/12/17 01:38
8M419630	CCV	NA	1	1		05/12/17 02:06
8M419631	RINSE	NA	1	1		05/12/17 02:34

Approved: May 15, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS8 Dataset: 051117
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: 54162

Internal Standard: STD81815 Surrogate Standard: STD81815
CCV: STD81840 LCS: STD81861 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG613886

Comments:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2	X			
File ID: 8M419600				
			2-butanone was low. DNR.	
4				
File ID: 8M419602				
			Not needed, DNR.	
28				
File ID: 8M419626				
			L17050650-01 B 624 reanalyzed for acrolein only.	
29				
File ID: 8M419627				
			L17050651-01 B 624 reanalyzed for acrolein only.	

Approved: May 15, 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: 17-APR-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 81593
Analytical Workgroups: WG610410

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	TMB
Spectra of TCL Hits	X
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:
18-APR-2017
Tiffany Bailey

Secondary Reviewer:
20-APR-2017

CHECKLIST1 - Modified 03/05/2008
Generated: APR-20-2017 13:10:53

Microbac Laboratories Inc.

Data Checklist

Date: 11-MAY-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 82140
Analytical Workgroups: WG613886

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	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:
13-MAY-2017
Tiffany Bailey

Secondary Reviewer:
15-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-15-2017 14:41:14

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B **AAB#:** WG613886

Login Number: L17050688

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-SP650-6438-GRAB	01	05/10/17					05/11/2017	1.1	14		05/11/17	1.1	14	
TRIP BLANK	02	05/10/17					05/11/2017	1.7	14		05/11/17	1.7	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5292863
Report generated 05/15/2017 15:13

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17050688
Instrument Id: HPMS8
Workgroup (AAB#): WG613886

Method: 8260
CAL ID: HPMS8-17-APR-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17050688-01	1.00	01	97.2	98.4	110	112
L17050688-02	1.00	01	95.9	97.0	110	112
WG613886-01	1.00	01	99.8	97.9	108	111
WG613886-02	1.00	01	101	101	105	110
WG613886-03	1.00	01	97.3	98.1	107	111
WG613886-04	1.00	01	97.5	96.1	111	112

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: 5292869
Report generated: 05/15/2017 15:14

METHOD BLANK SUMMARY

Login Number: L17050688
Work Group: WG613886
Blank File ID: 8M419603
Blank Sample ID: WG613886-01
Prep Date: 05/11/17 13:12
Instrument ID: HPMS8
Analyzed Date: 05/11/17 13:12
Method: 8260B
Analyst: TMB

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG613886-02	8M419604	05/11/17 13:41	01
LCS2	WG613886-03	8M419605	05/11/17 14:09	01
TRIP BLANK	L17050688-02	8M419611	05/11/17 17:00	01
LH18/24-SP650-6438-GRAB	L17050688-01	8M419612	05/11/17 17:29	01

Report Name: BLANK_SUMMARY
PDF File ID: 5294260
Report generated 05/15/2017 15:13

METHOD BLANK SUMMARY

Login Number:	L17050688	**Work Group:**	WG613886
Blank File ID:	8M419625	**Blank Sample ID:**	WG613886-04
Prep Date:	05/11/17 23:42	**Instrument ID:**	HPMS8
Analyzed Date:	05/11/17 23:42	**Method:**	8260B
Analyst:	TMB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG613886-02	8M419604	05/11/17 13:41	01
LCS2	WG613886-03	8M419605	05/11/17 14:09	01
TRIP BLANK	L17050688-02	8M419611	05/11/17 17:00	01
LH18/24-SP650-6438-GRAB	L17050688-01	8M419612	05/11/17 17:29	01

Report Name: BLANK_SUMMARY
PDF File ID: 5294260
Report generated 05/15/2017 15:13

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050688 Prep Date: 05/11/17 13:12 Sample ID: WG613886-01
Instrument ID: HPMS8 Run Date: 05/11/17 13:12 Prep Method: 5030B/5030C/503
File ID: 8M419603 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG613886 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS8-17-APR-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	99.8	70	-	120	PASS
4-Bromofluorobenzene	108	75	-	120	PASS
Dibromofluoromethane	97.9	85	-	115	PASS
Toluene-d8	111	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: 5292864
15-MAY-2017 15:13

Login Number: L17050688 Prep Date: 05/11/17 23:42 Sample ID: WG613886-04
Instrument ID: HPMS8 Run Date: 05/11/17 23:42 Prep Method: 5030B/5030C/503
File ID: 8M419625 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG613886 Matrix: Water 2 Units: ug/L
Contract #: Cal ID: HPMS8-17-APR-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	97.5	70	-	120	PASS
4-Bromofluorobenzene	111	75	-	120	PASS
Dibromofluoromethane	96.1	85	-	115	PASS
Toluene-d8	112	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: 5292864
15-MAY-2017 15:13

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050688 Analyst: TMB Prep Method: 5030B/5030C/503
Instrument ID: HPMS8 Matrix: Water Method: 8260B
Workgroup (AAB#): WG613886 Units: ug/L
QC Key: DOD4 Lot #: STD81766

Sample ID: WG613886-02 LCS File ID: 8M419604 Run Date: 05/11/2017 13:41
Sample ID: WG613886-03 LCS2 File ID: 8M419605 Run Date: 05/11/2017 14:09

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	19.8	98.9	20.0	19.8	99.0	0.147	65 - 130	30	
1,1,2-Trichloroethane	20.0	18.3	91.4	20.0	17.8	88.8	2.89	75 - 125	30	
1,1-Dichloroethane	20.0	19.2	95.9	20.0	19.1	95.3	0.584	70 - 135	30	
1,1-Dichloroethene	20.0	19.7	98.3	20.0	19.7	98.4	0.105	70 - 130	30	
1,2-Dichloroethane	20.0	19.2	96.0	20.0	18.8	94.2	1.96	70 - 130	30	
Acetone	20.0	15.6	78.2	20.0	15.9	79.7	1.78	40 - 140	30	
Benzene	20.0	19.7	98.4	20.0	19.5	97.7	0.699	80 - 120	30	
Carbon tetrachloride	20.0	19.4	97.0	20.0	19.7	98.5	1.56	65 - 140	30	
Chloroform	20.0	17.6	88.2	20.0	17.7	88.5	0.300	65 - 135	30	
Ethylbenzene	20.0	19.2	95.8	20.0	19.5	97.5	1.75	75 - 125	30	
m,p-Xylene	40.0	40.4	101	40.0	41.2	103	1.90	75 - 130	30	
Methylene chloride	20.0	18.4	92.2	20.0	18.1	90.5	1.91	55 - 140	30	
o-Xylene	20.0	19.6	97.9	20.0	19.7	98.6	0.671	80 - 120	30	
Styrene	20.0	20.2	101	20.0	20.4	102	1.05	65 - 135	30	
Tetrachloroethene	20.0	20.1	100	20.0	20.4	102	1.57	45 - 150	30	
Toluene	20.0	20.5	102	20.0	20.7	104	1.41	75 - 120	30	
Trichloroethene	20.0	18.8	94.2	20.0	19.0	94.9	0.740	70 - 125	30	
Vinyl chloride	20.0	20.1	100	20.0	20.2	101	0.815	50 - 145	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,2-Dichloroethane-d4	101	97.3	70 - 120	PASS
Dibromofluoromethane	101	98.1	85 - 115	PASS
4-Bromofluorobenzene	105	107	75 - 120	PASS
Toluene-d8	110	111	85 - 120	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5292865
Report generated: 05/15/2017 15:13

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17050688
Instrument: HPMS8
Analyst: TMB
Workgroup: WG610410

Tune ID: WG610410-01
Run Date: 04/17/2017
Run Time: 12:58
File ID: 8M419000
Cal ID: HPMS8 -

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	8216	PASS
75.0	95.0	30.0	60.0	47.8	21655	PASS
95.0	95.0	100	100	100	45349	PASS
96.0	95.0	5.00	9.00	6.40	2901	PASS
173	174	0	2.00	0.273	110	PASS
174	95.0	50.0	100	89.0	40349	PASS
175	174	5.00	9.00	7.54	3042	PASS
176	174	95.0	101	99.8	40256	PASS
177	176	5.00	9.00	6.96	2800	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG610410-02	STD	01	04/17/2017 13:51	
WG610410-03	STD	01	04/17/2017 14:25	
WG610410-04	STD	01	04/17/2017 14:55	
WG610410-05	STD	01	04/17/2017 15:25	
WG610410-06	STD	01	04/17/2017 15:54	
WG610410-07	STD	01	04/17/2017 16:24	
WG610410-08	STD-CCV	01	04/17/2017 16:54	
WG610410-09	STD	01	04/17/2017 17:23	
WG610410-10	STD	01	04/17/2017 17:54	
WG610410-11	STD	01	04/17/2017 18:24	
WG610410-12	SSCV	01	04/17/2017 19:53	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5292867
Report generated 05/15/2017 15:13

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17050688
Instrument: HPMS8
Analyst: TMB
Workgroup: WG613885

Tune ID: WG613885-01
Run Date: 05/11/2017
Run Time: 11:22
File ID: 8M419599
Cal ID: HPMS8-17-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	18.5	8003	PASS
75.0	95.0	30.0	60.0	48.4	20985	PASS
95.0	95.0	100	100	100	43344	PASS
96.0	95.0	5.00	9.00	6.89	2987	PASS
173	174	0	2.00	0.329	126	PASS
174	95.0	50.0	100	88.3	38288	PASS
175	174	5.00	9.00	7.30	2794	PASS
176	174	95.0	101	98.3	37656	PASS
177	176	5.00	9.00	6.70	2522	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG613885-02	CCV	01	05/11/2017 12:15	
WG613886-01	BLANK	01	05/11/2017 13:12	
WG613886-02	LCS	01	05/11/2017 13:41	
WG613886-03	LCS2	01	05/11/2017 14:09	
L17050688-02	TRIP BLANK	01	05/11/2017 17:00	
L17050688-01	LH18/24-SP650-6438-GRAB	01	05/11/2017 17:29	
WG613886-04	BLANK2	01	05/11/2017 23:42	*
WG613571-01	FBLK1	DL01	05/12/2017 01:08	*
WG613684-01	FBLK1	DL01	05/12/2017 01:38	*

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5292867
Report generated 05/15/2017 15:13

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 04-17-17 HPMS8
Last Calibration: Tue Apr 18 08:45:38 2017
Curve: WG610410
Calibration Files

	Compound	0.3 8M419002.D	0.4 8M419003.D	1 8M419004.D	2 8M419005.D	5 8M419006.D	20 8M419007.D	50 8M419008.D	100 8M419009.D	200 8M419010.D	300 8M419011.D	Avg	%RSD	Linear	Quad
I	Fluorobenzene	ISTD													
T	Dichlorodifluoromethane			0.313	0.289	0.277	0.384	0.370	0.362	0.373		0.338	13.019		
P	Chloromethane			0.456	0.440	0.417	0.437	0.403	0.401	0.407		0.423	5.087		
C	Vinyl Chloride		0.426	0.430	0.414	0.394	0.429	0.389	0.367	0.347		0.399	7.750		
T	1,3-Butadiene					0.273	0.246	0.164	0.130	0.118	0.112	0.174	39.828		1.000
T	Bromomethane			0.064	0.068	0.074	0.124	0.149	0.181			0.110	44.154		1.001
T	Chloroethane		0.162	0.163	0.173	0.171	0.183	0.177	0.180	0.186		0.174	5.074		
T	Trichlorofluoromethane		0.393	0.462	0.411	0.420	0.452	0.436	0.437	0.459		0.434	5.614		
T	Diethyl ether			0.159	0.160	0.163	0.158	0.160	0.167		0.176	0.163	3.861		
T	Isoprene					0.316	0.325	0.346	0.353	0.353	0.366	0.343	5.533		
T	Acrolein				0.022	0.023	0.021	0.022	0.024		0.024	0.023	4.706		
T	1,1,2-Trichloro-1,2,2-Trifluoroethane			0.251	0.228	0.237	0.253	0.250	0.252	0.261		0.247	4.440		
T	Acetone					0.036	0.033	0.036	0.037	0.034	0.035	0.035	4.082		
C	1,1-Dichloroethene		0.331	0.366	0.344	0.349	0.377	0.371	0.376	0.383		0.362	5.154		
T	Tert-Butyl Alcohol				0.010	0.012	0.011	0.011	0.011		0.013	0.011	10.980		
T	Dimethyl Sulfide					0.232	0.226	0.240	0.246	0.249	0.255	0.241	4.476		
T	Iodomethane					0.026	0.067	0.121	0.154	0.164	0.116	0.108	48.714	NO CAL	
T	Methyl acetate					0.099	0.091	0.097	0.098	0.093	0.100	0.096	3.655		
T	Methylene Chloride			0.271	0.245	0.249	0.263	0.258	0.264	0.272		0.260	3.943		
T	Carbon Disulfide			0.794	0.744	0.746	0.729	0.763	0.767	0.766	0.713	0.753	3.339		
T	Acrylonitrile			0.043	0.045	0.049	0.049	0.053	0.054		0.049	0.049	8.214		
T	Methyl Tert Butyl Ether			0.495	0.474	0.502	0.530	0.528	0.543	0.517		0.513	4.642		
T	trans-1,2-Dichloroethene		0.342	0.345	0.349	0.334	0.360	0.353	0.363	0.373		0.352	3.537		
T	n-Hexane					0.301	0.278	0.290	0.295	0.300	0.301	0.294	2.997		
T	Diisopropyl ether			0.776	0.794	0.805	0.792	0.783	0.801		0.768	0.788	1.708		
T	Vinyl Acetate					0.353	0.350	0.359	0.366	0.348	0.345	0.354	2.233		
P	1,1-Dichloroethane		0.405	0.460	0.437	0.441	0.474	0.462	0.473	0.476		0.453	5.418		
T	Ethyl-Tert-Butyl ether			0.651	0.652	0.684	0.667	0.669	0.693		0.679	0.671	2.398		
T	2-Butanone					0.053	0.052	0.056	0.058	0.053	0.059	0.055	5.073		
T	Propionitrile			0.015	0.016	0.018	0.017	0.017	0.018		0.019	0.017	7.523		
T	2,2-Dichloropropane		0.336	0.387	0.384	0.373	0.399	0.387	0.396	0.399		0.383	5.430		
T	cis-1,2-Dichloroethene		0.263	0.287	0.282	0.286	0.300	0.296	0.305	0.311		0.291	5.182		
C	Chloroform	0.619	0.539	0.514	0.499	0.459	0.479	0.467	0.473	0.471		0.502	10.092		
T	1-Bromopropane			0.057	0.053	0.055	0.056	0.057	0.059	0.061	0.061	0.057	5.096		
T	Bromochloromethane		0.118	0.150	0.156	0.160	0.167	0.167	0.170	0.168		0.157	11.011		
T	Tetrahydrofuran			0.039	0.035	0.038	0.036	0.038	0.040		0.039	0.038	4.497		
S	Dibromofluoromethane				0.251	0.244	0.261	0.272	0.265	0.269	0.273	0.262	4.105		
T	1,1,1-Trichloroethane		0.337	0.406	0.380	0.394	0.426	0.420	0.431	0.450		0.405	8.684		
T	Cyclohexane			0.371	0.358	0.372	0.358	0.379	0.389	0.403	0.391	0.377	4.255		
T	1,1-Dichloropropene			0.354	0.340	0.337	0.363	0.353	0.359	0.371		0.354	3.449		
T	Tert-Amyl-Methyl ether			0.568	0.579	0.618	0.598	0.602	0.629		0.609	0.600	3.552		
T	Carbon Tetrachloride		0.288	0.38	0.359	0.363	0.404	0.394	0.41	0.411		0.3759	10.8547		
S	1,2-Dichloroethane-d4				0.215	0.219	0.227	0.237	0.23	0.224	0.235	0.2267	3.56551		
T	Heptane											0	0		
T	1,2-Dichloroethane		0.247	0.28	0.273	0.279	0.298	0.293	0.305	0.299		0.284	6.56007		
T	Benzene		1.013	1.058	1.034	1.013	1.082	1.044	1.045	0.975		1.0328	3.16185		
T	Trichloroethene		0.28	0.291	0.275	0.274	0.294	0.29	0.302	0.315		0.2901	4.79714		
T	Methylcyclohexane					0.371	0.369	0.386	0.392	0.4	0.402	0.3867	3.65443		
C	1,2-Dichloropropane		0.235	0.244	0.249	0.243	0.257	0.256	0.264	0.269		0.2522	4.51345		
T	Bromodichloromethane		0.273	0.313	0.319	0.319	0.35	0.347	0.359	0.361		0.3301	9.09766		
T	1,4-Dioxane					0.001	0.001	0.002	0.002		0.002	0.0014	8.93532		
T	Dibromomethane		0.101	0.125	0.129	0.129	0.138	0.136	0.14	0.14		0.1298	9.96462		
T	2-Chloroethyl Vinyl Ether				0.091	0.101	0.106	0.114	0.116	0.114	0.122	0.1091	9.65313		
T	4-Methyl-2-Pentanone					0.042	0.045	0.05	0.051	0.049	0.055	0.0489	9.48763		
T	cis-1,3-Dichloropropene		0.303	0.354	0.349	0.364	0.401	0.404	0.417	0.416		0.3759	10.7244		

T	Dimethyl Disulfide					0.133	0.169	0.201	0.215	0.226	0.237	0.1968	19.8258	0.998
I	Chlorobenzene-d5	ISTD												
S	Toluene-d8				1.126	1.107	1.183	1.185	1.136	1.123	1.136	1.1423	2.63592	
C	Toluene		1.276	1.435	1.421	1.416	1.507	1.432	1.412	1.234		1.3916	6.46773	
T	Ethyl Methacrylate			0.208	0.222	0.252	0.262	0.287	0.29	0.277	0.303	0.2625	12.7656	
T	Paraldehyde											0	0	
T	trans-1,3-Dichloropropene			0.367	0.363	0.389	0.421	0.422	0.44	0.423		0.4036	7.59969	
T	1,1,2-Trichloroethane		0.21	0.235	0.224	0.228	0.239	0.229	0.237	0.23		0.2289	4.06629	
T	2-Hexanone					0.048	0.053	0.058	0.06	0.054	0.063	0.0562	9.63322	
T	1,3-Dichloropropane		0.353	0.405	0.372	0.373	0.41	0.397	0.403	0.383		0.387	5.15702	
T	Tetrachloroethene		0.245	0.284	0.279	0.285	0.31	0.295	0.312	0.328		0.2923	8.65757	
T	Dibromochloromethane		0.232	0.267	0.271	0.289	0.315	0.318	0.333	0.328		0.2942	12.052	
T	1,2-Dibromoethane		0.188	0.209	0.218	0.222	0.242	0.236	0.241	0.233		0.2236	8.21869	
T	1-Chlorohexane		0.385	0.44	0.423	0.428	0.44	0.451	0.457	0.466	0.472	0.4403	5.99946	
P	Chlorobenzene		1.008	0.965	0.972	0.936	1.008	0.988	1.042	1.006		0.9906	3.29062	
T	1,1,1,2-Tetrachloroethane		0.303	0.316	0.32	0.335	0.379	0.385	0.423			0.3515	12.6454	
C	Ethylbenzene		0.467	0.5	0.532	0.513	0.574	0.568	0.62	0.665		0.5548	11.7603	
T	m-,p-Xylene		0.572	0.637	0.62	0.627	0.689	0.677	0.694	0.623		0.6425	6.46237	
T	o-Xylene			0.611	0.592	0.623	0.665	0.648	0.68	0.703		0.6459	6.13337	
T	Styrene		0.814	0.93	0.929	0.995	1.114	1.111	1.142	1.067		1.0127	11.3997	
P	Bromoform			0.125	0.142	0.163	0.191	0.196	0.207	0.207		0.176	18.66	0.999
T	Isopropylbenzene		1.463	1.551	1.54	1.592	1.678	1.613	1.576	1.361		1.5466	6.28276	
I	1,4-Dichlorobenzene-d4	ISTD												
P	1,1,2,2-Tetrachloroethane		0.385	0.493	0.455	0.465	0.508	0.494	0.502	0.472		0.4717	8.42371	
S	p-Bromofluorobenzene				0.897	0.839	0.876	0.891	0.86	0.878	0.935	0.8823	3.42248	
T	1,2,3-Trichloropropane			0.117	0.127	0.131	0.143	0.144	0.146	0.138		0.1352	7.82469	
T	trans-1,4-Dichloro-2-Butene			0.058	0.065	0.085	0.109	0.122	0.115	0.114	0.116	0.0978	25.7933	1.000
T	n-Propylbenzene		3.478	3.723	3.692	3.608	3.807	3.577	3.383	2.726		3.4991	9.72861	
T	Bromobenzene	0.752	0.696	0.839	0.81	0.813	0.857	0.845	0.872	0.896		0.8199	7.58093	
T	1,3,5-Trimethylbenzene		2.467	2.514	2.525	2.506	2.737	2.623	2.589	2.306		2.5336	4.94471	
T	2-Chlorotoluene		2.674	2.623	2.305	2.553	2.347	2.198	2.2	2.21		2.3888	8.30021	
T	4-Chlorotoluene		1.995	2.135	2.439	1.867	2.369	2.326	2.308	1.784		2.1528	11.4607	
T	a-Methylstyrene					1.296	1.355	1.455	1.517	1.498	1.401	1.4204	6.02416	
T	tert-Butylbenzene			0.52	0.555	0.528	0.588	0.571	0.601	0.653		0.5736	7.96677	
T	1,2,4-Trimethylbenzene		2.284	2.607	2.62	2.578	2.817	2.742	2.701	2.343		2.5866	7.19751	
T	sec-Butylbenzene			3.278	3.292	3.183	3.429	3.252	3.145	2.633		3.1733	8.03336	
T	p-Isopropyltoluene			2.64	2.605	2.626	2.913	2.796	2.737	2.387		2.6721	6.23483	
T	1,3-Dichlorobenzene		1.502	1.596	1.568	1.535	1.665	1.625	1.642	1.581		1.5891	3.4371	
T	1,4-Dichlorobenzene	1.772	1.622	1.643	1.594	1.517	1.637	1.592	1.618	1.545		1.6156	4.45875	
T	n-Butylbenzene			2.426	2.337	2.245	2.632	2.542	2.483	2.184		2.407	6.69686	
T	1,2-Dichlorobenzene	1.368	1.185	1.488	1.397	1.379	1.46	1.438	1.454	1.396		1.396	6.36818	
T	1,2-Dibromo-3-Chloropropane				0.073	0.072	0.076	0.079	0.083	0.077		0.0768	5.09915	
T	1,2,4-Trichlorobenzene		0.864	0.92	0.882	0.852	0.952	0.983	1.022	1.044		0.9399	7.72424	
T	Hexachlorobutadiene		0.405	0.427	0.426	0.402	0.449	0.44	0.456	0.493		0.4374	6.74711	
T	Naphthalene		1.353	1.273	1.232	1.251	1.396	1.436	1.465	1.339		1.3431	6.41915	
T	1,2,3-Trichlorobenzene	0.796	0.766	0.75	0.705	0.691	0.802	0.821	0.847	0.847		0.7805	7.29917	

Tue Apr 18 12:15:24 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17050688 Run Date: 04/17/2017 Sample ID: WG610410-12
Instrument ID: HPMS8 Run Time: 19:53 Method: 8260B
File ID: 8M419014 Analyst: TMB QC Key: DOD4
ICal Workgroup: WG610410 Cal ID: HPMS8 - 17-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	47.0	ug/L	0.340	6.00	20	
Chloroform	CCC	50.0	44.7	ug/L	0.449	10.6	20	
Ethylbenzene	CCC	50.0	48.9	ug/L	0.543	2.20	20	
Toluene	CCC	50.0	48.5	ug/L	1.35	2.90	20	
Vinyl Chloride	CCC	50.0	45.4	ug/L	0.363	9.20	20	
Chloromethane	SPCC	50.0	48.6	ug/L	0.411	2.80	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	45.7	ug/L	0.431	8.60	20	
Chlorobenzene	SPCC	50.0	47.2	ug/L	0.934	5.70	20	
Bromoform	SPCC	50.0	42.9	ug/L	0.175	14.2	20	
1,1-Dichloroethane	SPCC	50.0	47.6	ug/L	0.432	4.80	20	
1,1,1-Trichloroethane		50.0	50.8	ug/L	0.412	1.60	20	
1,1,2-Trichloroethane		50.0	45.3	ug/L	0.208	9.40	20	
1,2-Dichloroethane		50.0	47.2	ug/L	0.268	5.50	20	
Acetone		50.0	43.2	ug/L	0.0304	13.6	20	
Benzene		50.0	47.6	ug/L	0.983	4.90	20	
Carbon Tetrachloride		50.0	50.2	ug/L	0.377	0.300	20	
Methylene Chloride		50.0	46.7	ug/L	0.243	6.60	20	
m-,p-Xylene		100	102	ug/L	0.654	1.70	20	
o-Xylene		50.0	48.1	ug/L	0.622	3.70	20	
Styrene		50.0	52.7	ug/L	1.07	5.40	20	
Tetrachloroethene		50.0	50.6	ug/L	0.296	1.20	20	
Trichloroethene		50.0	47.5	ug/L	0.276	5.00	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5292866
Report generated 05/15/2017 15:13

Login Number: L17050688 Run Date: 05/11/2017 Sample ID: WG613885-02
Instrument ID: HPMS8 Run Time: 12:15 Method: 8260B
File ID: 8M419601 Analyst: TMB QC Key: DOD4
Workgroup (AAB#): WG613886 Cal ID: HPMS8 - 17-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	48.7	ug/L	0.246	2.59	20	
1,1-Dichloroethene	CCC	50.0	50.4	ug/L	0.365	0.779	20	
Chloroform	CCC	50.0	44.8	ug/L	0.450	10.4	20	
Ethylbenzene	CCC	50.0	51.4	ug/L	0.571	2.85	20	
Toluene	CCC	50.0	51.6	ug/L	1.44	3.13	20	
Vinyl Chloride	CCC	50.0	44.7	ug/L	0.357	10.5	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	44.5	ug/L	0.420	10.9	20	
Bromoform	SPCC	50.0	40.1	ug/L	0.163	19.7	20	
Chlorobenzene	SPCC	50.0	49.1	ug/L	0.972	1.89	20	
Chloromethane	SPCC	50.0	47.6	ug/L	0.402	4.86	20	
1,1-Dichloroethane	SPCC	50.0	50.5	ug/L	0.458	0.992	20	
Xylenes		150	155	ug/L	0.660	3.47	20	
1,1,1-Trichloroethane		50.0	51.0	ug/L	0.414	2.01	20	
1,1,2-Trichloroethane		50.0	44.4	ug/L	0.203	11.3	20	
1,2-Dichloroethane		50.0	47.0	ug/L	0.267	6.09	20	
Acetone		50.0	43.7	ug/L	0.0308	12.5	20	
Benzene		50.0	49.4	ug/L	1.02	1.24	20	
Carbon Tetrachloride		50.0	51.8	ug/L	0.390	3.63	20	
Methylene Chloride		50.0	46.4	ug/L	0.242	7.17	20	
m-,p-Xylene		100	106	ug/L	0.678	5.50	20	
o-Xylene		50.0	49.7	ug/L	0.642	0.593	20	
Styrene		50.0	51.8	ug/L	1.05	3.58	20	
Tetrachloroethene		50.0	52.0	ug/L	0.304	4.04	20	
Trichloroethene		50.0	49.1	ug/L	0.285	1.74	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5292868
Report generated 05/15/2017 15:14

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

Login Number: L17050688
Instrument ID: HPMS8
Workgroup (AAB#): WG613886

ICAL CCV Number: WG610410-08
CAL ID: HPMS8-17-APR-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG610410-08	NA	NA	355416	667165	830845
Upper Limit	NA	NA	710832	1334330	1661690
Lower Limit	NA	NA	177708	333583	415423
L17050688-01	1.00	01	281289	593289	785478
L17050688-02	1.00	01	281701	591766	793097
WG613886-01	1.00	01	315823	648033	867801
WG613886-02	1.00	01	341835	671251	879718
WG613886-03	1.00	01	346526	686490	908700

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: 5294069
Report generated 05/15/2017 15:14

Microbac Laboratories Inc.

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

Login Number: L17050688
Instrument ID: HPMS8
Workgroup (AAB#): WG613886

ICAL CCV Number: WG610410-08
CAL ID: HPMS8-17-APR-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG610410-08	NA	NA	17.83	14.8	10.93
Upper Limit	NA	NA	18.33	15.3	11.43
Lower Limit	NA	NA	17.33	14.3	10.43
L17050688-01	1.00	01	17.81	14.79	10.92
L17050688-02	1.00	01	17.82	14.79	10.92
WG613886-01	1.00	01	17.81	14.79	10.92
WG613886-02	1.00	01	17.82	14.79	10.91
WG613886-03	1.00	01	17.82	14.79	10.92

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: 5294261
Report generated: 05/15/2017 15:14

2.2 General Chromatography Data

2.2.1 LC/MS Data (6850)

2.2.1.1 Summary Data

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	6850	**Prep Date:**	05/11/2017 10:45
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG613876	**Analyst:**	JWR	**Run Date:**	05/11/2017 22:54
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39614
Sample Tag:	01	**Units:**	ug/L		

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

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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: 042417_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 WG611327 (waters) Analytical WG611328 (waters)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments: ICAL WG611288 : Alternate Source STD80234
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39494	WG611288-01 CCB	1	1		04/24/17 13:27
2	1LM.LM39495	WG611288-02 STD (0.1 ug/L)	1	1	STD80232	04/24/17 13:46
3	1LM.LM39496	WG611288-03 STD (0.2 ug/L)	1	1	STD80232	04/24/17 14:05
4	1LM.LM39497	WG611288-04 STD (0.5 ug/L)	1	1	STD80232	04/24/17 14:24
5	1LM.LM39498	WG611288-05 STD (1.0 ug/L)	1	1	STD80232	04/24/17 14:43
6	1LM.LM39499	WG611288-06 STD (2.0 ug/L)	1	1	STD80232	04/24/17 15:02
7	1LM.LM39500	WG611288-07 STD (5.0 ug/L)	1	1	STD80232	04/24/17 15:21
8	1LM.LM39501	WG611288-08 STD (10 ug/L)	1	1	STD80232	04/24/17 15:40
9	1LM.LM39502	WG611288-09 SSCV (1.0 ug/L)	1	1	STD80234	04/24/17 15:59
10	1LM.LM39503	WG611330-01 CCB	1	1		04/24/17 16:18
11	1LM.LM39504	WG611330-02 CCV (1.0ug/L)	1	1	STD80232	04/24/17 16:37
12	1LM.LM39505	WG611327-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 16:56
13	1LM.LM39506	WG611327-01 MCT (0.2ug/L)	1	1	STD80234	04/24/17 17:14
14	1LM.LM39507	WG611327-02 BLANK	1	1		04/24/17 17:34
15	1LM.LM39508	WG611327-03 LCS (0.2ug/L)	1	1	STD80234	04/24/17 17:52
16	1LM.LM39509	L17040713-06 RS	1	1		04/24/17 18:11
17	1LM.LM39510	L17040713-07 MS	1	1	STD80234	04/24/17 18:30
18	1LM.LM39511	L17040713-08 MSD	1	1	STD80234	04/24/17 18:49
19	1LM.LM39512	L17040713-01	1	1		04/24/17 19:08
20	1LM.LM39513	L17040713-02	1	1		04/24/17 19:27
21	1LM.LM39514	L17040713-03	1	1		04/24/17 19:46
22	1LM.LM39515	L17040713-04	1	1		04/24/17 20:05
23	1LM.LM39516	WG611330-03 CCV (1.0ug/L)	1	1	STD80232	04/24/17 20:24
24	1LM.LM39517	WG611327-08 MRL (0.2ug/L)	1	1	STD80232	04/24/17 20:43
25	1LM.LM39518	WG611330-04 CCB	1	1		04/24/17 21:02
26	1LM.LM39519	L17040713-05	1	1		04/24/17 21:21
27	1LM.LM39520	L17040713-09	1	1		04/24/17 21:40
28	1LM.LM39521	L17040713-10	1	1		04/24/17 21:59
29	1LM.LM39522	L17040713-11	1	1		04/24/17 22:17
30	1LM.LM39523	L17040713-12	1	1		04/24/17 22:36
31	1LM.LM39524	L17040713-13	1	1		04/24/17 22:55
32	1LM.LM39525	WG611330-05 CCV (1.0ug/L)	1	1	STD80232	04/24/17 23:14
33	1LM.LM39526	WG611327-09 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:33

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Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 STD80234

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM39527	WG611328-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:52
35	1LM.LM39528	WG611330-06 CCB	1	1		04/25/17 00:11
36	1LM.LM39529	WG611328-01 MCT (0.2ug/L)	1	1	STD80234	04/25/17 00:30
37	1LM.LM39530	WG611328-02 BLANK	1	1		04/25/17 00:49
38	1LM.LM39531	WG611328-03 LCS (0.2ug/L)	1	1	STD80234	04/25/17 01:08
39	1LM.LM39532	L17040841-08 RS	1	1		04/25/17 01:27
40	1LM.LM39533	L17040841-09 MS	1	1	STD80234	04/25/17 01:46
41	1LM.LM39534	L17040841-10 MSD	1	1	STD80234	04/25/17 02:05
42	1LM.LM39535	L17040841-01	1	1		04/25/17 02:23
43	1LM.LM39536	L17040841-02	1	1		04/25/17 02:42
44	1LM.LM39537	L17040841-03	1	1		04/25/17 03:01
45	1LM.LM39538	L17040841-04	1	1		04/25/17 03:20
46	1LM.LM39539	WG611330-07 CCV (1.0ug/L)	1	1	STD80232	04/25/17 03:39
47	1LM.LM39540	WG611328-08 MRL (0.2ug/L)	1	1	STD80232	04/25/17 03:58
48	1LM.LM39541	WG611330-08 CCB	1	1		04/25/17 04:17
49	1LM.LM39542	L17040841-05	1	1		04/25/17 04:36
50	1LM.LM39543	L17040841-06	1	1		04/25/17 04:55
51	1LM.LM39544	L17040841-07	1	1		04/25/17 05:14
52	1LM.LM39545	L17040841-11	1	1		04/25/17 05:33
53	1LM.LM39546	L17040841-12	1	1		04/25/17 05:52
54	1LM.LM39547	L17040841-13	1	1		04/25/17 06:11
55	1LM.LM39548	WG611330-09 CCV (1.0ug/L)	1	1	STD80232	04/25/17 06:30
56	1LM.LM39549	WG611328-09 MRL (0.2ug/L)	1	1	STD80232	04/25/17 06:49
57	1LM.LM39550	WG611330-10 CCB	1	1		04/25/17 07:07

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 25-APR-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 051117_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 WG613813 (soils) Analytical WG613876 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments: Sample L17050687-01 was analyzed at a dilution based on its pre-run screen results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39606	WG613814-01 CCB	1	1		05/11/17 20:22
2	1LM.LM39607	WG613814-02 CCV (1.0ug/L)	1	1	STD80232	05/11/17 20:41
3	1LM.LM39608	WG613876-07 MRL (0.2ug/L)	1	1	STD80232	05/11/17 21:00
4	1LM.LM39609	WG613876-01 MCT (0.2ug/L)	1	1	STD80234	05/11/17 21:19
5	1LM.LM39610	WG613876-02 BLANK	1	1		05/11/17 21:38
6	1LM.LM39611	WG613876-03 LCS (0.2ug/L)	1	1	STD80234	05/11/17 21:57
7	1LM.LM39612	L17050427-01	1	1		05/11/17 22:16
8	1LM.LM39613	L17050687-01 (10,000x)	1	10000		05/11/17 22:35
9	1LM.LM39614	L17050688-01 REF	1	1		05/11/17 22:54
10	1LM.LM39615	L17050688-01 MS	1	1	STD80234	05/11/17 23:13
11	1LM.LM39616	L17050688-01 MSD	1	1	STD80234	05/11/17 23:32
12	1LM.LM39617	WG613814-03 CCV (1.0ug/L)	1	1	STD80232	05/11/17 23:51
13	1LM.LM39618	WG613876-08 MRL (0.2ug/L)	1	1	STD80232	05/12/17 00:10
14	1LM.LM39619	WG613813-07 MRL (2.0ug/kg)	7	1	STD80232	05/12/17 00:29
15	1LM.LM39620	WG613814-04 CCB	1	1		05/12/17 00:48
16	1LM.LM39621	WG613813-01 MCT (2.0ug/kg)	7	1	STD80234	05/12/17 01:07
17	1LM.LM39622	WG613813-02 BLANK	7	1		05/12/17 01:25
18	1LM.LM39623	WG613813-03 LCS (2.0ug/kg)	7	1	STD80234	05/12/17 01:44
19	1LM.LM39624	L17050554-03 REF	7	1		05/12/17 02:03
20	1LM.LM39625	L17050554-03 MS	7	1	STD80234	05/12/17 02:22
21	1LM.LM39626	L17050554-03 MSD	7	1	STD80234	05/12/17 02:41
22	1LM.LM39627	L17050554-01	7	1		05/12/17 03:00
23	1LM.LM39628	L17050554-02	7	1		05/12/17 03:19
24	1LM.LM39629	WG613814-05 CCV (1.0ug/L)	1	1	STD80232	05/12/17 03:38
25	1LM.LM39630	WG613813-08 MRL (2.0ug/kg)	7	1	STD80232	05/12/17 03:57
26	1LM.LM39631	WG613814-06 CCB	1	1		05/12/17 04:16

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 16-MAY-17

Microbac Laboratories Inc.

Data Checklist

Date: 24-APR-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG611288
Runlog ID: 81726
Analytical Workgroups: L17040713, L17040841

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	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:
25-APR-2017
John Richards

Secondary Reviewer:
25-APR-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: APR-25-2017 14:21:32

Microbac Laboratories Inc.

Data Checklist

Date: 11-MAY-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 82195
Analytical Workgroups: L17050427, L17050687, L17050688, L17050554

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)	X
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	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:
16-MAY-2017
John Richards

Secondary Reviewer:
16-MAY-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-16-2017 16:24:13

Microbac

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG613876

Login Number: L17050688

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-SP650-6438-GRAB	01	05/10/17					05/11/2017	.8	28		05/11/17	.5	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5296411
Report generated 05/23/2017 08:56

METHOD BLANK SUMMARY

Login Number: L17050688
Work Group: WG613876
Blank File ID: 1LM.LM39610
Blank Sample ID: WG613876-02
Prep Date: 05/11/17 10:45
Instrument ID: LCMS1
Analyzed Date: 05/11/17 21:38
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG613876-07	1LM.LM39608	05/11/17 21:00	01
MCT	WG613876-01	1LM.LM39609	05/11/17 21:19	01
LCS	WG613876-03	1LM.LM39611	05/11/17 21:57	01
LH18/24-SP650-6438-GRAB	L17050688-01	1LM.LM39614	05/11/17 22:54	01
QCMRL	WG613876-08	1LM.LM39618	05/12/17 00:10	01

Report Name: BLANK_SUMMARY
PDF File ID: 5296412
Report generated 05/23/2017 08:56

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17050688 Prep Date: 05/11/17 10:45 Sample ID: WG613876-02
Instrument ID: LCMS1 Run Date: 05/11/17 21:38 Prep Method: 6850
File ID: 1LM.LM39610 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-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: 5296413
23-MAY-2017 08:56

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number:	L17050688	**Run Date:**	05/11/2017	**Sample ID:**	WG613876-03
Instrument ID:	LCMS1	**Run Time:**	21:57	**Prep Method:**	6850
File ID:	1LM.LM39611	**Analyst:**	JWR	**Method:**	6850
Workgroup (AAB#):	WG613876	**Matrix:**	Water	**Units:**	ug/L
QC Key:	DOD4	**Lot#:**	STD80234	**Cal ID:**	LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.202	101	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5296414
Report generated: 05/23/2017 08:56

Loginnum:L17050688 Cal ID:LCMS1- Worknum:WG613876
Instrument ID:LCMS1 Contract #: Method:6850
Parent ID:WG613876-04 File ID:1LM.LM39614 Dil:1 Matrix:WATER
Sample ID:WG613876-05 MS File ID:1LM.LM39615 Dil:1 Units:ug/L
Sample ID:WG613876-06 MSD File ID:1LM.LM39616 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	ND	0.200	0.200	100	0.200	0.194	97.0	3.05	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: 5296415
Report generated 05/23/2017 08:57

Login Number: L17050688
Analytical Method: 6850
ICAL Workgroup: WG611288
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.286	4.98	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: 5305837
Report generated 05/23/2017 08:57

Login Number: L17050688
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-02			WG611288-03			WG611288-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	21000.0000	1.332	0.200	38200.0000	1.222	0.500	104000.000	1.335

INT_CAL - Modified 03/06/2008
PDF File ID: 5305837
Report generated 05/23/2017 08:57

Login Number: L17050688
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-05			WG611288-06			WG611288-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	206000.000	1.288	2.00	412000.000	1.312	5.00	955000.000	1.270

INT_CAL - Modified 03/06/2008
PDF File ID: 5305837
Report generated 05/23/2017 08:57

Login Number: L17050688
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-08		
	CONC	RESP	RF
Perchlorate	10.0	1860000.00	1.244

INT_CAL - Modified 03/06/2008
PDF File ID: 5305837
Report generated 05/23/2017 08:57

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17050688 Run Date: 04/24/2017 Sample ID: WG611288-09
Instrument ID: LCMS1 Run Time: 15:59 Method: 6850
File ID: 1LM.LM39502 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG611288 Cal ID: LCMS1 - 24-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.977	ug/L	1.24	2.30	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5305838
Report generated 05/23/2017 08:57

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17050688 | Run Date: 05/11/2017 | Sample ID: WG613814-01
Instrument ID: LCMS1 | Run Time: 20:22 | Method: 6850
File ID: 1LM.LM39606 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG613876 | Cal ID: LCMS1 - 24-APR-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: 5296418
Report generated 05/23/2017 08:57

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17050688 | Run Date: 05/12/2017 | Sample ID: WG613814-04
Instrument ID: LCMS1 | Run Time: 00:48 | Method: 6850
File ID: 1LM.LM39620 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG613876 | Cal ID: LCMS1 - 24-APR-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: 5296418
Report generated 05/23/2017 08:57

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/11/2017 Sample ID: WG613814-02

Instrument ID: LCMS1 Run Time: 20:41 Method: 6850

File ID: 1LM.LM39607 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG613876 Cal ID: LCMS1 - 24-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.01	ug/L	1.29	1.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5296417

Report generated 05/23/2017 08:57

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/11/2017 Sample ID: WG613814-03

Instrument ID: LCMS1 Run Time: 23:51 Method: 6850

File ID: 1LM.LM39617 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG613876 Cal ID: LCMS1 - 24-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.30	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5296417

Report generated 05/23/2017 08:57

Login Number: L17050688 Run Date: 05/11/2017 Sample ID: WG613876-07
Instrument ID: LCMS1 Run Time: 21:00 Prep Method: 6850
File ID: 1LM.LM39608 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.203	102	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5296416
Report generated 05/23/2017 08:57

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG613876-08
Instrument ID: LCMS1 Run Time: 00:10 Prep Method: 6850
File ID: 1LM.LM39618 Analyst: JWR Method: 6850
Workgroup (AAB#): WG613876 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5296416
Report generated 05/23/2017 08:57

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L17050688
Instrument ID: LCMS1
Workgroup (AAB#): WG613876

ICAL CCV Number: WG611288-05
CAL ID: LCMS1-24-APR-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG611288	NA	NA	777000
Upper Limit	NA	NA	1165500
Lower Limit	NA	NA	388500
L17050688-01	1.00	01	766000
WG613876-02	1.00	01	722000
WG613876-03	1.00	01	716000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5296419
Report generated 05/23/2017 08:57

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**	6850	**Samplenum:**	L17050688-01
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39614
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 22:54	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	2830	1160	2.44	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG611288-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39495
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 13:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21000	6820	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG611288-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39496
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38200	13500	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG611288-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39497
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	104000	33400	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG611288-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39498
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 14:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	65300	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG611288-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39499
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	412000	130000	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG611288-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39500
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	955000	298000	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG611288-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39501
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1860000	603000	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG611288-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39502
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	04/24/2017 15:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	65000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG613814-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39606
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 20:22	**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 #:	L17050688	**Prep Method:**		**Samplenum:**	WG613814-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39607
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 20:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	179000	57600	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG613814-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39617
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 23:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	64200	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**		**Samplenum:**	WG613814-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39620
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 00:48	**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 #:	L17050688	**Prep Method:**		**Samplenum:**	WG613814-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39629
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 03:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	214000	70200	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**	6850	**Samplenum:**	WG613876-01
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39609
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40100	12100	3.31	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**	6850	**Samplenum:**	WG613876-02
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39610
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	849	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**	6850	**Samplenum:**	WG613876-03
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39611
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	37800	11800	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**	6850	**Samplenum:**	WG613876-05
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39615
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 23:13	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	42300	14500	2.92	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**	6850	**Samplenum:**	WG613876-06
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39616
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 23:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	41500	14200	2.92	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**	6850	**Samplenum:**	WG613876-07
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39608
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/11/2017 21:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36900	12800	2.88	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050688	**Prep Method:**	6850	**Samplenum:**	WG613876-08
Instrument:	LCMS1	**Prep Date:**	05/11/2017 10:45	**File ID:**	1LM.LM39618
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG613876	**Analysis Date:**	05/12/2017 00:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44200	14400	3.07	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 #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	3520C	**Prep Date:**	05/11/2017 15:39
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG614147	**Analyst:**	SCB	**Run Date:**	05/15/2017 13:47
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	15M21204
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	21.8	J	2.30	1.15	0.575

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	58.0	20	129	

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

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	3520C	**Prep Date:**	05/11/2017 15:39
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG614147	**Analyst:**	SCB	**Run Date:**	05/15/2017 14:09
Collect Date:	05/10/2017 15:00	**Dilution:**	5	**File ID:**	15M21205
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	20.8		11.5	5.74	2.87

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	56.4	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: WG613903
Analyst: CPD
Spike Analyst: CPD
Method: 3520C
Run Date: 05/11/2017 15:39
SOP: EXB01 Revison 20
Spike Witness: JDH
Surr Solution: STD80323

TIME ON: 15:50 OFF: 10:40 ON: _____ OFF: _____
Methylene Chloride Lot #: COA19678
Na2SO4, Anhydrous, Granular Lot #: COA19660
1:1 H2SO4 Lot #: RGT39967

	SAMPLE #	Type	Reference	Prod	pH	Init Amnt	Surr Amnt	Spike Amnt	Spike Sol	Final Vol	Color
1	L17050688-01	SAMP		827-DIOXANE	<2	870 mL	.05 mL			1 mL	Transparent
2	WG613903-01	BLANK		827-DIOXANE	<2	1000 mL	.05 mL			1 mL	Transparent
3	WG613903-02	LCS		827-DIOXANE	<2	1000 mL	.05 mL	.05 mL	STD79978	1 mL	Transparent
4	WG613903-03	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
TV1P5,6

Analyst: Chadwick Davis

Reviewer: Justin Hesson

EXTRACT - Modified 01/23/2009
PDF ID: 5293283
Report generated: 05/15/2017 09:49

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 050417
Analyst1: SCB 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: WG612906, WG611968

Internal STD: STD81022 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	15M21101	BAKE OUT	1	1		05/04/17 13:29
2	15M21102	WG612906-01 5PPM LL DFTPP	1	1	STD80383	05/04/17 14:00
3	15M21103	WG612906-02 5PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 14:18
4	15M21104	WG612906-03 10PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 14:40
5	15M21105	WG612906-04 7.5PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 15:03
6	15M21106	WG612906-05 2.5PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 15:26
7	15M21107	WG612906-06 1PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 15:48
8	15M21108	WG612906-07 0.4PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 16:11
9	15M21109	WG612906-08 5PPM ALT 1,4-DIOX STD	1	1	STD80098	05/04/17 16:48
10	15M21110	WG611678-01 BLANK 827-DIOXANE	7	1	SOIL	05/04/17 17:11
11	15M21111	L17040008-50 827-DIOXANE	7	1	SOIL	05/04/17 17:34
12	15M21112	L17040008-51 827-DIOXANE	7	1	SOIL	05/04/17 17:56
13	15M21113	L17040008-52 827-DIOXANE	7	1	SOIL	05/04/17 18:19
14	15M21114	L17040008-53 827-DIOXANE	7	1	SOIL	05/04/17 18:43
15	15M21115	BAKE OUT	1	1		05/04/17 19:05
16	15M21116	BAKE OUT	1	1		05/04/17 19:28
17	15M21117	BAKE OUT	1	1		05/04/17 19:51

Comments

Seq.	Rerun	Dil.	Reason	Analytes
12				
	L17040008-51 827-DIOXANE low recovery-remix and reanalyze.			

Page: 1 Approved: 05-MAY-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 051517
Analyst1: SCB 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: WG614147

Internal STD: STD81022 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	15M21198	BAKE OUT	1	1		05/15/17 11:35
2	15M21199	WG614240-01 5PPM LL DFTPP	1	1	STD80383	05/15/17 11:58
3	15M21200	WG614240-02 5PPM 1,4-DIOXANE STD	1	1	STD80097	05/15/17 12:16
4	15M21201	WG613903-01 BLANK 5/11	1	1		05/15/17 12:39
5	15M21202	WG613903-02 LCS 5/11	1	1		05/15/17 13:01
6	15M21203	WG613903-03 LCS2 5/11	1	1		05/15/17 13:24
7	15M21204	L17050688-01	1	1		05/15/17 13:47
8	15M21205	L17050688-01 5X	1	5		05/15/17 14:09
9	15M21206	BAKE OUT	1	1		05/15/17 14:32
10	15M21207	BAKE OUT	1	1		05/15/17 14:54
11	15M21208	BAKE OUT	1	1		05/15/17 15:17

Comments

Seq.	Rerun	Dil.	Reason	Analytes
7	X	5	Over Calibration Range	1,4-dioxane
	L17050688-01			

Page: 1 Approved: 17-MAY-17

Microbac Laboratories Inc.

Data Checklist

Date: 04-MAY-2017
Analyst: SCB
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: NA
Runlog ID: 81976
Analytical Workgroups: WG612906, L17040008

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	X
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)	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	NA
Check for completeness	X
Primary Reviewer	SCB
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:
05-MAY-2017

Secondary Reviewer:
05-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-05-2017 17:10:06

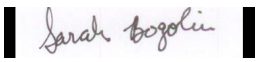
Microbac Laboratories Inc.

Data Checklist

Date: 15-MAY-2017
Analyst: SCB
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: NA
Runlog ID: 82170
Analytical Workgroups: L17050688

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	NA
Check for completeness	X
Primary Reviewer	SCB
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:
15-MAY-2017



Secondary Reviewer:
17-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-17-2017 10:50:26

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8270D **AAB#:** WG614147

Login Number: L17050688

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-SP650-6438-GRAB	01	05/10/17					05/11/2017	1	7		05/15/17	3.9	40	
LH18/24-SP650-6438-GRAB	01	05/10/17					05/11/2017	1	7		05/15/17	3.9	40	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5294975
Report generated 05/17/2017 10:47

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17050688
Instrument Id: HPMS15
Workgroup (AAB#): WG614147

Method: 827-DIOXANE
CAL ID: HPMS15-04-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1
L17050688-01	1.00	01	58.0
L17050688-01	5.00	DL01	56.4
WG613903-01	1.00	01	58.0
WG613903-02	1.00	01	62.9
WG613903-03	1.00	01	48.2

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: 5294984
Report generated: 05/18/2017 12:53

METHOD BLANK SUMMARY

Login Number:	L17050688	Work Group:	WG614147
Blank File ID:	15M21201	Blank Sample ID:	WG613903-01
Prep Date:	05/11/17 15:39	Instrument ID:	HPMS15
Analyzed Date:	05/15/17 12:39	Method:	8270D
Analyst:	SCB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG613903-02	15M21202	05/15/17 13:01	01
LCS2	WG613903-03	15M21203	05/15/17 13:24	01
LH18/24-SP650-6438-GRAB	L17050688-01	15M21204	05/15/17 13:47	01
LH18/24-SP650-6438-GRAB	L17050688-01	15M21205	05/15/17 14:09	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5294976
Report generated 05/17/2017 10:47

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17050688 Prep Date: 05/11/17 15:39 Sample ID: WG613903-01
Instrument ID: HPMS15 Run Date: 05/15/17 12:39 Prep Method: 3520C
File ID: 15M21201 Analyst: SCB Method: 8270D
Workgroup (AAB#): WG614147 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS15-04-MAY-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	58.0	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: 5294977
17-MAY-2017 10:47

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050688 Analyst: SCB Prep Method: 3520C
Instrument ID: HPMS15 Matrix: Water Method: 8270D
Workgroup (AAB#): WG614147 Units: ug/L
QC Key: DOD4 Lot #: STD79978

Sample ID: WG613903-02 LCS File ID: 15M21202 Run Date: 05/15/2017 13:01
Sample ID: WG613903-03 LCS2 File ID: 15M21203 Run Date: 05/15/2017 13:24

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,4-Dioxane	5.00	2.89	57.7	5.00	2.44	48.9	16.7	30 - 104	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,4-Dioxane-d8	62.9	48.2	20 - 129	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5294978
Report generated: 05/17/2017 10:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17050688
Instrument: HPMS15
Analyst: SCB
Workgroup: WG612906

Tune ID: WG612906-01
Run Date: 05/04/2017
Run Time: 14:00
File ID: 15M21102
Cal ID: HPMS15-04-MAY-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	39.8	100763	PASS
68.0	69.0	0	2.00	1.94	2347	PASS
69.0	198	0	100	47.6	120729	PASS
70.0	69.0	0	2.00	0.764	922	PASS
127	198	40.0	60.0	52.2	132295	PASS
197	198	0	1.00	0.399	1011	PASS
198	198	100	100	100	253422	PASS
199	198	5.00	9.00	6.86	17396	PASS
275	198	10.0	30.0	24.4	61731	PASS
365	198	1.00	100	2.74	6948	PASS
441	443	0.0100	100	72.9	21184	PASS
442	198	40.0	100	55.7	141072	PASS
443	442	17.0	23.0	20.6	29074	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG612906-02	STD-CCV	01	05/04/2017 14:18	
WG612906-03	STD	01	05/04/2017 14:40	
WG612906-04	STD	01	05/04/2017 15:03	
WG612906-05	STD	01	05/04/2017 15:26	
WG612906-06	STD	01	05/04/2017 15:48	
WG612906-07	STD	01	05/04/2017 16:11	
WG612906-08	SSCV	01	05/04/2017 16:48	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5294981
Report generated 05/17/2017 10:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17050688
Instrument: HPMS15
Analyst: SCB
Workgroup: WG614240

Tune ID: WG614240-01
Run Date: 05/15/2017
Run Time: 11:58
File ID: 15M21199
Cal ID: HPMS15-04-MAY-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	40.1	56552	PASS
68.0	69.0	0	2.00	1.10	725	PASS
69.0	198	0	100	46.8	65940	PASS
70.0	69.0	0	2.00	0.648	427	PASS
127	198	40.0	60.0	51.8	72963	PASS
197	198	0	1.00	0.815	1149	PASS
198	198	100	100	100	140944	PASS
199	198	5.00	9.00	6.77	9541	PASS
275	198	10.0	30.0	24.8	34968	PASS
365	198	1.00	100	3.56	5018	PASS
441	443	0.0100	100	76.9	11767	PASS
442	198	40.0	100	57.2	80605	PASS
443	442	17.0	23.0	19.0	15298	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG614240-02	CCV	01	05/15/2017 12:16	
WG613903-01	BLANK	01	05/15/2017 12:39	
WG613903-02	LCS	01	05/15/2017 13:01	
WG613903-03	LCS2	01	05/15/2017 13:24	
L17050688-01	LH18/24-SP650-6438-GRAB	01	05/15/2017 13:47	
L17050688-01	LH18/24-SP650-6438-GRAB	DL01	05/15/2017 14:09	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5294981
Report generated 05/17/2017 10:47

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17050688
Analytical Method: 8270D
ICAL Workgroup: WG612906

Instrument ID: HPMS15
Initial Calibration Date: 04-MAY-17 16:11
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
1,4-Dioxane		0.3110	1.82		

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

INT_CAL - Modified 03/06/2008
PDF File ID: 5294979
Report generated 05/17/2017 10:47

Login Number: L17050688
Analytical Method: 8270D
Instrument ID: HPMS15
Initial Calibration Date: 04-MAY-17 16:11
Column ID: F

Analyte	WG612906-02			WG612906-03			WG612906-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,4-Dioxane	5.00	126741.000	0.3085	10.0	226922.000	0.3188	7.50	171013.000	0.3132

INT_CAL - Modified 03/06/2008
PDF File ID: 5294979
Report generated 05/17/2017 10:47

Login Number: L17050688
Analytical Method: 8270D
Instrument ID: HPMS15
Initial Calibration Date: 04-MAY-17 16:11
Column ID: F

Analyte	WG612906-05			WG612906-06			WG612906-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,4-Dioxane	2.50	53891.0000	0.3099	1.00	21636.0000	0.3135	0.400	8746.00000	0.3020

INT_CAL - Modified 03/06/2008
PDF File ID: 5294979
Report generated 05/17/2017 10:47

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17050688 Run Date: 05/04/2017 Sample ID: WG612906-08
Instrument ID: HPMS15 Run Time: 16:48 Method: 8270D
File ID: 15M21109 Analyst: SCB/LJH QC Key: DOD4
ICal Workgroup: WG612906 Cal ID: HPMS15 - 04-MAY-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,4-Dioxane		5000	4430	ug/L	0.274	11.4	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5294980
Report generated 05/17/2017 10:47

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614240-02
Instrument ID: HPMS15 Run Time: 12:16 Method: 8270D
File ID: 15M21200 Analyst: SCB QC Key: DOD4
Workgroup (AAB#): WG614147 Cal ID: HPMS15 - 04-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,4-Dioxane		5000	4740	ug/L	0.295	5.16	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5294982
Report generated 05/17/2017 10:47

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17050688
Instrument ID: HPMS15
Workgroup (AAB#): WG614147

ICAL CCV Number: WG612906-02
CAL ID: HPMS15-04-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG612906-02	NA	NA	82158
Upper Limit	NA	NA	164316
Lower Limit	NA	NA	41079
L17050688-01	1.00	01	51343
L17050688-01	5.00	DL01	47822
WG613903-01	1.00	01	52234
WG613903-02	1.00	01	48980
WG613903-03	1.00	01	52144

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5294983
Report generated 05/17/2017 10:47

Microbac Laboratories Inc.

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

Login Number: L17050688
Instrument ID: HPMS15
Workgroup (AAB#): WG614147

ICAL CCV Number: WG612906-02
CAL ID: HPMS15-04-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG612906-02	NA	NA	7.2
Upper Limit	NA	NA	7.7
Lower Limit	NA	NA	6.7
L17050688-01	1.00	01	7.194
L17050688-01	5.00	DL01	7.194
WG613903-01	1.00	01	7.191
WG613903-02	1.00	01	7.194
WG613903-03	1.00	01	7.194

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5294985
Report generated: 05/17/2017 10:47

2.3 Metals Data

2.3.1 Metals I C P Data

2.3.1.1 Summary Data

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/12/2017 09:11
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	05/15/2017 12:57
Workgroup #:	WG614242	**Analyst:**	KKB	**Run Date:**	05/15/2017 14:46
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	T4.051517.144645
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 #: L17050688
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

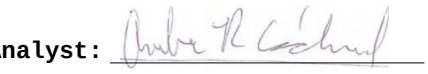
Microbac Laboratories Inc.
Microwave Digestion Log

Workgroup: WG614006
Analyst: AC
Spike Analyst: AC
Run Date: 05/12/2017 09:11
Method: 3015A
Balance: BAL019
Instrument: MW-4
Instrument Start: 05/12/2017 09:11

SOP: ME407 Revison 19
Spike Solution: STD81778
Spike Witness: VC
HNO3 Lot #: COA19718
HCL Lot #: COA19685
ICP FILTERS LOT#R6sa4256 RGT40011
40 & 50 ML. DIGESTION TU COA19487

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG614006-02	BLANK	1	40 mL	50 mL	204.629 g	204.61 g		
2	WG613917-01	FBLK1	17	5 mL	50 mL	205.815 g	205.8 g		
3	WG614006-03	LCS	1	40 mL	50 mL	211.633 g	211.624 g	5 mL	
4	L17050679-01	SAMP	1	40 mL	50 mL	206.484 g	206.468 g		05/18/17
5	L17050679-02	SAMP	1	40 mL	50 mL	204.501 g	204.488 g		05/18/17
6	L17050679-03	SAMP	1	40 mL	50 mL	206.753 g	206.742 g		05/18/17
7	L17050679-04	SAMP	1	40 mL	50 mL	203.905 g	203.893 g		05/18/17
8	L17050680-01	SAMP	1	40 mL	50 mL	205.397 g	205.385 g		05/18/17
9	L17050680-02	SAMP	1	40 mL	50 mL	205.783 g	205.772 g		05/18/17
10	L17050687-01	SAMP	1	40 mL	50 mL	206.168 g	206.158 g		05/22/17
11	L17050688-01	SAMP	1	40 mL	50 mL	206.464 g	206.45 g		05/22/17
12	L17050700-01	SAMP	17	5 mL	50 mL	203.397 g	203.372 g		05/22/17
13	WG614006-01	REF	17	5 mL	50 mL	205.729 g	205.711 g		
14	L17050712-01	SAMP	17	5 mL	50 mL	205.729 g	205.711 g		05/18/17
15	L17050713-01	SAMP	17	5 mL	50 mL	206.674 g	206.644 g		05/18/17
16	L17050732-01	SAMP	1	40 mL	50 mL	207.786 g	207.739 g		05/18/17
17	L17050732-02	SAMP	1	40 mL	50 mL	206.219 g	206.178 g		05/18/17
18	L17050732-03	SAMP	1	40 mL	50 mL	207.228 g	207.196 g		05/18/17
19	L17050760-02	SAMP	1	40 mL	50 mL	206.132 g	206.095 g		05/23/17
20	L17050760-03	SAMP	1	40 mL	50 mL	205.289 g	205.258 g		05/23/17
21	L17050760-04	SAMP	1	40 mL	50 mL	206.381 g	206.364 g		05/23/17
22	L17050760-05	SAMP	1	40 mL	50 mL	203.746 g	203.676 g		05/23/17
23	WG614006-04	MS	1	5 mL	50 mL	211.627 g	211.586 g	5 mL	
24	WG614006-05	MSD	1	5 mL	50 mL	209.108 g	209.086 g	5 mL	

L17050732-01	Filtered Digestate

Analyst: 

Reviewer: 

MW_DIG - Modified 09/30/2009
PDF ID: 5290643
Report generated: 05/12/2017 10:06

TCLP Non-Volatile

Analyst(s): BNB
Date: 5-11-17
Filter Lot #: 94810030
Microbac SOP: TCLP01 Rev #: 12

Balance ID: BAL020
pH Probe ID: T5
Temp probe ID: ☒1025 ☐1023

Analyst / Date		Analyst / Date	
BNB 5-11-17		BNB 5-12-17	
Time On	Temp On °C	Time Off	Temp Off °C
1522	23.0	805	22.5

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	05-0700-01	Me, CR-6	1311	1-235	S	100	7.09	1.54	100.47	2009	4.89
D	05-0712-01	Me	〃	〃	〃	〃	9.51	1.64	100.29	2005	4.92
D	05-0713-01	Me	〃	〃	〃	〃	9.44	3.67	100.40	2008	4.93
NA	FB1K-1	Me, CR-6	1311	〃	NA	NA	NA	NA	100	100	4.92

BNB 5-12-17

*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: [signature]

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 051517T4.1R.TXT
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81715 ICV Std: STD81716 Post Spike: STD81528
ICSA: STD81649 ICSAB: STD81581 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19158 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 614242,614249

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T4.051517.124245	WG614366-01	Calibration Point		1		05/15/17 12:42
2	T4.051517.124627	WG614366-02	Calibration Point		1		05/15/17 12:46
3	T4.051517.125009	WG614366-03	Calibration Point		1		05/15/17 12:50
4	T4.051517.125351	WG614366-04	Calibration Point		1		05/15/17 12:53
5	T4.051517.125719	WG614366-05	Calibration Point		1		05/15/17 12:57
6	T4.051517.130044	WG614366-06	Initial Calibration Verification		1		05/15/17 13:00
7	T4.051517.130413	WG614366-07	Initial Calib Blank		1		05/15/17 13:04
8	T4.051517.130755	WG614366-08	Low Level Initial Calibration V		1		05/15/17 13:07
9	T4.051517.131130	WG614366-09	LLICV		1		05/15/17 13:11
10	T4.051517.131505	WG614366-10	LLICV		1		05/15/17 13:15
11	T4.051517.131841	WG614366-11	Interference Check		1		05/15/17 13:18
12	T4.051517.132225	WG614366-12	Interference Check		1		05/15/17 13:22
13	T4.051517.132604	WG614366-13	CCV		1		05/15/17 13:26
14	T4.051517.132932	WG614366-14	CCB		1		05/15/17 13:29
15	T4.051517.135558	WG614006-02	Method/Prep Blank	40/50	1		05/15/17 13:55
16	T4.051517.135940	WG614006-03	Laboratory Control S	40/50	1		05/15/17 13:59
17	T4.051517.140308	WG613917-01	Fluid Blank 1		1		05/15/17 14:03
18	T4.051517.140651	L17050679-01	1804-109 W1	40/50	1		05/15/17 14:06
19	T4.051517.141029	L17050679-02	1804-109 S3	40/50	1		05/15/17 14:10
20	T4.051517.141408	L17050679-03	1804-109 S1	40/50	1		05/15/17 14:14
21	T4.051517.141748	L17050679-04	1804-109 S2	40/50	1		05/15/17 14:17
22	T4.051517.142127	L17050680-01	45-20-1.01 W1	40/50	1		05/15/17 14:21
23	T4.051517.142507	WG614242-01	Post Digestion Spike		1	L17050680-01	05/15/17 14:25
24	T4.051517.142835	WG614242-02	Serial Dilution		5	L17050680-01	05/15/17 14:28
25	T4.051517.143215	WG614366-15	CCV		1		05/15/17 14:32
26	T4.051517.143543	WG614366-16	CCB		1		05/15/17 14:35
27	T4.051517.143927	L17050680-02	45-20-1.01 P1	40/50	1		05/15/17 14:39
28	T4.051517.144307	L17050687-01	LH18/24-SP140-7438-GRAB	40/50	1		05/15/17 14:43
29	T4.051517.144645	L17050688-01	LH18/24-SP650-6438-GRAB	40/50	1		05/15/17 14:46
30	T4.051517.145031	L17050700-01	C SECTIONS	5/50	1		05/15/17 14:50
31	T4.051517.145409	WG614006-01	Reference Sample		1	L17050712-01	05/15/17 14:54
32	T4.051517.145750	WG614006-04	Matrix Spike	5/50	1	L17050712-01	05/15/17 14:57
33	T4.051517.150117	WG614006-05	Matrix Spike Duplica	5/50	1	L17050712-01	05/15/17 15:01
34	T4.051517.150445	L17050713-01	J7E0752-01	5/50	1		05/15/17 15:04

Page: 1 Approved: May 16, 2017

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 051517T4.1R.TXT
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81715 ICV Std: STD81716 Post Spike: STD81528
ICSA: STD81649 ICSAB: STD81581 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19158 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 614242,614249

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T4.051517.150825	L17050732-01	SW01-GW-051017	40/50	1		05/15/17 15:08
36	T4.051517.151201	L17050732-02	WVU04-GW-051017	40/50	1		05/15/17 15:12
37	T4.051517.151541	WG614366-17	CCV		1		05/15/17 15:15
38	T4.051517.151909	WG614366-18	CCB		1		05/15/17 15:19
39	T4.051517.152252	L17050732-03	TCF-EB-051017	40/50	1		05/15/17 15:22
40	T4.051517.152635	L17050760-02	MW-38D-051117	40/50	1		05/15/17 15:26
41	T4.051517.153013	L17050760-03	DUP-051117	40/50	1		05/15/17 15:30
42	T4.051517.153351	L17050760-04	BW-5-051117	40/50	1		05/15/17 15:33
43	T4.051517.153729	L17050760-05	BW-1-051117	40/50	1		05/15/17 15:37
44	T4.051517.154109	WG614366-19	CCV		1		05/15/17 15:41
45	T4.051517.154436	WG614366-20	CCB		1		05/15/17 15:44
46	T4.051517.154820	WG614166-02	Method/Prep Blank	40/50	1		05/15/17 15:48
47	T4.051517.155201	WG614166-03	Laboratory Control S	40/50	1		05/15/17 15:52
48	T4.051517.155529	WG614166-04	Filter Blank		1		05/15/17 15:55
49	T4.051517.155911	L17050758-01	54095-06-13-38-WW1	40/50	1		05/15/17 15:59
50	T4.051517.160246	L17050758-02	54095-06-13-38-WW1	40/50	1		05/15/17 16:02
51	T4.051517.160624	L17050792-01	BSUMP-SW-051117	40/50	1		05/15/17 16:06
52	T4.051517.161004	L17050792-02	BSUMP-SW-051117	40/50	1		05/15/17 16:10
53	T4.051517.161343	L17050792-04	PZ101-GW-051117	40/50	1		05/15/17 16:13
54	T4.051517.161727	WG614249-01	Post Digestion Spike		1	L17050792-04	05/15/17 16:17
55	T4.051517.162104	WG614249-02	Serial Dilution		5	L17050792-04	05/15/17 16:21
56	T4.051517.162441	WG614366-21	CCV		1		05/15/17 16:24
57	T4.051517.162807	WG614366-22	CCB		1		05/15/17 16:28
58	T4.051517.163151	L17050792-06	PZ104-GW-051117	40/50	1		05/15/17 16:31
59	T4.051517.163535	L17050792-08	PZ105-GW-051117	40/50	1		05/15/17 16:35
60	T4.051517.163917	L17050843-01	12402-F01-WQ-W0003	40/50	1		05/15/17 16:39
61	T4.051517.164259	L17050843-02	15403-G03-WQ-W0019	40/50	1		05/15/17 16:42
62	T4.051517.164640	L17050843-03	45005-G02-WQ-W0007	40/50	1		05/15/17 16:46
63	T4.051517.165022	L17050843-04	50401-F01-WQ-W0017	40/50	1		05/15/17 16:50
64	T4.051517.165401	L17050843-05	51109-B01-WQ-W0003	40/50	1		05/15/17 16:54
65	T4.051517.165744	L17050848-02	SW1A-333-14	40/50	1		05/15/17 16:57
66	T4.051517.170125	WG614366-23	CCV		1		05/15/17 17:01
67	T4.051517.170453	WG614366-24	CCB		1		05/15/17 17:04
68	T4.051517.170837	L17050848-07	SW2A-333-14		1	WG614166-01	05/15/17 17:08

 Approved: May 16, 2017

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 051517T4.1R.TXT
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81715 ICV Std: STD81716 Post Spike: STD81528
ICSA: STD81649 ICSAB: STD81581 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19158 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 614242,614249

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	T4.051517.171218	L17050848-08	SW2A-333-14	40/50	1	WG614166-05	05/15/17 17:12
70	T4.051517.171546	L17050848-09	SW2A-333-14	40/50	1	WG614166-06	05/15/17 17:15
71	T4.051517.171914	L17050848-14	SW3A-333-14	40/50	1		05/15/17 17:19
72	T4.051517.172254	L17050848-17	SW3B-333-14	40/50	1		05/15/17 17:22
73	T4.051517.172634	L17050848-20	SW4A-333-14	40/50	1		05/15/17 17:26
74	T4.051517.173015	L17050848-23	SW5A-333-14	40/50	1		05/15/17 17:30
75	T4.051517.173358	WG614366-25	CCV		1		05/15/17 17:33
76	T4.051517.173726	WG614366-26	CCB		1		05/15/17 17:37
77	T4.051517.174111	WG614366-27	LLCCV		1		05/15/17 17:41
78	T4.051517.174445	WG614366-28	Low Level Continuing Calibra		1		05/15/17 17:44
79	T4.051517.174821	WG614366-29	LLCCV		1		05/15/17 17:48
80	T4.051517.175156	WG614366-30	Interference Check		1		05/15/17 17:51
81	T4.051517.175540	WG614366-31	Interference Check		1		05/15/17 17:55
82	T4.051517.175919	WG614366-32	CCV		1		05/15/17 17:59
83	T4.051517.180247	WG614366-33	CCB		1		05/15/17 18:02

Page: 3 Approved: May 16, 2017

Microbac Laboratories Inc.

Data Checklist

Date: 15-MAY-2017
Analyst: KKB
Analyst: NA
Method: 6010B/6010C/200.7
Instrument: ICP-THERMO4
Curve Workgroup: 614366
Runlog ID: 82168
Analytical Workgroups: 614242,614249

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	X
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	X
Client Forms	X
Level X	
Level 3	732,792
Level 4	687,688,760,843
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	KKB
Secondary Reviewer	KHR
Comments	

Primary Reviewer:
16-MAY-2017

Secondary Reviewer:
16-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-16-2017 12:12:54

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C AAB#: WG614242

Login Number: L17050688

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-SP650-6438-GRAB	01	05/10/17					05/12/2017	1.8	180		05/15/17	5	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5295472
Report generated 05/16/2017 10:04

METHOD BLANK SUMMARY

Login Number:	L17050688	**Work Group:**	WG614242
Blank File ID:	T4.051517.135558	**Blank Sample ID:**	WG614006-02
Prep Date:	05/12/17 09:11	**Instrument ID:**	ICP-THERMO4
Analyzed Date:	05/15/17 13:55	**Method:**	6010C
Analyst:	KKB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG614006-03	T4.051517.135940	05/15/17 13:59	01
LH18/24-SP650-6438-GRAB	L17050688-01	T4.051517.144645	05/15/17 14:46	01

Report Name: BLANK_SUMMARY
PDF File ID: 5295473
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17050688 Prep Date: 05/12/17 09:11 Sample ID: WG614006-02
Instrument ID: ICP-THERMO4 Run Date: 05/15/17 13:55 Prep Method: 3015A
File ID: T4.051517.135558 Analyst: KKB Method: 6010C
Workgroup (AAB#): WG614242 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-TH-15-MAY-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: 5295474
16-MAY-2017 10:07

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614006-03
Instrument ID: ICP-THERMO4 Run Time: 13:59 Prep Method: 3015A
File ID: T4.051517.135940 Analyst: KKB Method: 6010C
Workgroup (AAB#): WG614242 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD81778 Cal ID: ICP-TH-15-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Selenium, Total	0.250	0.232	92.6	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5295475
Report generated: 05/16/2017 10:07

Loginnum:L17050688 Cal ID:ICP-THERMO4- Worknum:WG614242
Instrument ID:ICP-THERMO4 Contract #: Method:6010C
Parent ID:WG614006-01 File ID:T4.051517.145409 Dil:1 Matrix:WATER
Sample ID:WG614006-04 MS File ID:T4.051517.145750 Dil:1 Units:mg/L
Sample ID:WG614006-05 MSD File ID:T4.051517.150117 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	1.96	97.8	2.00	2.01	101	2.83	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: 5295476
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17050688 **Worknum:** WG614242
Instrument: ICP-THERMO4 **Method:** 6010C
Serial Dil: WG614242-02 **File ID:** T4.051517.142835 **Dil:** 5 **Units:** ug/L
Sample: L17050680-01 **File ID:** T4.051517.142127 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Selenium	2.58		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: 5295470
05/16/2017 10:07

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17050688 **Worknum:** WG614242
Instrument ID: ICP-THERMO4 **Method:** 6010C
Post Spike ID: WG614242-01 **File ID:** T4.051517.142507 **Dil:** 1 **Units:** ug/L
Sample ID: L17050680-01 **File ID:** T4.051517.142127 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
SELENIUM	191		0	U	200	95.6	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: 5295471
Report generated: 05/16/2017 10:07

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17050688**	Workgroup (AAB#):	**WG614242**
Analytical Method:	**6010C**	Instrument ID:	**ICP-THERMO4**
ICAL Worknum:	**WG614366**	Initial Calibration Date:	**15-MAY-2017 12:57**

	WG614366-01		WG614366-02		WG614366-03		WG614366-04		WG614366-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
SELENIUM	0	-0.0000800	NA	NA	.008	-0.0000300	.4	0.00604	.8	0.0122	.999334	

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: 5295479
Report generated: 16-MAY-2017 10:07

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-07
Instrument ID: ICP-THERMO4 Run Time: 13:04 Method: 6010C
File ID: T4.051517.130413 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG614242 Cal ID: ICP-THERI - 15-MAY-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: 5295481
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050688	Run Date:	05/15/2017	Sample ID:	WG614366-14
Instrument ID:	ICP-THERMO4	Run Time:	13:29	Method:	6010C
File ID:	T4.051517.132932	Analyst:	KKB	Units:	mg/L
Workgroup (AAB#):	WG614242	Cal ID:	ICP-TH - 15-MAY-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: 5295484
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050688	**Run Date:**	05/15/2017	**Sample ID:**	WG614366-16
Instrument ID:	ICP-THERMO4	**Run Time:**	14:35	**Method:**	6010C
File ID:	T4.051517.143543	**Analyst:**	KKB	**Units:**	mg/L
Workgroup (AAB#):	WG614242	**Cal ID:**	ICP-TH - 15-MAY-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: 5295484
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050688	Run Date:	05/15/2017	Sample ID:	WG614366-18
Instrument ID:	ICP-THERMO4	Run Time:	15:19	Method:	6010C
File ID:	T4.051517.151909	Analyst:	KKB	Units:	mg/L
Workgroup (AAB#):	WG614242	Cal ID:	ICP-TH - 15-MAY-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: 5295484
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050688	Run Date:	05/15/2017	Sample ID:	WG614366-26
Instrument ID:	ICP-THERMO4	Run Time:	17:37	Method:	6010C
File ID:	T4.051517.173726	Analyst:	KKB	Units:	mg/L
Workgroup (AAB#):	WG614242	Cal ID:	ICP-TH - 15-MAY-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: 5295484
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050688	Run Date:	05/15/2017	Sample ID:	WG614366-33
Instrument ID:	ICP-THERMO4	Run Time:	18:02	Method:	6010C
File ID:	T4.051517.180247	Analyst:	KKB	Units:	mg/L
Workgroup (AAB#):	WG614242	Cal ID:	ICP-TH - 15-MAY-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: 5295484
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-06
Instrument ID: ICP-THERMO4 Run Time: 13:00 Method: 6010C
File ID: T4.051517.130044 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Selenium		.4	0.392	98.1	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5295480
Report generated 05/16/2017 10:07

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-13
Instrument ID: ICP-THERMO4 Run Time: 13:26 Method: 6010C
File ID: T4.051517.132604 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.398	mg/L	99.5	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5295483
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-15
Instrument ID: ICP-THERMO4 Run Time: 14:32 Method: 6010C
File ID: T4.051517.143215 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.403	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5295483
Report generated 05/16/2017 10:07

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-17
Instrument ID: ICP-THERMO4 Run Time: 15:15 Method: 6010C
File ID: T4.051517.151541 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.406	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5295483
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-25

Instrument ID: ICP-THERMO4 Run Time: 17:33 Method: 6010C

File ID: T4.051517.173358 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-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: 5295483

Report generated 05/16/2017 10:07

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-32

Instrument ID: ICP-THERMO4 Run Time: 17:59 Method: 6010C

File ID: T4.051517.175919 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.400	0.408	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5295483

Report generated 05/16/2017 10:07

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-08
Instrument ID: ICP-THERMO4 Run Time: 13:07 Method: 6010C
File ID: T4.051517.130755 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0126	mg/L	79.0	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5295485
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17050688 Run Date: 05/15/2017 Sample ID: WG614366-28
Instrument ID: ICP-THERMO4 Run Time: 17:44 Method: 6010C
File ID: T4.051517.174445 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG614242 Cal ID: ICP-TH - 15-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Selenium		0.0160	0.0181	mg/L	113	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5295485
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17050688 **Workgroup (AAB#):** WG614242
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG614366-11 **File ID:** T4.051517.131841 **Units:** mg/L
Sol. AB : WG614366-12 **File ID:** T4.051517.132225 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Selenium	NS	0.000460	NS	0.250	0.240	96.0	

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: 5295482
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17050688 **Workgroup (AAB#):** WG614242
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG614366-30 **File ID:** T4.051517.175156 **Units:** mg/L
Sol. AB : WG614366-31 **File ID:** T4.051517.175540 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Selenium	NS	-0.00646	NS	0.250	0.243	97.2	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).
+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5295482
Report generated 05/16/2017 10:07

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050688 **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: 5295478
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050688 **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: 5295478
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050688 **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: 5295478
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050688 **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: 5295478
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050688 **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: 5295478
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050688 **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: 5295478
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17050688 **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: 5295478
Report generated: 05/16/2017 10:04

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17050688 **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: 5295477
Report generated: 05/16/2017 10:04

2.3 Metals Data

2.3.2 Metals ICP-MS Data

2.3.2.1 Summary Data

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	3015	**Prep Date:**	05/12/2017 08:38
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	05/12/2017 10:49
Workgroup #:	WG614072	**Analyst:**	JYH	**Run Date:**	05/12/2017 12:04
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	NI.051217.120411
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Barium, Total	7440-39-3	0.130		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 #: L17050688
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: WG614007
Analyst: VC
Spike Analyst: VC
Run Date: 05/12/2017 08:38
Method: 3015
Balance: BAL016
Instrument: MW-3
Instrument Start: 05/12/2017 08:46

SOP: ME407 Revison 19
Spike Solution: STD80296
Spike Witness: ERP
HNO3 Lot #: COA19718
40 & 50 ML. DIGESTION TU COA19487
MS Filters- fisher-Lot#R RGT38288

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG614007-02	BLANK	1	20 mL	50 mL	184.725 g	184.724 g		
2	WG614007-03	LCS	1	20 mL	50 mL	184.998 g	184.994 g	.25 mL	
3	L17050615-10	SAMP	1	20 mL	50 mL	183.938 g	183.928 g		05/24/17
4	L17050645-01	SAMP	1	20 mL	50 mL	183.649 g	183.644 g		05/17/17
5	WG614007-01	REF	1	20 mL	50 mL	184.894 g	184.888 g		
6	L17050645-02	SAMP	1	20 mL	50 mL	184.894 g	184.888 g		05/17/17
7	L17050687-01	SAMP	1	20 mL	50 mL	184.238 g	184.229 g		05/22/17
8	L17050688-01	SAMP	1	20 mL	50 mL	181.901 g	181.897 g		05/22/17
9	WG614007-04	MS	1	20 mL	50 mL	186.123 g	186.121 g	.25 mL	
10	WG614007-05	MSD	1	20 mL	50 mL	184.254 g	184.249 g	.25 mL	

Analyst: Vicki Collins

Reviewer: Erin Potter

MW_DIG - Modified 09/30/2009
PDF ID: 5290489
Report generated: 05/12/2017 09:21

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 051217A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

Calibration Std: STD81804 ICV Std: STD81801 Post Spike: STD79415
ICSA: STD81802 ICSAB: STD81803 Int. Std: RGT39300
CCV: STD81800 LLCCV: STD81819 Tuning Sol : STD81805
Stannous : Hydroxylamine :

Workgroups: 614072

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.051217.103736	Blank	Blank		1		05/12/17 10:37
2	NI.051217.104041	WG614119-01	Calibration Point		1		05/12/17 10:40
3	NI.051217.104347	WG614119-02	Calibration Point		1		05/12/17 10:43
4	NI.051217.104653	WG614119-03	Calibration Point		1		05/12/17 10:46
5	NI.051217.104958	WG614119-04	Calibration Point		1		05/12/17 10:49
6	NI.051217.105304	WG614119-05	Initial Calibration Verification		1		05/12/17 10:53
7	NI.051217.105611	WG614119-06	Initial Calib Blank		1		05/12/17 10:56
8	NI.051217.105918	WG614119-07	Low Level Initial Calibration V		1		05/12/17 10:59
9	NI.051217.110223	WG614119-08	Interference Check		1		05/12/17 11:02
10	NI.051217.110529	WG614119-09	Interference Check		1		05/12/17 11:05
11	NI.051217.110836	WG614119-10	CCV		1		05/12/17 11:08
12	NI.051217.111141	WG614119-11	CCB		1		05/12/17 11:11
13	NI.051217.112400	WG614007-02	Method/Prep Blank	20/50	1		05/12/17 11:24
14	NI.051217.112705	WG614007-03	Laboratory Control S	20/50	1		05/12/17 11:27
15	NI.051217.113010	L17050615-10	P267-500	20/50	1		05/12/17 11:30
16	NI.051217.113316	L17050615-10	P267-500		5		05/12/17 11:33
17	NI.051217.113621	L17050615-10	P267-500		25		05/12/17 11:36
18	NI.051217.113927	WG614072-03	Serial Dilution		125	L17050615-10	05/12/17 11:39
19	NI.051217.114233	WG614119-12	CCV		1		05/12/17 11:42
20	NI.051217.114538	WG614119-13	CCB		1		05/12/17 11:45
21	NI.051217.114845	L17050645-01	1705063-01	20/50	1		05/12/17 11:48
22	NI.051217.115151	WG614007-01	Reference Sample		1	L17050645-02	05/12/17 11:51
23	NI.051217.115457	WG614007-04	Matrix Spike	20/50	1	L17050645-02	05/12/17 11:54
24	NI.051217.115802	WG614007-05	Matrix Spike Duplica	20/50	1	L17050645-02	05/12/17 11:58
25	NI.051217.120107	L17050687-01	LH18/24-SP140-7438-GRAB	20/50	1		05/12/17 12:01
26	NI.051217.120411	L17050688-01	LH18/24-SP650-6438-GRAB	20/50	1		05/12/17 12:04
27	NI.051217.120717	WG614072-01	Post Digestion Spike		1	L17050688-01	05/12/17 12:07
28	NI.051217.121023	WG614072-02	Serial Dilution		5	L17050688-01	05/12/17 12:10
29	NI.051217.121328	WG614072-02	Serial Dilution		25	L17050688-01	05/12/17 12:13
30	NI.051217.121634	WG614119-14	CCV		1		05/12/17 12:16
31	NI.051217.121940	WG614119-15	CCB		1		05/12/17 12:19
32	NI.051217.122253	WG614119-16	Low Level Continuing Calibra		1		05/12/17 12:22

Comments

Page: 1 Approved: May 15, 2017

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 051217A.REP

Analyst1: JYH Analyst2: N/A

Method: 6020/6020A/200.8 SOP: ME700A Rev: 3

Maintenance Log ID:

Calibration Std: STD81804 ICV Std: STD81801 Post Spike: STD79415

ICSA: STD81802 ICSAB: STD81803 Int. Std: RGT39300

CCV: STD81800 LLCCV: STD81819 Tuning Sol : STD81805

Stannous : Hydroxylamine :

Workgroups: 614072

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time

Seq.	Rerun	Dil.	Reason	Analytes
15			Seq. 15-18: wrong sample label. JYH	
26			Wrong sample label. JYH	

Page: 2 Approved: May 15, 2017

Microbac Laboratories Inc.

Data Checklist

Date: 12-MAY-2017
Analyst: JYH
Analyst: NA
Method: 6020/6020A/200.8
Instrument: ICP-MS2
Curve Workgroup: 614119
Runlog ID: 82130
Analytical Workgroups: 614072

STD ID#s on Runlog	X
Calibration/Linearity	X
ICV/CCV	X
ICV RSD < 3% (EPA 200.7 only)	X
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	615,645,687,688
Client Forms	X
Level X	
Level 3	
Level 4	615,645,687,688
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:
15-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-15-2017 12:52:05

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6020A AAB#: WG614072

Login Number: L17050688

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-SP650-6438-GRAB	01	05/10/17					05/12/2017	1.7	180		05/12/17	1.9	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5292388
Report generated 05/12/2017 14:21

METHOD BLANK SUMMARY

Login Number:	L17050688	**Work Group:**	WG614072
Blank File ID:	NI.051217.112400	**Blank Sample ID:**	WG614007-02
Prep Date:	05/12/17 08:38	**Instrument ID:**	ICP-MS2
Analyzed Date:	05/12/17 11:24	**Method:**	6020A
Analyst:	JYH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG614007-03	NI.051217.112705	05/12/17 11:27	01
LH18/24-SP650-6438-GRAB	L17050688-01	NI.051217.120411	05/12/17 12:04	01

Report Name: BLANK_SUMMARY
PDF File ID: 5292389
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L17050688 Prep Date:05/12/17 08:38 Sample ID:WG614007-02
Instrument ID:ICP-MS2 Run Date:05/12/17 11:24 Prep Method:3015
File ID:NI.051217.112400 Analyst:JYH Method:6020A
Workgroup (AAB#):WG614072 Matrix:Water Units:mg/L
Contract #: Cal ID:ICP-MS-12-MAY-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: 5292408
12-MAY-2017 14:21

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050688 **Run Date:** 05/12/2017 **Sample ID:** WG614007-03
Instrument ID: ICP-MS2 **Run Time:** 11:27 **Prep Method:** 3015
File ID: NI.051217.112705 **Analyst:** JYH **Method:** 6020A
Workgroup (AAB#): WG614072 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80296 **Cal ID:** ICP-MS-12-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Barium, Total	0.125	0.124	99.1	80 - 120	
Lead, Total	0.125	0.125	100	80 - 120	
Silver, Total	0.125	0.129	103	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5292409
Report generated: 05/12/2017 14:21

Microbac Laboratories Inc.
MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum:L17050688 Cal ID:ICP-MS2- Worknum:WG614072
Instrument ID:ICP-MS2 Contract #: Method:6020A
Parent ID:WG614007-01 File ID:NI.051217.115151 Dil:1 Matrix:WATER
Sample ID:WG614007-04 MS File ID:NI.051217.115457 Dil:1 Units:mg/L
Sample ID:WG614007-05 MSD File ID:NI.051217.115802 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Barium	0.0716	0.125	0.193	96.9	0.125	0.191	95.9	0.665	80 - 120	20	
Lead	ND	0.125	0.123	98.1	0.125	0.122	97.5	0.669	80 - 120	20	
Silver	ND	0.125	0.124	99.0	0.125	0.122	97.9	1.13	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: 5292392
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17050688 **Worknum:** WG614072
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG614072-02 **File ID:** NI.051217.121023 **Dil:** 5 **Units:** ug/L
Sample: L17050688-01 **File ID:** NI.051217.120411 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Barium	51.9	X	53.8	X	3.53	
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: 5292406
05/12/2017 14:21

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17050688 **Worknum:** WG614072
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG614072-03 **File ID:** NI.051217.113316 **Dil:** 5 **Units:** ug/L
Sample: L17050615-10 **File ID:** NI.051217.113010 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Barium	558		563		0.89	
Lead	121		122		0.67	
Silver	161		163		1.38	

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: 5292406
05/12/2017 14:21

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17050688 **Worknum:** WG614072
Instrument ID: ICP-MS2 **Method:** 6020A
Post Spike ID: WG614072-01 **File ID:** NI.051217.120717 **Dil:** 1 **Units:** ug/L
Sample ID: L17050688-01 **File ID:** NI.051217.120411 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
BARIUM	101		51.9		50	98.4	75 - 125	
LEAD	50.7		0	U	50	101.4	75 - 125	
SILVER	44.1		0	U	50	88.2	75 - 125	

N = % Recovery exceeds control limits
F = Result is between MDL and RL
U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 5292407
Report generated: 05/12/2017 14:21

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17050688**	Workgroup (AAB#):	**WG614072**
Analytical Method:	**6020A**	Instrument ID:	**ICP-MS2**
ICAL Worknum:	**WG614119**	Initial Calibration Date:	**12-MAY-2017 10:49**

	WG614119-01		WG614119-02		WG614119-03		WG614119-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
BARIUM	0	41.0	.4	146	50	106000	100	204000	.999995	
LEAD	0	859	.4	1260	50	387000	100	748000	.999995	
SILVER	0	152	.4	515	50	331000	100	646000	.999998	

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: 5292395
Report generated: 12-MAY-2017 14:21

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG614119-06
Instrument ID: ICP-MS2 Run Time: 10:56 Method: 6020A
File ID: NI.051217.105611 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG614072 Cal ID: ICP-MS2 - 12-MAY-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: 5292397
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050688	**Run Date:**	05/12/2017	**Sample ID:**	WG614119-11
Instrument ID:	ICP-MS2	**Run Time:**	11:11	**Method:**	6020A
File ID:	NI.051217.111141	**Analyst:**	JYH	**Units:**	ug/L
Workgroup (AAB#):	WG614072	**Cal ID:**	ICP-MS - 12-MAY-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: 5292400
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050688	**Run Date:**	05/12/2017	**Sample ID:**	WG614119-13
Instrument ID:	ICP-MS2	**Run Time:**	11:45	**Method:**	6020A
File ID:	NI.051217.114538	**Analyst:**	JYH	**Units:**	ug/L
Workgroup (AAB#):	WG614072	**Cal ID:**	ICP-MS - 12-MAY-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: 5292400
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG614119-15
Instrument ID: ICP-MS2 Run Time: 12:19 Method: 6020A
File ID: NI.051217.121940 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-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: 5292400
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG614119-05
Instrument ID: ICP-MS2 Run Time: 10:53 Method: 6020A
File ID: NI.051217.105304 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Barium		50	49.0	97.9	90 - 110	
Lead		50	49.1	98.1	90 - 110	
Silver		50	49.5	98.9	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5292396
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG614119-10

Instrument ID: ICP-MS2 Run Time: 11:08 Method: 6020A

File ID: NI.051217.110836 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0484	mg/L	96.8	90 - 110		
Lead		0.0500	0.0491	mg/L	98.2	90 - 110		
Silver		0.0500	0.0496	mg/L	99.2	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5292399

Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG614119-12

Instrument ID: ICP-MS2 Run Time: 11:42 Method: 6020A

File ID: NI.051217.114233 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0491	mg/L	98.2	90 - 110		
Lead		0.0500	0.0495	mg/L	99.0	90 - 110		
Silver		0.0500	0.0504	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5292399

Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG614119-14

Instrument ID: ICP-MS2 Run Time: 12:16 Method: 6020A

File ID: NI.051217.121634 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.0500	0.0489	mg/L	97.8	90 - 110		
Lead		0.0500	0.0496	mg/L	99.2	90 - 110		
Silver		0.0500	0.0501	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5292399

Report generated 05/12/2017 14:21

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG614119-07
Instrument ID: ICP-MS2 Run Time: 10:59 Method: 6020A
File ID: NI.051217.105918 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.750	0.699	ug/L	93.2	70 - 130		
Lead		0.200	0.169	ug/L	84.7	70 - 130		
Silver		0.400	0.380	ug/L	94.9	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5294046
Report generated 05/15/2017 13:59

Login Number: L17050688 Run Date: 05/12/2017 Sample ID: WG614119-16
Instrument ID: ICP-MS2 Run Time: 12:22 Method: 6020A
File ID: NI.051217.122253 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG614072 Cal ID: ICP-MS - 12-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Barium		0.750	0.675	ug/L	90.0	70 - 130		
Lead		0.200	0.151	ug/L	75.6	70 - 130		
Silver		0.400	0.367	ug/L	91.7	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5294046
Report generated 05/15/2017 13:59

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17050688 **Workgroup (AAB#):** WG614072
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG614119-08 **File ID:** NI.051217.110223 **Units:** ug/L
Sol. AB : WG614119-09 **File ID:** NI.051217.110529 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Barium	NS	0.0437	NS	100	99.3	99.3	
Lead	NS	0.00520	NS	100	100	100	
Silver	NS	-0.000200	NS	100	85.7	85.7	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).
+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5292398
Report generated 05/12/2017 14:21

Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L17050688 **Analytical Method:** 6020
Analytical Workgroup: WG614072 **Matrix:** 1
Instrument: ICP-MS2 **Analyst:** JYH
ICAL Date: 12-MAY-2017 10:40

			BISMUTH	GERMANIUM	INDIUM
Sample	Type	Run Date	% Rec	% Rec	% Rec
L17050615-10	SAMP	12-MAY-2017 11:30	98.013	100.452	97.724
L17050688-01	SAMP	12-MAY-2017 12:04	90.619	95.961	95.26
WG614007-02	BLANK	12-MAY-2017 11:24	98.605	102.166	99.815
WG614007-03	LCS	12-MAY-2017 11:27	97.376	100.972	97.551
WG614072-01	PSPK	12-MAY-2017 12:07	91.646	96.79	95.299
WG614072-02	SERIAL	12-MAY-2017 12:10	90.82	93.501	91.536
WG614072-03	SERIAL	12-MAY-2017 11:33	96.448	99.641	96.744
WG614119-05	ICV	12-MAY-2017 10:53	95.675	97.755	96.668
WG614119-06	ICB	12-MAY-2017 10:56	96.373	98.003	96.062
WG614119-07	LLICV	12-MAY-2017 10:59	95.538	95.364	93.765
WG614119-08	ICS	12-MAY-2017 11:02	95.119	100.268	96.56
WG614119-09	ICS	12-MAY-2017 11:05	97.912	102.113	100.443
WG614119-10	CCV	12-MAY-2017 11:08	98.236	102.2	100.579
WG614119-11	CCB	12-MAY-2017 11:11	98.317	101.441	99.309
WG614119-12	CCV	12-MAY-2017 11:42	95.116	99.994	96.168
WG614119-13	CCB	12-MAY-2017 11:45	95.495	99.705	95.97
WG614119-14	CCV	12-MAY-2017 12:16	95.695	100.705	97.785
WG614119-15	CCB	12-MAY-2017 12:19	95.667	99.96	96.586
WG614119-16	LLCCV	12-MAY-2017 12:22	95.376	98.034	95.149

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: 5292394
Report generated: 05/12/2017 14:21

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17050688 **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: 5292393
Report generated: 05/12/2017 14:21

2.4 General Chemistry Data

2.4.1 Hexavalent Chromium Data

2.4.1.1 Summary Data

Microbac

Lab Report #: L17050688
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050688-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6438-GRAB	**Prep Method:**	7196A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	7196A	**Cal Date:**	03/10/2017 13:59
Workgroup #:	WG613920	**Analyst:**	ADG	**Run Date:**	05/11/2017 14:20
Collect Date:	05/10/2017 15:00	**Dilution:**	1	**File ID:**	00.1705111420-07
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.

Generated at May 24, 2017 15:44

Microbac

Lab Report #: L17050688
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: 11-MAY-2017
Analyst: ADG
Analyst: NA
Method: CR-6
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG613920

Calibration/Linearity	05/11/17
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:
12-MAY-2017

Secondary Reviewer:
18-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-18-2017 15:26:13

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 7196A AAB#: WG613920

Login Number: L17050688

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-SP650-6438-GRAB	01	05/10/17					05/11/2017	1	1		05/11/17	1	1	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5300218
Report generated 05/18/2017 13:55

METHOD BLANK SUMMARY

Login Number:	L17050688	**Work Group:**	WG613920
Blank File ID:	00.1705111420-03	**Blank Sample ID:**	WG613920-01
Prep Date:	05/11/17 14:20	**Instrument ID:**	UV-2600
Analyzed Date:	05/11/17 14:20	**Method:**	7196A
Analyst:	ADG		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG613920-02	00.1705111420-04	05/11/17 14:20	
LCS2	WG613920-03	00.1705111420-05	05/11/17 14:20	
LH18/24-SP650-6438-GRAB	L17050688-01	00.1705111420-07	05/11/17 14:20	
DUP	WG613920-05	00.1705111420-08	05/11/17 14:20	

Report Name: BLANK_SUMMARY
PDF File ID: 5300219
Report generated 05/18/2017 13:55

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050688 Prep Date: 05/11/17 14:20 Sample ID: WG613920-01
Instrument ID: UV-2600 Run Date: 05/11/17 14:20 Prep Method: 7196A
File ID: 00.1705111420-03 Analyst: ADG Method: 7196A
Workgroup (AAB#): WG613920 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-11-MAY-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: 5300220
18-MAY-2017 13:55

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050688 Analyst: ADG Prep Method: 7196A
Instrument ID: UV-2600 Matrix: Water Method: 7196A
Workgroup (AAB#): WG613920 Units: mg/L
QC Key: DOD4 Lot #: STD80875

Sample ID: WG613920-02 LCS File ID: 00.1705111420-04 Run Date: 05/11/2017 14:20
Sample ID: WG613920-03 LCS2 File ID: 00.1705111420-05 Run Date: 05/11/2017 14:20

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chromium, Hexavalent	0.100	0.103	103	0.100	0.104	104	0.482	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5300221
Report generated: 05/18/2017 13:55

2.4.1.3 Raw Data

WG 1105850 00855587

Curves

Parameter: Cole-Low

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: JK 80872, 80873

Concentration: 50mg/L, 5mg/L

Recipe for preparation of curve standards found in:
SOP: K2180 Revision: 22 Page: 12

Second Source Stock: 30875 (concentration: 2mg/L)

Daily Preparation: 10(2)/100

concentration = 0.01

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
0.2	100	5cm	540	0.808
0.1	100	5cm	540	0.408
0.05	100	5cm	540	0.206
0.02	100	5cm	540	0.084
0.01	100	5cm	540	0.052
0.00	100	5cm	540	0.003
2nd source 0.1	100	5cm	540	0.418

Analyst: Jamie Greene Date/Time: 3/01/17 1355

DCN#124473

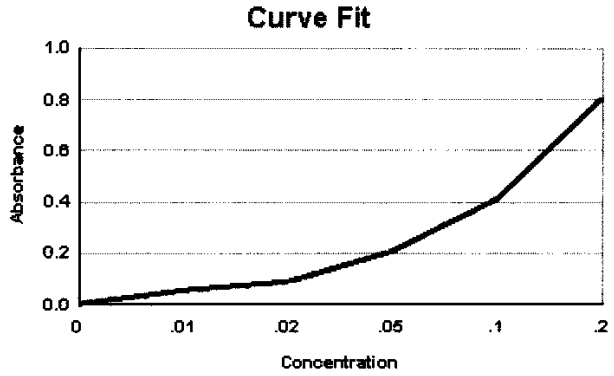
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG605850
Analytical Method:3500CR
Instrument ID:UV-2600

Analyst:ADG
Initial Calibration Date:03/10/2017

Analyte: CHROMIUM, HEXAVALENT
Number of Points: 6
Slope: 4.01048
Y-Intercept: 0.00616935
Coef. Of Correlation (R^2): 0.999893
Coef. Of Correlation (R): 0.999947

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00300	0.00	0.00	0.00616935
0.0100	0.0520	0.000100	0.000520	0.0462742
0.0200	0.0840	0.000400	0.00168	0.0863790
0.0500	0.206	0.00250	0.0103	0.206694
0.100	0.408	0.0100	0.0408	0.407218
0.200	0.808	0.0400	0.162	0.808266



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 03/10/2017 15:28

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG605850
File ID: 00.1703101359-07
CCV ID: WG605850-07
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 03/10/2017
Run Time: 13:59
Analyst: ADG
Cal ID: UV-260 - 10-MAR-17 13:59:06

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.1	0.103	4.18	3.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 03/10/2017 15:29

[redacted]

WORKGROUP: WG613920

CHROMIUM (6)

(cr6)

Standard Methods 3500 Cr-D (18th, 19th), 3500Cr-B(20th) SPEC: UV-2600

SOP K2186 Rev. # 22 SW846 7196A Curve ID: 3-10-17

SOP OVAP K3500-Cr Rev. #____ CCV: 80873 LCS: 80875 Spike: 80874 RGT 44113

Matrix: Liquid (mg/L) Daily dilution: 1(5)/100 Daily dilution: 10(2)/200 Daily dilution: 6.2(50)/100 RGT 18997

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			~~5~~	
CCV: mg/L(5 cm)	100	✓		5	0.214
Blank/CCB:	100	✓		5	0.000
LCS: ppm	100	✓		5	0.420
LCSDUP: ppm	100	✓		5	0.422
687-01	100	✓		5	0.004
688-01	100	✓		5	0.005
	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: 687-01	100	✓		5	0.002
MS: ( ) 687-01	100	✓		5	0.006
MSD: ( )	100				
CCV: (1 cm)	100				
CCV: (5 cm)	100	✓		5	0.213
CCB:	100	✓		5	0.000

Analyst: April Greene Date / Time: 5/11/17 1@1420

SW846 7196 (Dup and/or MS every 10 samples) **SM3500 Cr (Dup and MS/MSD every 20 samples)**

DCN#125807

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG613920
Analyte: CHROMIUM, HEXAVALENT

Analyst: ADG
Date: 05/11/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG613920-01	100	100	0	4.010	0.006169	-0.0015383	-0.0015383	1	mg/L
WG613920-02	100	100	0.420	4.010	0.006169	0.10319	0.10319	1	mg/L
WG613920-03	100	100	0.422	4.010	0.006169	0.10369	0.10369	1	mg/L
L17050687-01	100	100	0.00400	4.010	0.006169	-0.00054092	ND	1	mg/L
WG613920-04	100	100	0.00400	4.010	0.006169	-0.00054092	-0.00054092	1	mg/L
L17050688-01	100	100	0.00500	4.010	0.006169	-0.00029157	ND	1	mg/L
WG613920-05	100	100	0.00200	4.010	0.006169	-0.0010396	-0.0010396	1	mg/L
WG613920-06	100	100	0.00600	4.010	0.006169	-0.000042228	-0.000042228	1	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 05/12/2017 10:11

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG614071
File ID: 00.1705111420-01
CCV ID: WG614071-01
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 05/11/2017
Run Time: 14:20
Analyst: ADG
Cal ID: UV-260 - 11-MAY-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0518	4.28	3.6	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/12/2017 10:10

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG614071
File ID: 00.1705111420-10
CCV ID: WG614071-03
Units: mg/L
Analyte: CHROMIUM, HEXAVALENT

Instrument ID: UV-2600
Run Date: 05/11/2017
Run Time: 14:20
Analyst: ADG
Cal ID: UV-260 - 11-MAY-17

Analyte	Expected	Found	RF	%D	Q
Chromium, Hexavalent	.05	0.0516	4.26	3.2	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/12/2017 10:10

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
May 24, 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
May 24, 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
May 24, 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-SP650-6438-Grab	Water	05/10/17 / 15:00		3	X										HCL	
LH18/24-SP650-6438-Grab	Water	05/10/17 / 15:00		4			X	X	X						NONE	
LH18/24-SP650-6438-Grab	Water	05/10/17 / 15:00		1		X									HNO3	
Trip Blank	Water	05/10/17		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	05/10/17	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: 05/11/2017 09:41
By: CARA STRICKLER 221000100747

Cara Strickler

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC

COOLER TEMP >6° C LOG

Cooler ID 747

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

CWD 5/11/17

pH Exceptions

pH Lot # HC193124

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

CWD 5/11/17

PRESERVATIVE EXCEPTIONS

✓ NONE

__ AS NOTED

CWD 5/11/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17050688
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 22-MAY-2017

Samplenum	Container ID	Products
L17050688-01	907685	

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	11-MAY-2017 10:11	CLS		
2	ANALYZ	V1	ORG4	11-MAY-2017 10:47	HRF	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	11-MAY-2017 10:11	CLS		
2	ANALYZ	V1	ORG4	11-MAY-2017 10:47	HRF	CLS	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	11-MAY-2017 10:11	CLS		
2	ANALYZ	V1	ORG4	11-MAY-2017 10:47	HRF	CLS	

Samplenum	Container ID	Products
L17050688-01	907686	

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	11-MAY-2017 10:11	CLS		
2	PREP	W1	EXT	11-MAY-2017 15:23	CPD	BRG	

Comments:Products cancelled.

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		11-MAY-2017 10:11	CLS		

Samplenum	Container ID	Products
L17050688-01	907687	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	11-MAY-2017 10:11	CLS		
2	ANALYZ	W1	SEM	11-MAY-2017 10:42	JWR	BRG	
3	STORE	SEM	A1	16-MAY-2017 15:12	CLS	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: L17050688
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 22-MAY-2017

Samplenum	Container ID	Products
L17050688-01	907688	AG-MS BA-MS PB-MS SE-AX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	11-MAY-2017 10:11	CLS		
2	PREP	W1	DIG	11-MAY-2017 10:51	ERP	BRG	
3	ANALYZ*	DIG	METALS	12-MAY-2017 10:24	JYH	ERP	
4	STORE	DIG	A1	12-MAY-2017 12:34	BRG	ERP	

***Sample extract/digestate/leachate**

Samplenum	Container ID	Products
L17050688-01	907689	826-SPE 827-DIOXANE CR-6

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	11-MAY-2017 10:11	CLS		
2	ANALYZ	W1	WET	11-MAY-2017 10:20	ADG	CLS	
3	STORE	DIG	A1	16-MAY-2017 08:38	CLS	ADG	

Samplenum	Container ID	Products
L17050688-02	907690	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	11-MAY-2017 10:11	CLS		
2	ANALYZ	V1	ORG4	11-MAY-2017 10:47	HRF	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	11-MAY-2017 10:11	CLS		
2	ANALYZ	V1	ORG4	11-MAY-2017 10:47	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: L17050768

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 May 24 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 #: L17050768
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?
00113659	I	4.0		J4616881604	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 #: L17050768
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-SP650-6439-GRAB	L17050768-01	05/11/2017 15:00	05/12/2017 09:49

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:**	L17050768
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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	2017-05-24 14:56:16

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050768
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17050768
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17050768
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17050768
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17050768
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17050768
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG614315	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-05-18 17:59:30

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050768
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG614315	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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					
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:**	L17050768
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG614315	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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:**	L17050768
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG614315	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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)			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:**	L17050768
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG614315	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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)	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:**	L17050768
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG614315	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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:**	L17050768
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614093	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-05-18 17:58:36

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050768
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614093	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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					
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:**	L17050768
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614093	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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:**	L17050768
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614093	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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)			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:**	L17050768
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614093	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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)	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:**	L17050768
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614093	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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:**	L17050768
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG614084	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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
Deanna Hesson	Deanna Hesson	Conventional Lab Supervisor	2017-05-18 18:00:00

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050768
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG614084	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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					
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Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
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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:**	L17050768
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG614084	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 00:00:00		

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Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
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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				
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Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17050768
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG614084	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 00:00:00		

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Were all points generated between the lowest and highest standard used to calculate the curve?	X				
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Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
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Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)			X		
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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:**	L17050768
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG614084	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 00:00:00		

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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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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:**	L17050768
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG614084	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-18 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 #: L17050768
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050768-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6439-GRAB	**Prep Method:**	6850	**Prep Date:**	05/19/2017 10:50
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG614890	**Analyst:**	JWR	**Run Date:**	05/19/2017 20:02
Collect Date:	05/11/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39661
Sample Tag:	01	**Units:**	ug/L		

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

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17050768
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050768-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM
Client ID:	LH18/24-SP650-6439-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	05/16/2017 08:16
Workgroup #:	WG614315	**Analyst:**	DCM	**Run Date:**	05/16/2017 09:31
Collect Date:	05/11/2017 15:00	**Dilution:**	4	**File ID:**	SC170516001.074
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	8.83		0.800	0.400	0.200

Certificate of Analysis

Sample #:	L17050768-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6439-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	03/09/2017 11:25
Workgroup #:	WG614093	**Analyst:**	DLP	**Run Date:**	05/12/2017 14:30
Collect Date:	05/11/2017 15:00	**Dilution:**	5	**File ID:**	00.1705121430-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	2.14		0.500	0.250	0.125

Certificate of Analysis

Sample #:	L17050768-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6439-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG614084	**Analyst:**	ADG	**Run Date:**	05/13/2017 02:50
Collect Date:	05/11/2017 15:00	**Dilution:**	2	**File ID:**	TC05122017.059
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	58.2		4.00	2.00	1.00

2.1 General Chromatography Data

2.1.1 LC/MS Data (6850)

2.1.1.1 Summary Data

Microbac

Lab Report #: L17050768
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050768-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6439-GRAB	**Prep Method:**	6850	**Prep Date:**	05/19/2017 10:50
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG614890	**Analyst:**	JWR	**Run Date:**	05/19/2017 20:02
Collect Date:	05/11/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39661
Sample Tag:	01	**Units:**	ug/L		

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

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17050768
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)

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

Comments: ICAL WG611288 : Alternate Source STD80234
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39494	WG611288-01 CCB	1	1		04/24/17 13:27
2	1LM.LM39495	WG611288-02 STD (0.1 ug/L)	1	1	STD80232	04/24/17 13:46
3	1LM.LM39496	WG611288-03 STD (0.2 ug/L)	1	1	STD80232	04/24/17 14:05
4	1LM.LM39497	WG611288-04 STD (0.5 ug/L)	1	1	STD80232	04/24/17 14:24
5	1LM.LM39498	WG611288-05 STD (1.0 ug/L)	1	1	STD80232	04/24/17 14:43
6	1LM.LM39499	WG611288-06 STD (2.0 ug/L)	1	1	STD80232	04/24/17 15:02
7	1LM.LM39500	WG611288-07 STD (5.0 ug/L)	1	1	STD80232	04/24/17 15:21
8	1LM.LM39501	WG611288-08 STD (10 ug/L)	1	1	STD80232	04/24/17 15:40
9	1LM.LM39502	WG611288-09 SSCV (1.0 ug/L)	1	1	STD80234	04/24/17 15:59
10	1LM.LM39503	WG611330-01 CCB	1	1		04/24/17 16:18
11	1LM.LM39504	WG611330-02 CCV (1.0ug/L)	1	1	STD80232	04/24/17 16:37
12	1LM.LM39505	WG611327-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 16:56
13	1LM.LM39506	WG611327-01 MCT (0.2ug/L)	1	1	STD80234	04/24/17 17:14
14	1LM.LM39507	WG611327-02 BLANK	1	1		04/24/17 17:34
15	1LM.LM39508	WG611327-03 LCS (0.2ug/L)	1	1	STD80234	04/24/17 17:52
16	1LM.LM39509	L17040713-06 RS	1	1		04/24/17 18:11
17	1LM.LM39510	L17040713-07 MS	1	1	STD80234	04/24/17 18:30
18	1LM.LM39511	L17040713-08 MSD	1	1	STD80234	04/24/17 18:49
19	1LM.LM39512	L17040713-01	1	1		04/24/17 19:08
20	1LM.LM39513	L17040713-02	1	1		04/24/17 19:27
21	1LM.LM39514	L17040713-03	1	1		04/24/17 19:46
22	1LM.LM39515	L17040713-04	1	1		04/24/17 20:05
23	1LM.LM39516	WG611330-03 CCV (1.0ug/L)	1	1	STD80232	04/24/17 20:24
24	1LM.LM39517	WG611327-08 MRL (0.2ug/L)	1	1	STD80232	04/24/17 20:43
25	1LM.LM39518	WG611330-04 CCB	1	1		04/24/17 21:02
26	1LM.LM39519	L17040713-05	1	1		04/24/17 21:21
27	1LM.LM39520	L17040713-09	1	1		04/24/17 21:40
28	1LM.LM39521	L17040713-10	1	1		04/24/17 21:59
29	1LM.LM39522	L17040713-11	1	1		04/24/17 22:17
30	1LM.LM39523	L17040713-12	1	1		04/24/17 22:36
31	1LM.LM39524	L17040713-13	1	1		04/24/17 22:55
32	1LM.LM39525	WG611330-05 CCV (1.0ug/L)	1	1	STD80232	04/24/17 23:14
33	1LM.LM39526	WG611327-09 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:33

Page: 1 Approved: 25-APR-17

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)

CCV STD: STD80232 LCS STD: STD80234 STD80234

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM39527	WG611328-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:52
35	1LM.LM39528	WG611330-06 CCB	1	1		04/25/17 00:11
36	1LM.LM39529	WG611328-01 MCT (0.2ug/L)	1	1	STD80234	04/25/17 00:30
37	1LM.LM39530	WG611328-02 BLANK	1	1		04/25/17 00:49
38	1LM.LM39531	WG611328-03 LCS (0.2ug/L)	1	1	STD80234	04/25/17 01:08
39	1LM.LM39532	L17040841-08 RS	1	1		04/25/17 01:27
40	1LM.LM39533	L17040841-09 MS	1	1	STD80234	04/25/17 01:46
41	1LM.LM39534	L17040841-10 MSD	1	1	STD80234	04/25/17 02:05
42	1LM.LM39535	L17040841-01	1	1		04/25/17 02:23
43	1LM.LM39536	L17040841-02	1	1		04/25/17 02:42
44	1LM.LM39537	L17040841-03	1	1		04/25/17 03:01
45	1LM.LM39538	L17040841-04	1	1		04/25/17 03:20
46	1LM.LM39539	WG611330-07 CCV (1.0ug/L)	1	1	STD80232	04/25/17 03:39
47	1LM.LM39540	WG611328-08 MRL (0.2ug/L)	1	1	STD80232	04/25/17 03:58
48	1LM.LM39541	WG611330-08 CCB	1	1		04/25/17 04:17
49	1LM.LM39542	L17040841-05	1	1		04/25/17 04:36
50	1LM.LM39543	L17040841-06	1	1		04/25/17 04:55
51	1LM.LM39544	L17040841-07	1	1		04/25/17 05:14
52	1LM.LM39545	L17040841-11	1	1		04/25/17 05:33
53	1LM.LM39546	L17040841-12	1	1		04/25/17 05:52
54	1LM.LM39547	L17040841-13	1	1		04/25/17 06:11
55	1LM.LM39548	WG611330-09 CCV (1.0ug/L)	1	1	STD80232	04/25/17 06:30
56	1LM.LM39549	WG611328-09 MRL (0.2ug/L)	1	1	STD80232	04/25/17 06:49
57	1LM.LM39550	WG611330-10 CCB	1	1		04/25/17 07:07

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 25-APR-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 051917_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 WG614890 (waters)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39639	WG614892-01 CCB	1	1		05/19/17 13:05
2	1LM.LM39640	WG614892-02 CCV (1.0ug/L)	1	1	STD80232	05/19/17 13:24
3	1LM.LM39641	WG614890-07 MRL (0.2ug/L)	1	1	STD80232	05/19/17 13:43
4	1LM.LM39642	WG614890-01 MCT (0.2ug/L)	1	1	STD80234	05/19/17 14:02
5	1LM.LM39643	WG614890-02 BLANK	1	1		05/19/17 14:21
6	1LM.LM39644	WG614890-03 LCS (0.2ug/L)	1	1	STD80234	05/19/17 14:40
7	1LM.LM39645	L17050772-02 RS	1	1		05/19/17 14:59
8	1LM.LM39646	L17050772-04 MS	1	1	STD80234	05/19/17 15:18
9	1LM.LM39647	L17050772-06 MSD	1	1	STD80234	05/19/17 15:37
10	1LM.LM39648	L17050772-01	1	1		05/19/17 15:56
11	1LM.LM39649	L17050772-08	1	1		05/19/17 16:15
12	1LM.LM39650	L17050772-10	1	1		05/19/17 16:34
13	1LM.LM39651	L17050988-01	1	1		05/19/17 16:53
14	1LM.LM39652	WG614892-03 CCV (1.0ug/L)	1	1	STD80232	05/19/17 17:12
15	1LM.LM39653	WG614890-08 MRL (0.2ug/L)	1	1	STD80232	05/19/17 17:31
16	1LM.LM39654	WG614892-04 CCB	1	1		05/19/17 17:49
17	1LM.LM39655	L17050988-03	1	1		05/19/17 18:08
18	1LM.LM39656	L17050988-03 (RR 5x) (NR)	1	5		05/19/17 18:27
19	1LM.LM39657	L17050988-05	1	1		05/19/17 18:46
20	1LM.LM39658	L17050988-05 (RR 5x) (NR)	1	5		05/19/17 19:05
21	1LM.LM39659	L17050988-07	1	1		05/19/17 19:24
22	1LM.LM39660	L17050988-07 (RR 5x) (NR)	1	5		05/19/17 19:43
23	1LM.LM39661	L17050768-01	1	1		05/19/17 20:02
24	1LM.LM39662	L17051050-01	1	1		05/19/17 20:21
25	1LM.LM39663	WG614892-05 CCV (1.0ug/L)	1	1	STD80232	05/19/17 20:40
26	1LM.LM39664	WG614890-09 MRL (0.2ug/L)	1	1	STD80232	05/19/17 20:59
27	1LM.LM39665	WG614892-06 CCB	1	1		05/19/17 21:18

Comments

Seq.	Rerun	Dil.	Reason	Analytes
18				
	L17050988-03 (RR 5x) (NR) : the result for this sample at this dilution is not needed			
20				

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 051917_JWR.TXT

Analyst1: JWR 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: Analytical WG614890 (waters)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)

CCV STD: STD80232 LCS STD: STD80234 STD80234

Comments

Seq.	Rerun	Dil.	Reason	Analytes
	L17050988-05 (RR 5x) (NR) : the result for this sample at this dilution is not needed			
22				
	L17050988-07 (RR 5x) (NR) : the result for this sample at this dilution is not needed			

Page: 2 Approved: 23-MAY-17

Microbac Laboratories Inc.

Data Checklist

Date: 24-APR-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG611288
Runlog ID: 81726
Analytical Workgroups: L17040713, L17040841

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	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:
25-APR-2017
John Richards

Secondary Reviewer:
25-APR-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: APR-25-2017 14:21:32

Microbac Laboratories Inc.

Data Checklist

Date: 19-MAY-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 82337
Analytical Workgroups: L17050768, L17050772, L17050988, L17051050

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	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	ECL

Primary Reviewer:
23-MAY-2017
John Richards

Secondary Reviewer:
23-MAY-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-23-2017 14:46:49

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG614890

Login Number: L17050768

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-SP650-6439-GRAB	01	05/11/17					05/19/2017	7.8	28		05/19/17	.4	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5306340
Report generated 05/24/2017 08:28

METHOD BLANK SUMMARY

Login Number: L17050768
Work Group: WG614890
Blank File ID: 1LM.LM39643
Blank Sample ID: WG614890-02
Prep Date: 05/19/17 10:50
Instrument ID: LCMS1
Analyzed Date: 05/19/17 14:21
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG614890-07	1LM.LM39641	05/19/17 13:43	01
MCT	WG614890-01	1LM.LM39642	05/19/17 14:02	01
LCS	WG614890-03	1LM.LM39644	05/19/17 14:40	01
QCMRL	WG614890-08	1LM.LM39653	05/19/17 17:31	01
LH18/24-SP650-6439-GRAB	L17050768-01	1LM.LM39661	05/19/17 20:02	01
QCMRL	WG614890-09	1LM.LM39664	05/19/17 20:59	01

Report Name: BLANK_SUMMARY
PDF File ID: 5306341
Report generated 05/24/2017 08:28

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050768 Prep Date: 05/19/17 10:50 Sample ID: WG614890-02
Instrument ID: LCMS1 Run Date: 05/19/17 14:21 Prep Method: 6850
File ID: 1LM.LM39643 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-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: 5306342
24-MAY-2017 08:28

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050768 **Run Date:** 05/19/2017 **Sample ID:** WG614890-03
Instrument ID: LCMS1 **Run Time:** 14:40 **Prep Method:** 6850
File ID: 1LM.LM39644 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG614890 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD80234 **Cal ID:** LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.202	101	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5306343
Report generated: 05/24/2017 08:28

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17050768
Analytical Method: 6850
ICAL Workgroup: WG611288

Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.286	4.98	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: 5307579
Report generated 05/24/2017 08:28

Login Number: L17050768
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-02			WG611288-03			WG611288-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	21000.0000	1.332	0.200	38200.0000	1.222	0.500	104000.000	1.335

INT_CAL - Modified 03/06/2008
PDF File ID: 5307579
Report generated 05/24/2017 08:28

Login Number: L17050768
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-05			WG611288-06			WG611288-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	206000.000	1.288	2.00	412000.000	1.312	5.00	955000.000	1.270

INT_CAL - Modified 03/06/2008
PDF File ID: 5307579
Report generated 05/24/2017 08:28

Login Number: L17050768
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-08		
	CONC	RESP	RF
Perchlorate	10.0	1860000.00	1.244

INT_CAL - Modified 03/06/2008
PDF File ID: 5307579
Report generated 05/24/2017 08:28

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17050768 Run Date: 04/24/2017 Sample ID: WG611288-09
Instrument ID: LCMS1 Run Time: 15:59 Method: 6850
File ID: 1LM.LM39502 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG611288 Cal ID: LCMS1 - 24-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.977	ug/L	1.24	2.30	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5307580
Report generated 05/24/2017 08:29

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050768	Run Date:	05/19/2017	Sample ID:	WG614892-01
Instrument ID:	LCMS1	Run Time:	13:05	Method:	6850
File ID:	1LM.LM39639	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG614890	Cal ID:	LCMS1 - 24-APR-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: 5306346
Report generated 05/24/2017 08:29

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050768	Run Date:	05/19/2017	Sample ID:	WG614892-04
Instrument ID:	LCMS1	Run Time:	17:49	Method:	6850
File ID:	1LM.LM39654	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG614890	Cal ID:	LCMS1 - 24-APR-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: 5306346
Report generated 05/24/2017 08:29

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17050768	Run Date:	05/19/2017	Sample ID:	WG614892-06
Instrument ID:	LCMS1	Run Time:	21:18	Method:	6850
File ID:	1LM.LM39665	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG614890	Cal ID:	LCMS1 - 24-APR-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: 5306346
Report generated 05/24/2017 08:29

Login Number: L17050768 Run Date: 05/19/2017 Sample ID: WG614892-02
Instrument ID: LCMS1 Run Time: 13:24 Method: 6850
File ID: 1LM.LM39640 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG614890 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.07	ug/L	1.36	7.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5306345
Report generated 05/24/2017 08:29

Login Number: L17050768 Run Date: 05/19/2017 Sample ID: WG614892-03
Instrument ID: LCMS1 Run Time: 17:12 Method: 6850
File ID: 1LM.LM39652 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG614890 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.06	ug/L	1.35	6.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5306345
Report generated 05/24/2017 08:29

Login Number: L17050768 Run Date: 05/19/2017 Sample ID: WG614892-05
Instrument ID: LCMS1 Run Time: 20:40 Method: 6850
File ID: 1LM.LM39663 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG614890 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.06	ug/L	1.34	6.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5306345
Report generated 05/24/2017 08:29

Login Number: L17050768 Run Date: 05/19/2017 Sample ID: WG614890-07
Instrument ID: LCMS1 Run Time: 13:43 Prep Method: 6850
File ID: 1LM.LM39641 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.211	106	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5306344
Report generated 05/24/2017 08:28

Login Number: L17050768 Run Date: 05/19/2017 Sample ID: WG614890-08
Instrument ID: LCMS1 Run Time: 17:31 Prep Method: 6850
File ID: 1LM.LM39653 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.209	105	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5306344
Report generated 05/24/2017 08:28

Login Number: L17050768 Run Date: 05/19/2017 Sample ID: WG614890-09
Instrument ID: LCMS1 Run Time: 20:59 Prep Method: 6850
File ID: 1LM.LM39664 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.208	104	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5306344
Report generated 05/24/2017 08:28

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

Login Number: L17050768
Instrument ID: LCMS1
Workgroup (AAB#): WG614890

ICAL CCV Number: WG611288-05
CAL ID: LCMS1-24-APR-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG611288	NA	NA	777000
Upper Limit	NA	NA	1165500
Lower Limit	NA	NA	388500
L17050768-01	1.00	01	733000
WG614890-02	1.00	01	735000
WG614890-03	1.00	01	725000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5306347
Report generated 05/24/2017 08:29

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**	6850	**Samplenum:**	L17050768-01
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39661
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 20:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	2930	1250	2.34	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG611288-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39495
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 13:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21000	6820	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG611288-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39496
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 14:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38200	13500	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG611288-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39497
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 14:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	104000	33400	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG611288-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39498
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 14:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	65300	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG611288-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39499
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 15:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	412000	130000	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG611288-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39500
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 15:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	955000	298000	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG611288-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39501
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 15:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1860000	603000	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG611288-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39502
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 15:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	65000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**	6850	**Samplenum:**	WG614890-01
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39642
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 14:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36600	11700	3.13	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**	6850	**Samplenum:**	WG614890-02
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39643
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 14:21	**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 #:	L17050768	**Prep Method:**	6850	**Samplenum:**	WG614890-03
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39644
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 14:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38400	12100	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**	6850	**Samplenum:**	WG614890-07
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39641
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 13:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40500	13800	2.93	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**	6850	**Samplenum:**	WG614890-08
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39653
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 17:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	46100	14400	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**	6850	**Samplenum:**	WG614890-09
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39664
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 20:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	49300	16900	2.92	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG614892-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39639
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 13:05	**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 #:	L17050768	**Prep Method:**		**Samplenum:**	WG614892-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39640
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 13:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	188000	60200	3.12	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG614892-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39652
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 17:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	217000	69700	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG614892-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39654
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 17:49	**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 #:	L17050768	**Prep Method:**		**Samplenum:**	WG614892-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39663
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 20:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	227000	73300	3.10	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17050768	**Prep Method:**		**Samplenum:**	WG614892-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39665
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 21:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	429	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 #: L17050768
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050768-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM
Client ID:	LH18/24-SP650-6439-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	05/16/2017 08:16
Workgroup #:	WG614315	**Analyst:**	DCM	**Run Date:**	05/16/2017 09:31
Collect Date:	05/11/2017 15:00	**Dilution:**	4	**File ID:**	SC170516001.074
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	8.83		0.800	0.400	0.200

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: 16-MAY-2017
Analyst: DCM
Analyst: NA
Method: NH3
Instrument: SC
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG614313 WG614315

Calibration/Linearity	05-16-2017
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:
17-MAY-2017

Secondary Reviewer:
18-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-18-2017 13:05:43

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1 **AAB#:** WG614315

Login Number: L17050768

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-SP650-6439-GRAB	01	05/11/17					05/16/2017	4.8	28		05/16/17	4.8	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5298321
Report generated 05/17/2017 12:56

METHOD BLANK SUMMARY

Login Number:	L17050768	**Work Group:**	WG614315
Blank File ID:	SC170516001.035	**Blank Sample ID:**	WG614315-01
Prep Date:	05/16/17 08:41	**Instrument ID:**	SMARTCHEM
Analyzed Date:	05/16/17 08:41	**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	WG614315-02	SC170516001.036	05/16/17 08:43	01
DUP	WG614315-04	SC170516001.062	05/16/17 09:06	DL01
LH18/24-SP650-6439-GRAB	L17050768-01	SC170516001.074	05/16/17 09:31	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5298322
Report generated 05/17/2017 12:56

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050768 Prep Date: 05/16/17 08:41 Sample ID: WG614315-01
Instrument ID: SMARTCHEM Run Date: 05/16/17 08:41 Prep Method: 350.1
File ID: SC170516001.035 Analyst: DCM Method: 350.1
Workgroup (AAB#): WG614315 Matrix: Water Units: mg/L
Contract #: Cal ID: SMARTC-16-MAY-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: 5298323
17-MAY-2017 12:56

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050768 **Run Date:** 05/16/2017 **Sample ID:** WG614315-02
Instrument ID: SMARTCHEM **Run Time:** 08:43 **Prep Method:** 350.1
File ID: SC170516001.036 **Analyst:** DCM **Method:** 350.1
Workgroup (AAB#): WG614315 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80299 **Cal ID:** SMARTC-16-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.96	97.9	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5298324
Report generated: 05/17/2017 12:56

2.2 General Chemistry Data

2.2.2 Orthophosphate Data

2.2.2.1 Summary Data

Microbac

Lab Report #: L17050768
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050768-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6439-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	03/09/2017 11:25
Workgroup #:	WG614093	**Analyst:**	DLP	**Run Date:**	05/12/2017 14:30
Collect Date:	05/11/2017 15:00	**Dilution:**	5	**File ID:**	00.1705121430-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	2.14		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: 12-MAY-2017
Analyst: DLP
Analyst: NA
Method: PO4
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG614093

Calibration/Linearity	03-09-17
Second Source Check	
ICV/CCV (std)	X
ICB/CCB	X
Blank	X
LCS/LCS Dup	X
MS/MSD	X
Duplicate	X
Upload Results	
Client Forms	
QC Violation Sheet	
Case Narratives	
Signed Raw Data	X
STD/LCS on benchsheet	X
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	
Primary Reviewer	DLP
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
12-MAY-2017

Secondary Reviewer:
18-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-18-2017 14:04:21

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.2 **AAB#:** WG614093

Login Number: L17050768

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-SP650-6439-GRAB	01	05/11/17					05/12/2017	1	2		05/12/17	1	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5300222
Report generated 05/18/2017 14:02

METHOD BLANK SUMMARY

Login Number:	L17050768	**Work Group:**	WG614093
Blank File ID:	00.1705121430-03	**Blank Sample ID:**	WG614093-01
Prep Date:	05/12/17 14:30	**Instrument ID:**	UV-2600
Analyzed Date:	05/12/17 14:30	**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	WG614093-02	00.1705121430-04	05/12/17 14:30	
LCS2	WG614093-03	00.1705121430-05	05/12/17 14:30	
LH18/24-SP650-6439-GRAB	L17050768-01	00.1705121430-06	05/12/17 14:30	
DUP	WG614093-05	00.1705121430-07	05/12/17 14:30	

Report Name: BLANK_SUMMARY
PDF File ID: 5300223
Report generated 05/18/2017 14:02

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17050768 Prep Date: 05/12/17 14:30 Sample ID: WG614093-01
Instrument ID: UV-2600 Run Date: 05/12/17 14:30 Prep Method: 365.2
File ID: 00.1705121430-03 Analyst: DLP Method: 365.2
Workgroup (AAB#): WG614093 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-11-MAY-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: 5300224
18-MAY-2017 14:02

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050768 Analyst: DLP Prep Method: 365.2
Instrument ID: UV-2600 Matrix: Water Method: 365.2
Workgroup (AAB#): WG614093 Units: mg/L
QC Key: DOD4 Lot #: STD81764

Sample ID: WG614093-02 LCS File ID: 00.1705121430-04 Run Date: 05/12/2017 14:30
Sample ID: WG614093-03 LCS2 File ID: 00.1705121430-05 Run Date: 05/12/2017 14:30

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Orthophosphate	1.00	1.01	101	1.00	1.04	104	2.96	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5300225
Report generated: 05/18/2017 14:02

2.2.2.3 Raw Data

UG 0057657

Curves

Parameter: PO4

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: Std 79640

Concentration: 1000mg/L

Recipe for preparation of curve standards found in:

SOP: 3165 Revision: 17 Page: 89

Second Source Stock: ~~79554~~ Std 80857 Ag 3/9/17 (concentration: ~~1000~~ 100)

Daily Preparation: Std 80857
10(ml) | 100

concentration = =1.0

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
1.0	50	1cm	880	0.632
0.7				0.438
0.5				0.317
0.2				0.129
0.1				0.067
0.05				0.039
0.00			3/9/17 Ag	~~0.043~~ 0.001
2nd Source 1.0	↓	↓	↓	0.633

Analyst: April Greene Date/Time: 3/9/17 1125

DCN#124440

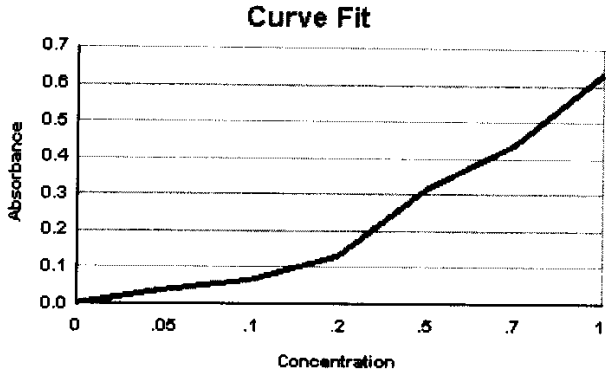
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG605651
Analytical Method:300
Instrument ID:UV-2600

Analyst:ADG
Initial Calibration Date:03/09/2017

Analyte: ORTHOPHOSPHATE
Number of Points: 7
Slope: 0.625674
Y-Intercept: 0.00393300
Coef. Of Correlation (R^2): 0.999869
Coef. Of Correlation (R): 0.999935

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00100	0.00	0.00	0.00393300
0.0500	0.0390	0.00250	0.00195	0.0352167
0.100	0.0670	0.0100	0.00670	0.0665004
0.200	0.129	0.0400	0.0258	0.129068
0.500	0.317	0.250	0.159	0.316770
0.700	0.438	0.490	0.307	0.441905
1.00	0.632	1.00	0.632	0.629607



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 03/09/2017 11:49

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG605651
File ID: 00.1703091125-08
CCV ID: WG605651-08
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 03/09/2017
Run Time: 11:25
Analyst: ADG
Cal ID: UV-260 - 09-MAR-17 11:25:07

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	1	1.01	0.633	1.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 03/09/2017 11:50

[redacted]

WORKGROUP: WG614093

Orthophosphate
(orthophosphate1)

EPA 365.2 / SM4500-P E
SOP K3653 Rev 17
Color Reagent Chemicals
RGT 39679
RGT 38726
RGT 39475
COA 18278

CCV: STD 81763
Daily Dilution: 5(5)/50
Daily Dilution: 0.5
Spectrophotometer: UV 2600

LCS: STD 81764
Daily Dilution: 10(10)/100
Daily Dilution: 1.0
Curve ID: 603651
3-09-17

Spike: STD 81764
Daily Dilution: 2(10)/50
Daily Dilution: 0.40

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: 0.5 mg/L	50			0.326
BLK/CCB:	50			0.001
LCS: 1.0 ppm	50			0.637
LCSD: 1.0 ppm	50			0.656
05-768-01	50	YS		0.272
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP: 05-768-01	50	YS		0.272
MS: ( )768-01	50	YS		0.322
MSD: ( )	50			
CCV: ( )	50			0.333
CCB:	50			0.001

Analyst: [signature] Date / Time 05-12-17 / 1430

DCN#125838

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG614093
Analyte: ORTHOPHOSPHATE

Analyst: DLP
Date: 05/12/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG614093-01	50	50	0.00100	0.6257	0.003933	-0.0046877	-0.0046877	1	mg/L
WG614093-02	50	50	0.637	0.6257	0.003933	1.0118	1.0118	1	mg/L
WG614093-03	50	50	0.656	0.6257	0.003933	1.0422	1.0422	1	mg/L
L17050768-01	50	50	0.272	0.6257	0.003933	0.42845	2.1422	5	mg/L
WG614093-04	50	50	0.272	0.6257	0.003933	0.42845	2.1422	5	mg/L
WG614093-05	50	50	0.272	0.6257	0.003933	0.42845	2.1422	5	mg/L
WG614093-06	50	50	0.322	0.6257	0.003933	0.50836	2.5418	5	mg/L

[redacted]

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 05/12/2017 17:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG614157
File ID: 00,1705121430-01
CCV ID: WG614157-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 05/12/2017
Run Time: 14:30
Analyst: DLP
Cal ID: UV-260 - 11-MAY-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.515	0.652	3.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/12/2017 17:53

[redacted]

Microbac Laboratories Inc.

CONTINUING CALIBRATION REPORT

Workgroup #: WG614157
File ID: 00.1705121430-09
CCV ID: WG614157-03
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 05/12/2017
Run Time: 14:30
Analyst: DLP
Cal ID: UV-260 - 11-MAY-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.526	0.666	5.2	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/12/2017 17:53

[redacted]

2.2 General Chemistry Data

2.2.3 Total Organic Carbon Data

2.2.3.1 Summary Data

Microbac

Lab Report #: L17050768
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17050768-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6439-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG614084	**Analyst:**	ADG	**Run Date:**	05/13/2017 02:50
Collect Date:	05/11/2017 15:00	**Dilution:**	2	**File ID:**	TC05122017.059
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	58.2		4.00	2.00	1.00

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)

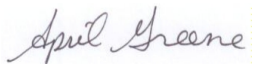
Microbac Laboratories Inc.

Data Checklist

Date: 12-MAY-2017
Analyst: ADG
Analyst: TOC
Method:
Instrument: TOCVPM
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG613997 WG614084

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	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:
16-MAY-2017



Secondary Reviewer:
18-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-18-2017 13:13:57

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 415.1 **AAB#:** WG614084

Login Number: L17050768

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-SP650-6439-GRAB	01	05/11/17					05/13/2017	1.5	28		05/13/17	1.5	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5297122
Report generated 05/17/2017 08:55

METHOD BLANK SUMMARY

Login Number:	L17050768	Work Group:	WG614084
Blank File ID:	TC05122017.033	Blank Sample ID:	WG614084-01
Prep Date:	05/12/17 18:33	Instrument ID:	TOC-VWP
Analyzed Date:	05/12/17 18:33	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	WG614084-02	TC05122017.034	05/12/17 18:52	01
LCS2	WG614084-03	TC05122017.035	05/12/17 19:13	01
LH18/24-SP650-6439-GRAB	L17050768-01	TC05122017.059	05/13/17 02:50	DL01
DUP	WG614084-05	TC05122017.060	05/13/17 03:12	01

Report Name: BLANK_SUMMARY
PDF File ID: 5297123
Report generated 05/17/2017 08:55

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L17050768 Prep Date:05/12/17 18:33 Sample ID:WG614084-01
Instrument ID:TOC-VWP Run Date:05/12/17 18:33 Prep Method:415.1
File ID:TC05122017.033 Analyst:ADG Method:415.1
Workgroup (AAB#):WG614084 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: 5297124
17-MAY-2017 08:55

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17050768 Analyst: ADG Prep Method: 415.1
Instrument ID: TOC-VWP Matrix: Water Method: 415.1
Workgroup (AAB#): WG614084 Units: mg/L
QC Key: DOD4 Lot #: STD80787

Sample ID: WG614084-02 LCS File ID: TC05122017.034 Run Date: 05/12/2017 18:52
Sample ID: WG614084-03 LCS2 File ID: TC05122017.035 Run Date: 05/12/2017 19:13

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	25.3	101	25.0	25.3	101	0.119	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5297125
Report generated: 05/17/2017 08:55

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

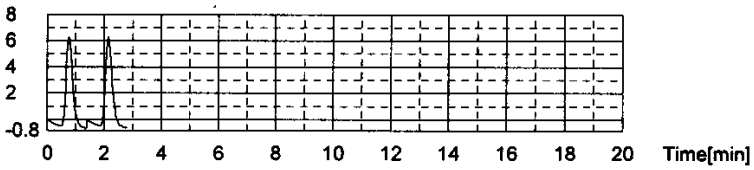
Sample Name:	TCCURVE
Sample ID:	Untitled
Cal. Curve:	TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status	Completed

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

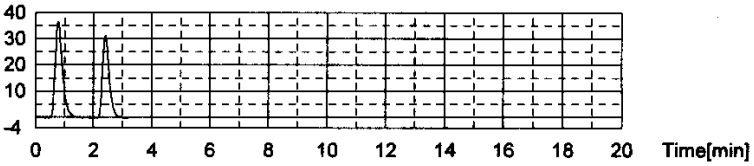
Acid Add. 0.000%
Mean Area 10.82



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

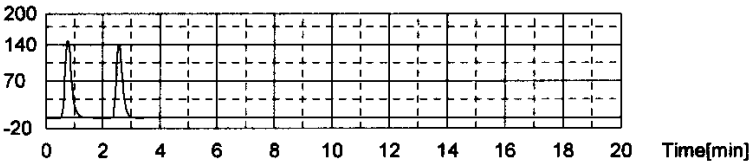
Acid Add. 0.000%
Mean Area 57.92



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

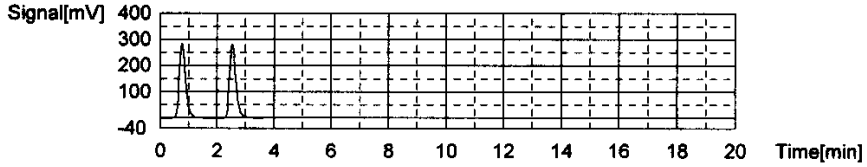
Acid Add. 0.000%
Mean Area 227.4



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

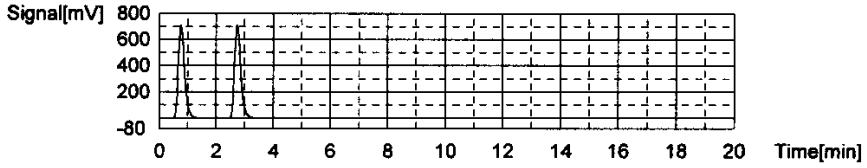
Acid Add. 0.000%
Mean Area 440.2



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

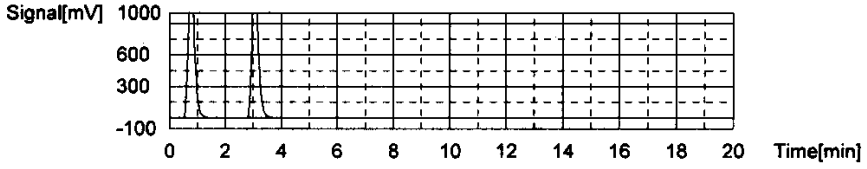
Acid Add. 0.000%
Mean Area 1092



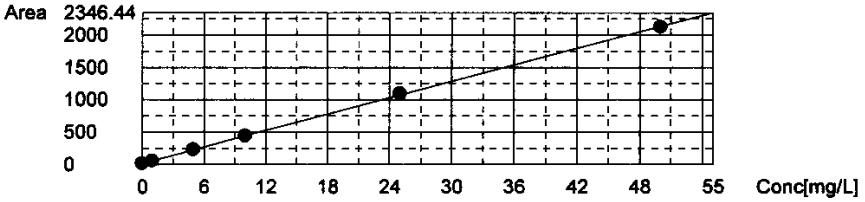
Conc: 50.00mg/L

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

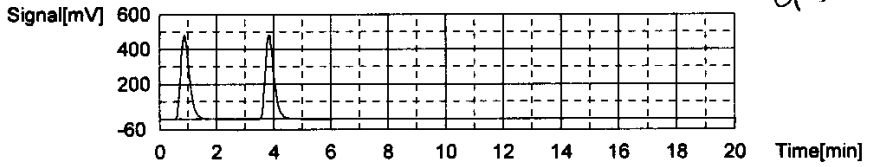
1. Det

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

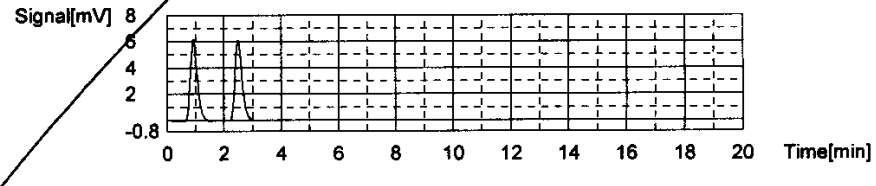
Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed

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

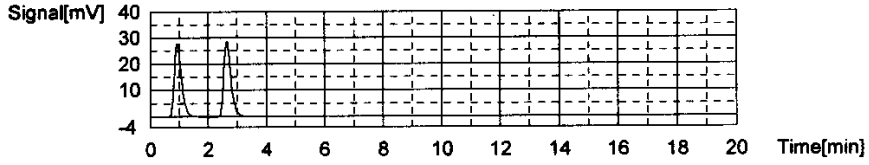
Acid Add. 3.000%
Mean Area 10.51



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



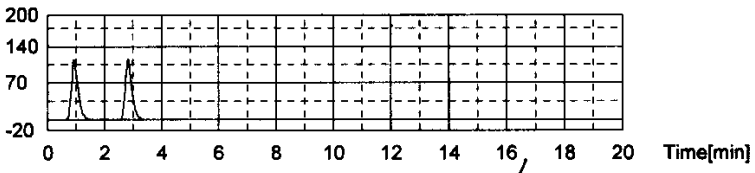
Conc: 5.000mg/L

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

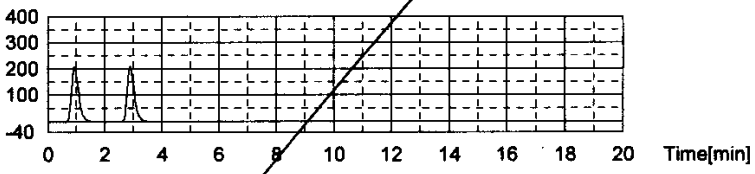
Acid Add. 3.000%
Mean Area 189.6



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

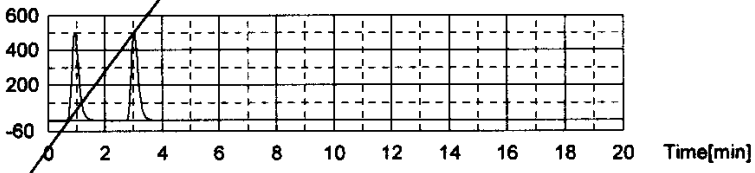
Acid Add. 3.000%
Mean Area 361.4



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

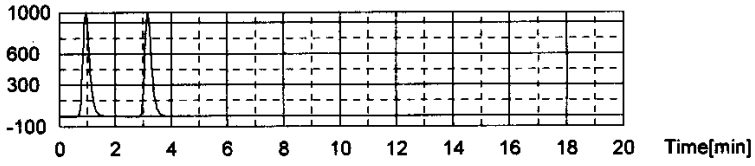
Acid Add. 3.000%
Mean Area 858.1



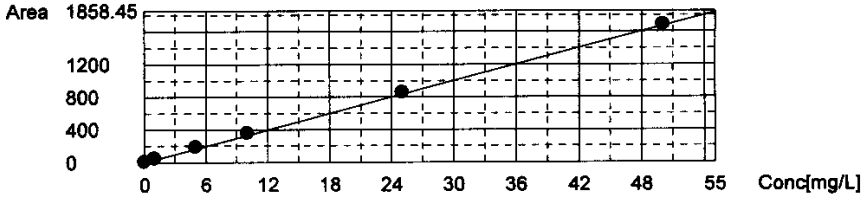
Conc: 50.00mg/L

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

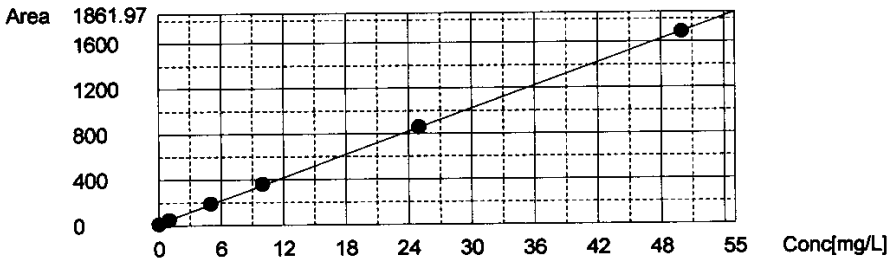
Acid Add.	3.000%
Mean Area	858.1
SD Area	1.697
CV Area	0.20%
Vial	4

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

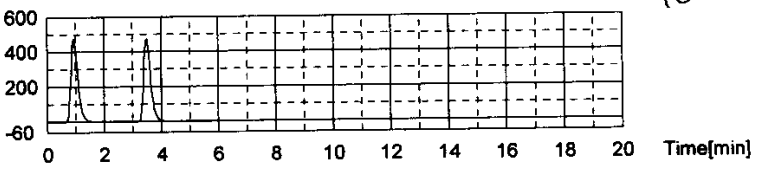
1. Det

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

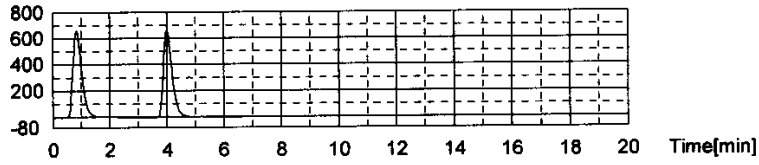
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

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

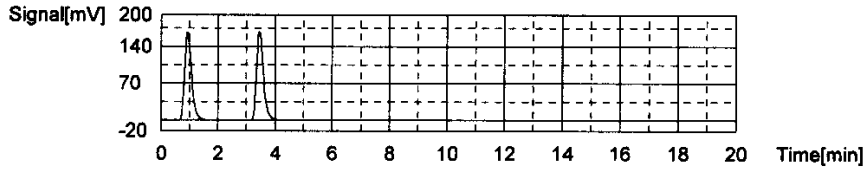
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

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

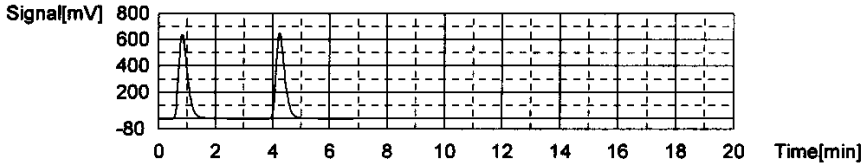
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

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: WG613997 L14084

Total Organic Carbon

MAKE DAILY

CCV (TOC): 79381 / (5/200)(1000) = 25mg/L

LCS (TOC): Std 80787 / (5/200)(1000) = 25mg/L

CCV (TIC): 80416 / (5/200)(1000) = 25mg/L

MS (TOC): Std 80787 / 0.4(1000)/40 = 10

Calibration Curve Date: 2/10/17

Reagent: 400669, 392666

☒ SM5310-C : Matrix 2 WG613997, L14084

☐ EPA 415.1/9060A(mod): Matrix 1 WG_____ SOP: K 1451 Rev. 19

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	TIC/TOC	
3	CCV	
4	BLK	
5	LCS	
6	LCS	
7	1635-01	1/50
8	1644-01	1/50
9	1654-01	1/20
10	731-01	
11	03	
12	05	
13	07	
14	CCV	
15	CCB	
16	731-09	
17	11	
18	13	
19	15	
20	17	
21	19	
22	21	
23	23	
24	25	
25	27	

Position	Sample ID	Dilution
26	CCV	
27	CCB	
28	731-29	
29	32	
30	34	
31	731-34 Dup	
32	731-34 MS	
33	BLK	
34	LCS	
35	LCS	
36	1675-02	1/2
37	03	1/2
38	CCV	1
39	CCB	
40	1675-04	1/5
41	05	1/5
42	Ref 06	1/5
43	MS 07	1/5
44	MS 08	1/5
45	0733-01	
46	03	
47	05	
48	07	
49	09	
50	CCV	

Position	Sample ID	Dilution
51	CCB	
52	0733-11	
53	13	
54	15	
55	1760-02	1/2
56	03	1/2
57	04	
58	05	1/2
59	1768-01	1/2
60	733-15 Dup	
61	CCV	
62	CCB	
63	~~CCB~~ MS 12/17	
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		

Analyst: April Greene Date/Time: 5/12/17

sample diluted at 1/30 per client Request

DCN#125821

C:\TOC3201\Data\05-12-2017-ADG-TOC.t32

	Analysis	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:1.982mg/L TC:27.62mg/L IC:25.64mg/L	Complete	5/12/2017 8:06:38 AM	1
2	TOC	TIC/TOC	TOC:26.22mg/L TC:34.95mg/L IC:8.726mg/L	Complete	5/12/2017 8:19:20 AM	2
3	TOC	CCV	!!Error!! TOC:23.54mg/L TC:23.19mg/L IC:-0.3500mg/L	Complete	5/12/2017 8:31:28 AM	3
4	TOC	WG613997-01 BLK	!!Error!! TOC:0.1338mg/L TC:-0.1572mg/L IC:-0.2910mg/	Complete	5/12/2017 8:47:49 AM	0
5	TOC	WG613997-02 LCS	!!Error!! TOC:25.33mg/L TC:24.96mg/L IC:-0.3614mg/L	Complete	5/12/2017 9:08:29 AM	5
6	TOC	WG613997-03 LCSD	!!Error!! TOC:25.28mg/L TC:24.94mg/L IC:-0.3432mg/L	Complete	5/12/2017 9:29:18 AM	6
7	TOC	L17050635-01 (50)	TOC:31.41mg/L TC:31.52mg/L IC:0.1080mg/L	Complete	5/12/2017 9:59:01 AM	7
8	TOC	L17050644-01 (50)	TOC:33.95mg/L TC:34.06mg/L IC:0.1120mg/L	Complete	5/12/2017 10:22:27 AM	8
9	TOC	L17050654-01	!!Error!! TOC:8.028mg/L TC:7.765mg/L IC:-0.2636mg/L	Complete	5/12/2017 10:44:39 AM	9
10	TOC	L17050731-01	TOC:2.226mg/L TC:32.53mg/L IC:30.30mg/L	Complete	5/12/2017 11:06:51 AM	10
11	TOC	L17050731-03	TOC:2.805mg/L TC:26.52mg/L IC:23.72mg/L	Complete	5/12/2017 11:29:06 AM	11
12	TOC	L17050731-05	TOC:2.568mg/L TC:34.51mg/L IC:31.94mg/L	Complete	5/12/2017 11:52:42 AM	12
13	TOC	L17050731-07	TOC:2.458mg/L TC:24.47mg/L IC:22.01mg/L	Complete	5/12/2017 12:14:49 PM	13
14	TOC	CCV	!!Error!! TOC:23.36mg/L TC:23.15mg/L IC:-0.2134mg/L	Complete	5/12/2017 12:27:00 PM	14
15	TOC	CCB	!!Error!! TOC:0.1233mg/L TC:-0.1594mg/L IC:-0.2827mg/	Complete	5/12/2017 12:35:54 PM	0
16	TOC	L17050731-09	TOC:2.348mg/L TC:27.54mg/L IC:25.19mg/L	Complete	5/12/2017 12:58:13 PM	16
17	TOC	L17050731-11	TOC:2.082mg/L TC:19.61mg/L IC:17.52mg/L	Complete	5/12/2017 1:19:56 PM	17
18	TOC	L17050731-13	TOC:2.300mg/L TC:24.94mg/L IC:22.64mg/L	Complete	5/12/2017 1:42:55 PM	18
19	TOC	L17050731-15	TOC:3.142mg/L TC:33.98mg/L IC:30.84mg/L	Complete	5/12/2017 2:06:01 PM	19
20	TOC	L17050731-17	TOC:3.385mg/L TC:22.31mg/L IC:18.92mg/L	Complete	5/12/2017 2:28:26 PM	20
21	TOC	L17050731-19	TOC:3.139mg/L TC:17.00mg/L IC:13.86mg/L	Complete	5/12/2017 2:50:05 PM	21
22	TOC	L17050731-21	TOC:2.815mg/L TC:14.80mg/L IC:11.99mg/L	Complete	5/12/2017 3:11:16 PM	22
23	TOC	L17050731-23	TOC:2.786mg/L TC:14.22mg/L IC:11.43mg/L	Complete	5/12/2017 3:32:45 PM	23
24	TOC	L17050731-25	TOC:3.129mg/L TC:17.95mg/L IC:14.82mg/L	Complete	5/12/2017 3:54:38 PM	24
25	TOC	L17050731-27	TOC:2.193mg/L TC:11.80mg/L IC:9.607mg/L	Complete	5/12/2017 4:25:11 PM	25
26	TOC	CCV	!!Error!! TOC:23.31mg/L TC:23.08mg/L IC:-0.2238mg/L	Complete	5/12/2017 4:37:17 PM	26
27	TOC	CCB	!!Error!! TOC:0.1205mg/L TC:-0.1650mg/L IC:-0.2855mg/	Complete	5/12/2017 4:46:12 PM	0
28	TOC	L17050731-29	TOC:1.382mg/L TC:7.531mg/L IC:6.148mg/L	Complete	5/12/2017 5:07:04 PM	28
29	TOC	L17050731-32	TOC:1.548mg/L TC:3.944mg/L IC:2.396mg/L	Complete	5/12/2017 5:27:12 PM	29
30	TOC	L17050731-34	TOC:1.748mg/L TC:5.168mg/L IC:3.420mg/L	Complete	5/12/2017 5:47:37 PM	30
31	TOC	WG613997-05 DUP	TOC:1.687mg/L TC:4.907mg/L IC:3.220mg/L	Complete	5/12/2017 6:07:56 PM	31
32	TOC	WG613997-06 MS	TOC:12.80mg/L TC:13.80mg/L IC:0.9928mg/L	Complete	5/12/2017 6:28:21 PM	32
33	TOC	WG614084-01 BLK	!!Error!! TOC:0.1268mg/L TC:-0.1643mg/L IC:-0.2912mg/	Complete	5/12/2017 6:44:41 PM	0
34	TOC	WG614084-02 LCS	!!Error!! TOC:25.25mg/L TC:24.96mg/L IC:-0.2890mg/L	Complete	5/12/2017 7:05:28 PM	34
35	TOC	WG614084-03 LCSD	!!Error!! TOC:25.28mg/L TC:24.99mg/L IC:-0.2919mg/L	Complete	5/12/2017 7:26:16 PM	35
36	TOC	L17050675-02 (2)	TOC:6.676mg/L TC:19.58mg/L IC:12.91mg/L	Complete	5/12/2017 7:47:52 PM	36
37	TOC	L17050675-03 (2)	TOC:19.77mg/L TC:28.36mg/L IC:8.585mg/L	Complete	5/12/2017 8:10:18 PM	37
38	TOC	CCV	!!Error!! TOC:23.04mg/L TC:22.75mg/L IC:-0.2937mg/L	Complete	5/12/2017 8:22:23 PM	38
39	TOC	CCB	!!Error!! TOC:0.1300mg/L TC:-0.1598mg/L IC:-0.2898mg/	Complete	5/12/2017 8:31:19 PM	0
40	TOC	L17050675-04 (5)	TOC:8.262mg/L TC:13.16mg/L IC:4.900mg/L	Complete	5/12/2017 8:52:50 PM	40
41	TOC	L17050675-05 (5)	TOC:8.530mg/L TC:13.62mg/L IC:5.089mg/L	Complete	5/12/2017 9:14:27 PM	41
42	TOC	L17050675-07 (5)	TOC:10.60mg/L TC:13.44mg/L IC:2.836mg/L	Complete	5/12/2017 9:35:05 PM	42
43	TOC	L17050675-08 (5) MS	TOC:18.67mg/L TC:21.73mg/L IC:3.060mg/L	Complete	5/12/2017 9:56:04 PM	43
44	TOC	L17050675-09 (5) MS	TOC:9.904mg/L TC:11.51mg/L IC:1.609mg/L	Complete	5/12/2017 10:16:24 PM	44
45	TOC	L17050733-01	!!Error!! TOC:1.216mg/L TC:1.150mg/L IC:-0.06613mg/L	Complete	5/12/2017 10:36:17 PM	45
46	TOC	L17050733-03	!!Error!! TOC:1.065mg/L TC:0.9844mg/L IC:-0.08092mg/L	Complete	5/12/2017 10:55:58 PM	46
47	TOC	L17050733-05	TOC:1.279mg/L TC:2.130mg/L IC:0.8510mg/L	Complete	5/12/2017 11:16:07 PM	47
48	TOC	L17050733-07	TOC:1.263mg/L TC:1.914mg/L IC:0.6515mg/L	Complete	5/12/2017 11:36:09 PM	48
49	TOC	L17050733-09	TOC:1.075mg/L TC:2.492mg/L IC:1.417mg/L	Complete	5/12/2017 11:56:11 PM	49
50	TOC	CCV	!!Error!! TOC:23.23mg/L TC:22.92mg/L IC:-0.3051mg/L	Complete	5/13/2017 12:08:18 AM	50
51	TOC	CCB	!!Error!! TOC:0.1263mg/L TC:-0.1610mg/L IC:-0.2874mg/	Complete	5/13/2017 12:17:13 AM	0
52	TOC	L17050733-11	TOC:1.943mg/L TC:2.341mg/L IC:0.3981mg/L	Complete	5/13/2017 12:37:03 AM	52
53	TOC	L17050733-13	TOC:1.132mg/L TC:3.906mg/L IC:2.774mg/L	Complete	5/13/2017 12:57:12 AM	53
54	TOC	L17050733-15	TOC:0.9987mg/L TC:2.881mg/L IC:1.882mg/L	Complete	5/13/2017 1:17:14 AM	54
55	TOC	L17050760-02 (2)	TOC:6.389mg/L TC:10.47mg/L IC:4.084mg/L	Complete	5/13/2017 1:37:47 AM	55
56	TOC	<Untitled>	TOC:6.157mg/L TC:9.044mg/L IC:2.887mg/L	Complete	5/13/2017 1:58:19 AM	56
57	TOC	L17050760-04	TOC:7.059mg/L TC:16.38mg/L IC:9.324mg/L	Complete	5/13/2017 2:21:08 AM	57
58	TOC	L17050760-05 (2)	TOC:11.72mg/L TC:12.80mg/L IC:1.080mg/L	Complete	5/13/2017 2:41:52 AM	58
59	TOC	L17050768-01 (2)	TOC:29.12mg/L TC:30.41mg/L IC:1.292mg/L	Complete	5/13/2017 3:05:28 AM	59
60	TOC	WG614084-05 DUP	TOC:0.9582mg/L TC:2.089mg/L IC:1.131mg/L	Complete	5/13/2017 3:25:26 AM	60
61	TOC	CCV	!!Error!! TOC:23.26mg/L TC:22.96mg/L IC:-0.2997mg/L	Complete	5/13/2017 3:37:36 AM	61
62	TOC	CCB	!!Error!! TOC:0.1264mg/L TC:-0.1558mg/L IC:-0.2823mg/	Complete	5/13/2017 3:46:32 AM	0

5/15/2017 3:33:19 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

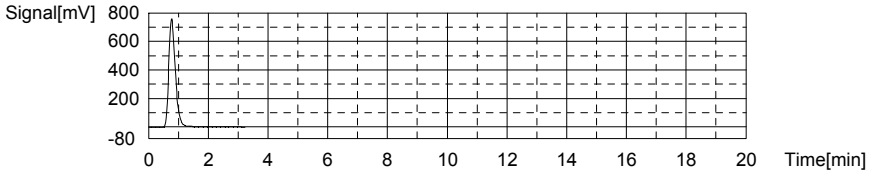
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.982mg/L TC:27.62mg/L IC:25.64mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1186	27.62mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:01:25 AM

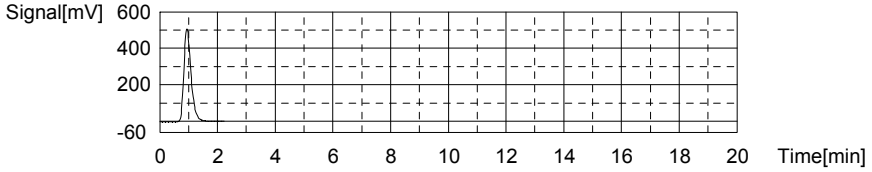
Mean Area 1186
Mean Conc. 27.62mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	877.0	25.64mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:06:38 AM

Mean Area 877.0
Mean Conc. 25.64mg/L



Sample

Sample Name: TIC/TOC
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

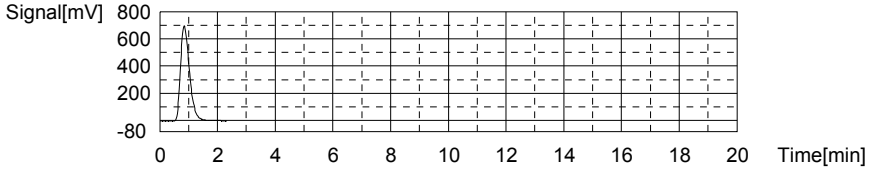
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:26.22mg/L TC:34.95mg/L IC:8.726mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1496	34.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:14:23 AM

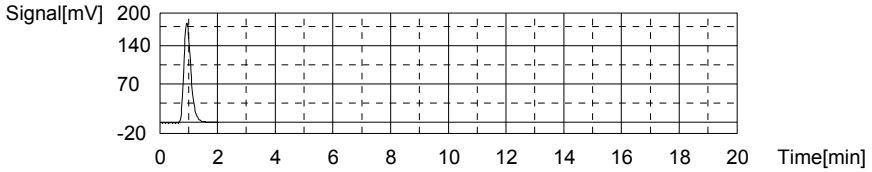
Mean Area 1496
Mean Conc. 34.95mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	310.6	8.726mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:19:20 AM

Mean Area 310.6
Mean Conc. 8.726mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

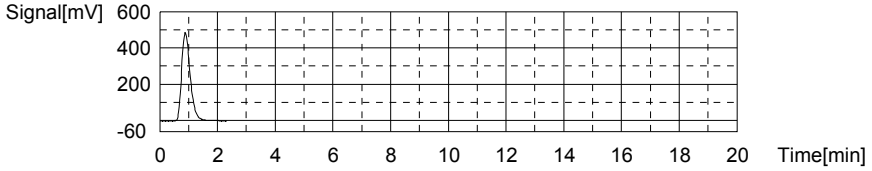
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.54mg/L TC:23.19mg/L IC:-0.3500mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	998.5	23.19mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:27:06 AM

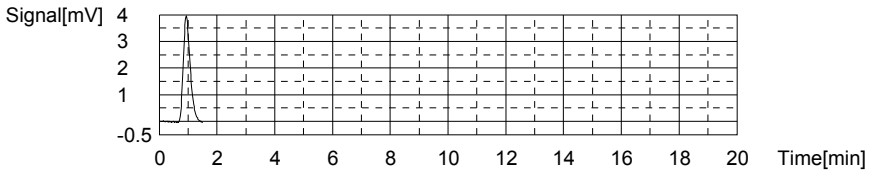
Mean Area 998.5
Mean Conc. 23.19mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	6.695	-0.3500mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:31:28 AM

Mean Area 6.695
Mean Conc. -0.3500mg/L



Sample

Sample Name: WG613997-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

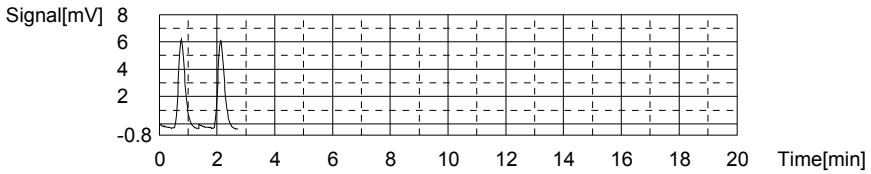
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1338mg/L TC:-0.1572mg/L IC:-0.2910mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.25	-0.1563mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:36:28 AM
2	10.17	-0.1582mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:39:58 AM

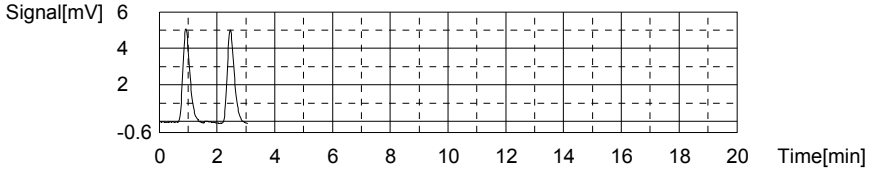
Mean Area 10.21
Mean Conc. -0.1572mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.710	-0.2898mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:43:54 AM
2	8.630	-0.2922mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:47:49 AM

Mean Area 8.670
Mean Conc. -0.2910mg/L



Sample

Sample Name: WG613997-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

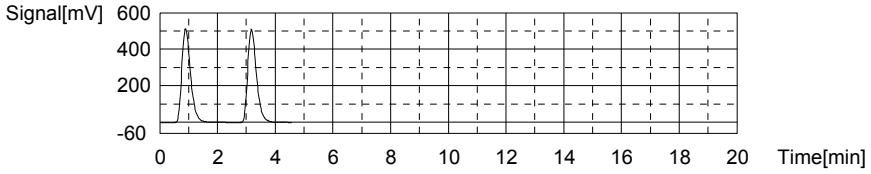
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.33mg/L TC:24.96mg/L IC:-0.3614mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1078	25.07mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:55:32 AM
2	1069	24.86mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:00:04 AM

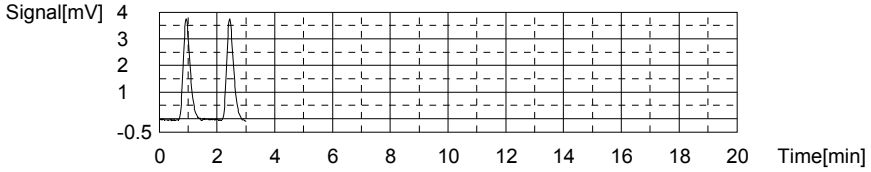
Mean Area 1074
Mean Conc. 24.96mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	6.281	-0.3623mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:04:24 AM
2	6.344	-0.3605mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:08:29 AM

Mean Area 6.313
Mean Conc. -0.3614mg/L



Sample

Sample Name: WG613997-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

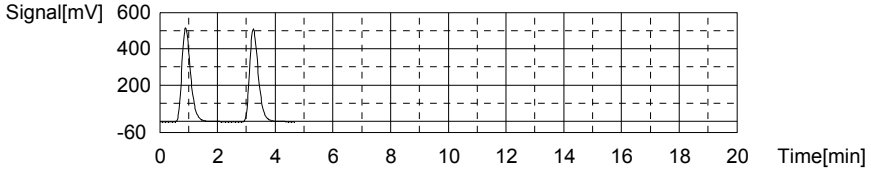
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.28mg/L TC:24.94mg/L IC:-0.3432mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1078	25.07mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:16:16 AM
2	1067	24.81mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:20:51 AM

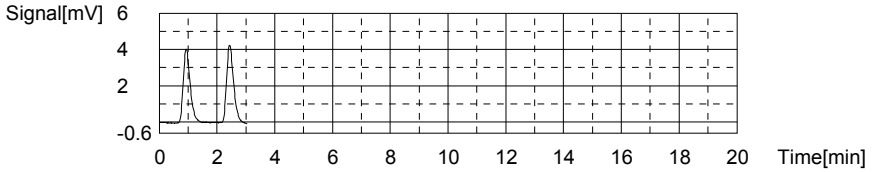
Mean Area 1073
Mean Conc. 24.94mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	6.719	-0.3493mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:25:12 AM
2	7.128	-0.3371mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:29:18 AM

Mean Area 6.924
Mean Conc. -0.3432mg/L



Sample

Sample Name: L17050635-01 (50)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

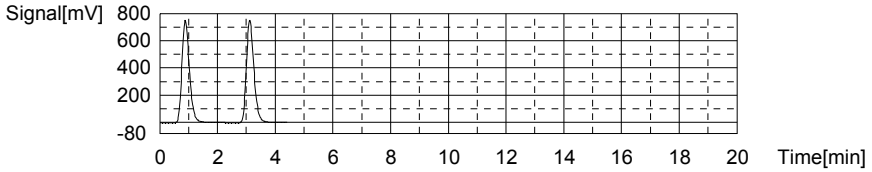
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:31.41mg/L TC:31.52mg/L IC:0.1080mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1352	31.54mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:44:46 AM
2	1350	31.50mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:50:16 AM

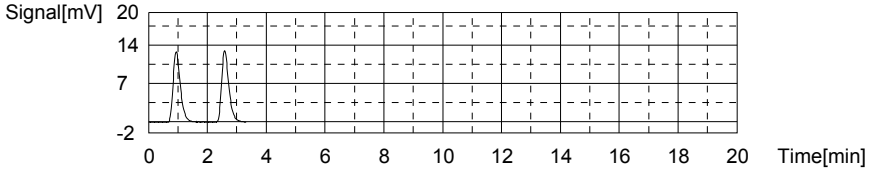
Mean Area 1351
Mean Conc. 31.52mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	21.94	0.1053mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:54:44 AM
2	22.12	0.1107mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:59:01 AM

Mean Area 22.03
Mean Conc. 0.1080mg/L



Sample

Sample Name: L17050644-01 (50)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

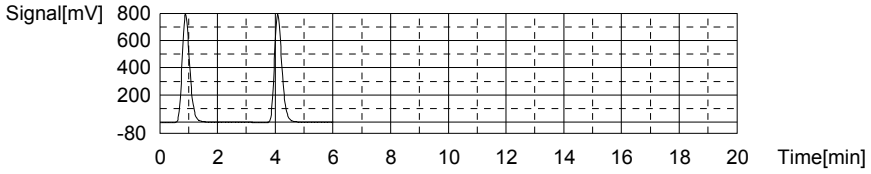
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:33.95mg/L TC:34.06mg/L IC:0.1120mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1463	34.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:07:40 AM
2	1454	33.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:13:42 AM

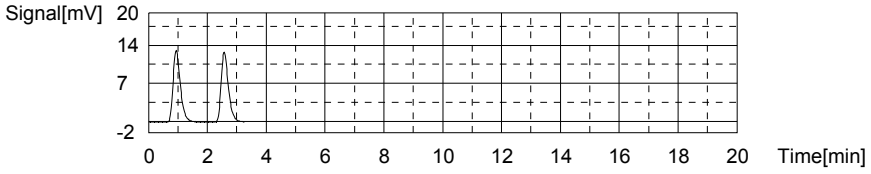
Mean Area 1459
Mean Conc. 34.06mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	22.52	0.1226mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:18:11 AM
2	21.81	0.1014mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:22:27 AM

Mean Area 22.16
Mean Conc. 0.1120mg/L



Sample

Sample Name: L17050654-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

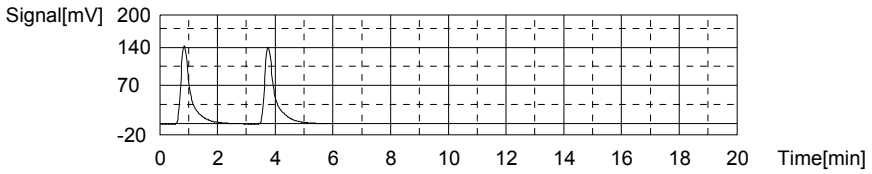
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:8.028mg/L TC:7.765mg/L IC:-0.2636mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	339.9	7.632mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:30:47 AM
2	351.1	7.897mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:36:07 AM

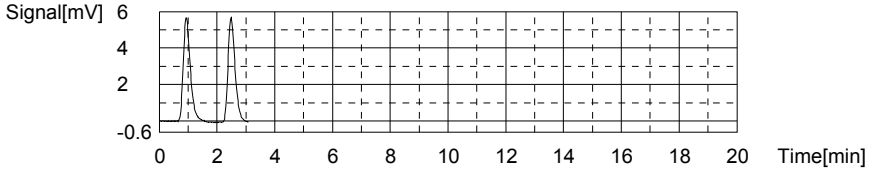
Mean Area 345.5
Mean Conc. 7.765mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.582	-0.2638mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:40:29 AM
2	9.591	-0.2635mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:44:39 AM

Mean Area 9.587
Mean Conc. -0.2636mg/L



Sample

Sample Name: L170503-731-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

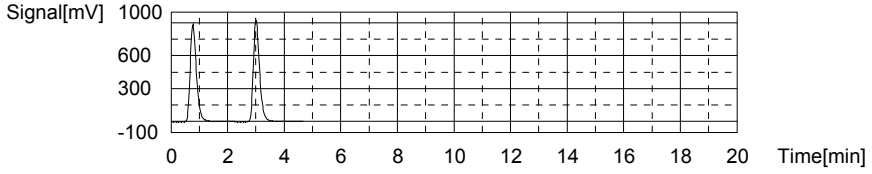
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.226mg/L TC:32.53mg/L IC:30.30mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1363	31.80mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:52:19 AM
2	1424	33.25mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:57:02 AM

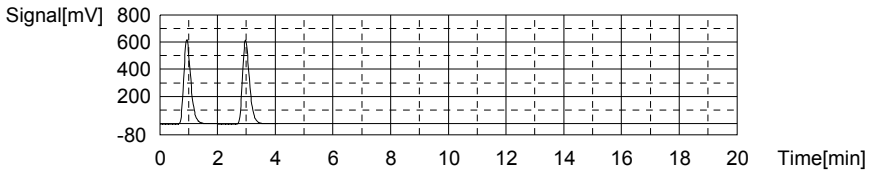
Mean Area 1394
Mean Conc. 32.53mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1036	30.39mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:02:03 AM
2	1030	30.21mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:06:51 AM

Mean Area 1033
Mean Conc. 30.30mg/L



Sample

Sample Name: L17050731-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

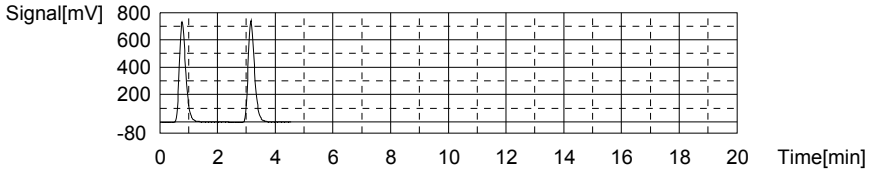
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.805mg/L TC:26.52mg/L IC:23.72mg/L

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_55	5/12/2017 11:14:40 AM
2	1143	26.61mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:19:11 AM

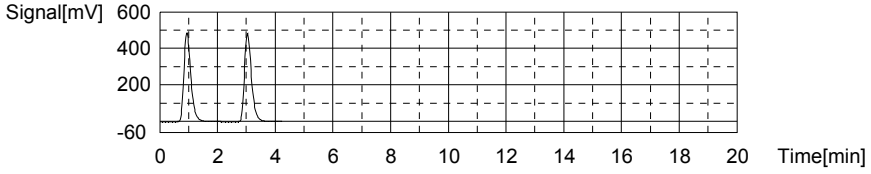
Mean Area 1140
Mean Conc. 26.52mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	811.1	23.67mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:24:15 AM
2	814.2	23.76mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:29:06 AM

Mean Area 812.7
Mean Conc. 23.72mg/L



Sample

Sample Name: L17050731-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

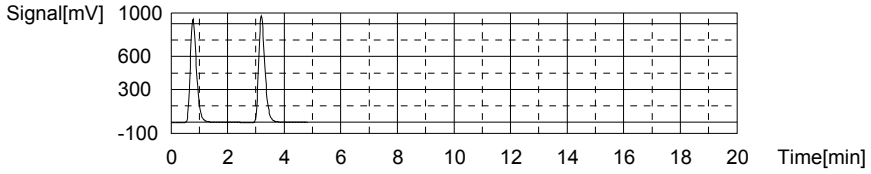
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.568mg/L TC:34.51mg/L IC:31.94mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1455	33.98mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:36:57 AM
2	1500	35.04mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:42:28 AM

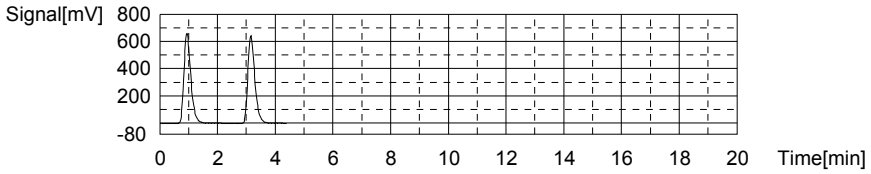
Mean Area 1478
Mean Conc. 34.51mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1096	32.18mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:47:43 AM
2	1080	31.70mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:52:42 AM

Mean Area 1088
Mean Conc. 31.94mg/L



Sample

Sample Name: L17050731-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

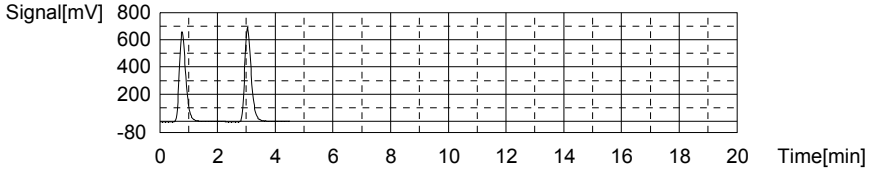
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.458mg/L TC:24.47mg/L IC:22.01mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1026	23.84mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 12:00:24 PM
2	1079	25.09mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 12:04:55 PM

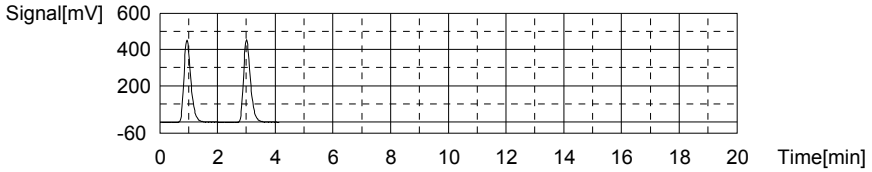
Mean Area 1053
Mean Conc. 24.47mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	754.7	21.99mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/12/2017 12:09:58 PM
2	756.2	22.03mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/12/2017 12:14:49 PM

Mean Area 755.5
Mean Conc. 22.01mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

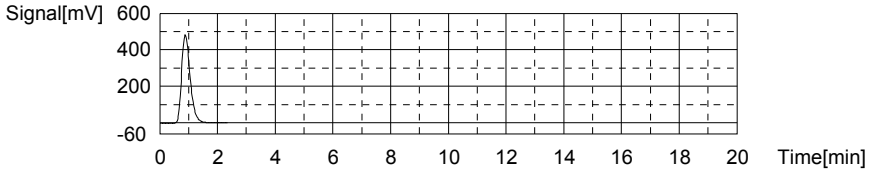
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.36mg/L TC:23.15mg/L IC:-0.2134mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	996.7	23.15mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 12:22:36 PM

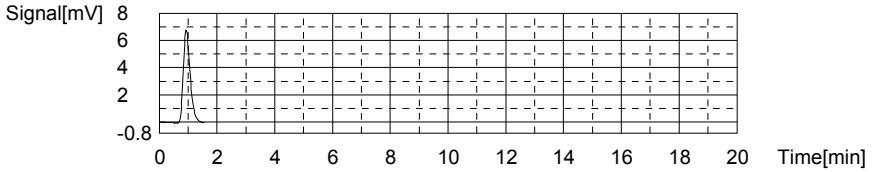
Mean Area 996.7
Mean Conc. 23.15mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.27	-0.2134mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/12/2017 12:27:00 PM

Mean Area 11.27
Mean Conc. -0.2134mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

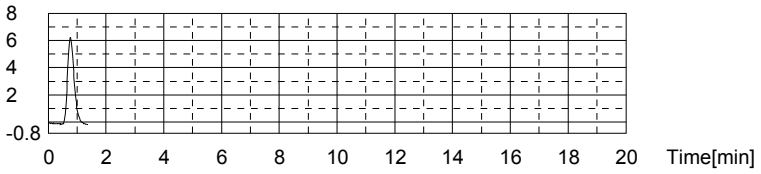
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1233mg/L TC:-0.1594mg/L IC:-0.2827mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.12	-0.1594mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 12:32:00 PM

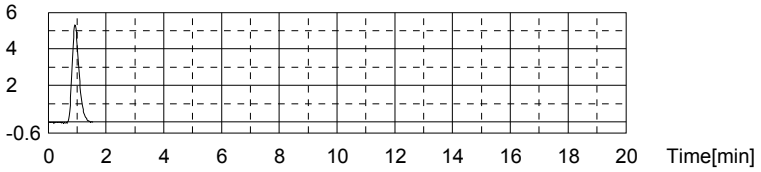
Mean Area 10.12
Mean Conc. -0.1594mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.949	-0.2827mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 12:35:54 PM

Mean Area 8.949
Mean Conc. -0.2827mg/L



Sample

Sample Name: L17050731-09
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

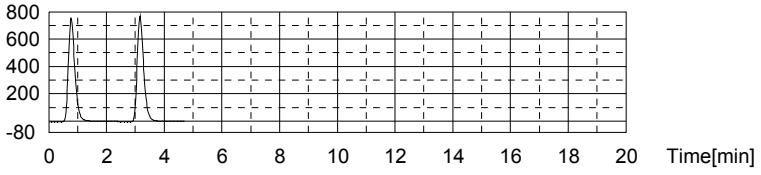
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.348mg/L TC:27.54mg/L IC:25.19mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1172	27.29mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 12:43:44 PM
2	1193	27.79mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 12:48:20 PM

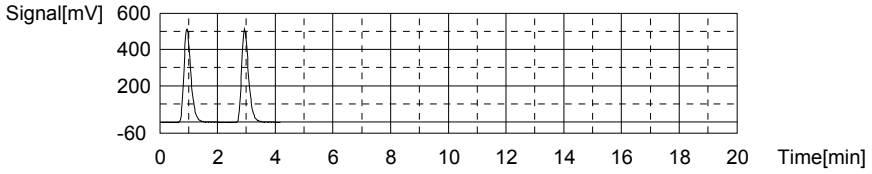
Mean Area 1183
Mean Conc. 27.54mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	861.1	25.17mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 12:53:19 PM
2	862.9	25.22mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 12:58:13 PM

Mean Area 862.0
Mean Conc. 25.19mg/L



Sample

Sample Name: L17050731-11
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

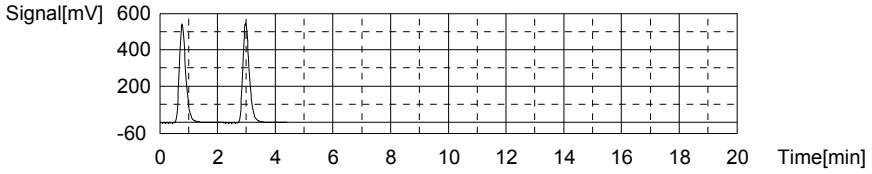
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.082mg/L TC:19.61mg/L IC:17.52mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	839.0	19.42mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 1:05:52 PM
2	854.5	19.79mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 1:10:21 PM

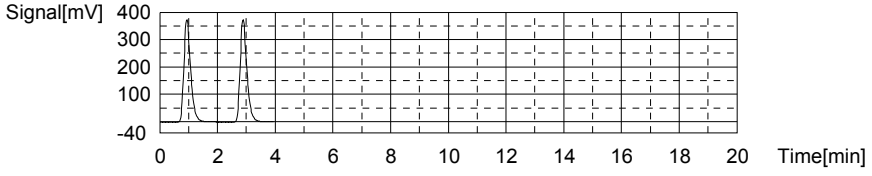
Mean Area 846.8
Mean Conc. 19.61mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	605.7	17.54mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 1:15:16 PM
2	604.8	17.51mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 1:19:56 PM

Mean Area 605.3
Mean Conc. 17.52mg/L



Sample

Sample Name: L17050731-13
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

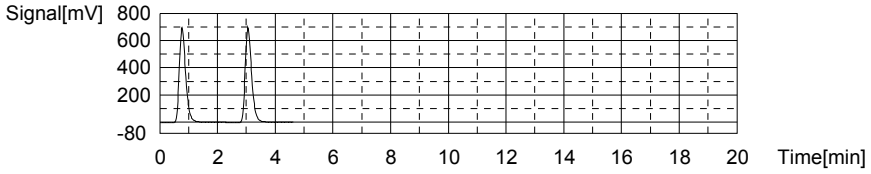
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.300mg/L TC:24.94mg/L IC:22.64mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1069	24.86mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 1:27:40 PM
2	1076	25.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 1:33:07 PM

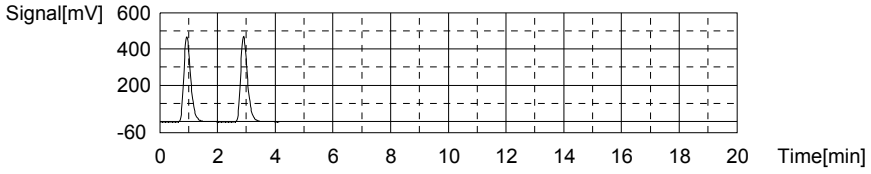
Mean Area 1073
Mean Conc. 24.94mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	774.9	22.59mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 1:38:03 PM
2	778.2	22.69mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 1:42:55 PM

Mean Area 776.6
Mean Conc. 22.64mg/L



Sample

Sample Name: L17050731-15
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

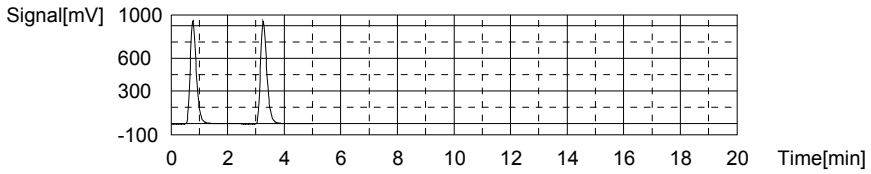
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.142mg/L TC:33.98mg/L IC:30.84mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1440	33.62mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 1:50:51 PM
2	1470	34.33mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 1:55:52 PM

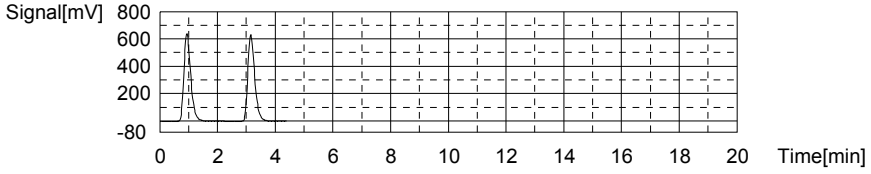
Mean Area 1455
Mean Conc. 33.98mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1052	30.87mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 2:01:06 PM
2	1050	30.81mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 2:06:01 PM

Mean Area 1051
Mean Conc. 30.84mg/L



Sample

Sample Name: L17050731-17
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

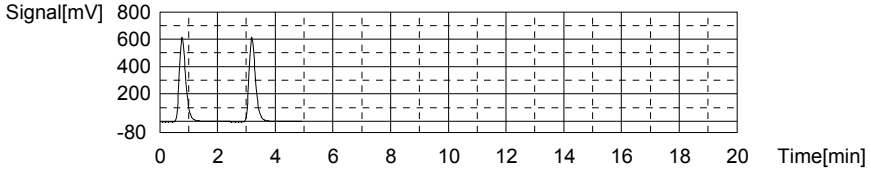
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.385mg/L TC:22.31mg/L IC:18.92mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	960.9	22.30mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 2:13:53 PM
2	961.2	22.31mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 2:18:40 PM

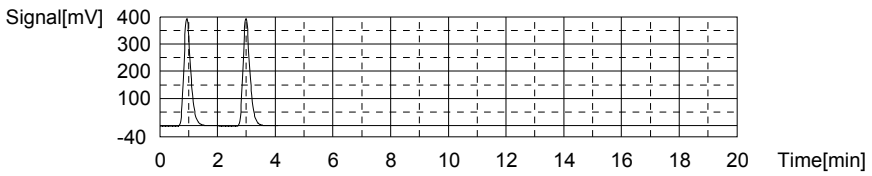
Mean Area 961.1
Mean Conc. 22.31mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	652.3	18.93mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 2:23:41 PM
2	651.8	18.92mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 2:28:26 PM

Mean Area 652.1
Mean Conc. 18.92mg/L



Sample

Sample Name: L17050731-19
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

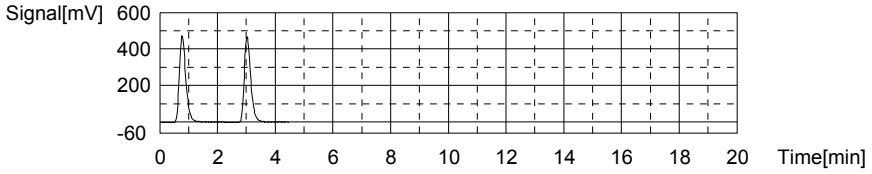
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.139mg/L TC:17.00mg/L IC:13.86mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	740.0	17.09mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 2:36:08 PM
2	732.5	16.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 2:40:36 PM

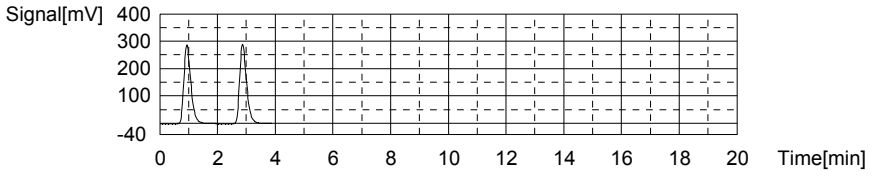
Mean Area 736.3
Mean Conc. 17.00mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	480.2	13.79mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 2:45:27 PM
2	484.7	13.92mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 2:50:05 PM

Mean Area 482.5
Mean Conc. 13.86mg/L



Sample

Sample Name: L17050731-21
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

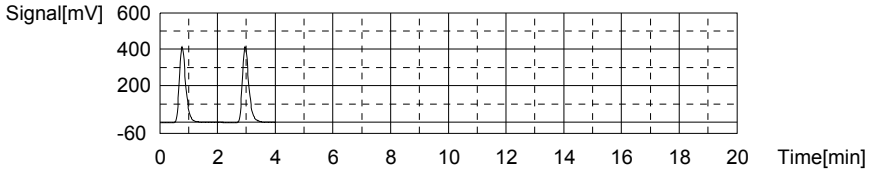
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.815mg/L TC:14.80mg/L IC:11.99mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	642.0	14.77mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 2:57:43 PM
2	644.7	14.83mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 3:01:50 PM

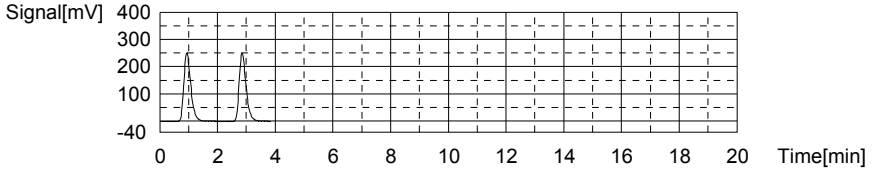
Mean Area 643.4
Mean Conc. 14.80mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	421.0	12.02mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 3:06:42 PM
2	418.6	11.95mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 3:11:16 PM

Mean Area 419.8
Mean Conc. 11.99mg/L



Sample

Sample Name: L17050731-23
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

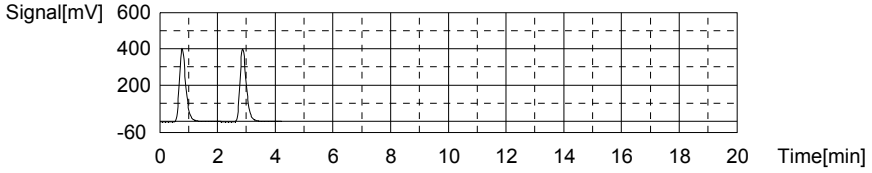
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.786mg/L TC:14.22mg/L IC:11.43mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	618.6	14.22mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 3:18:49 PM
2	618.9	14.22mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 3:23:13 PM

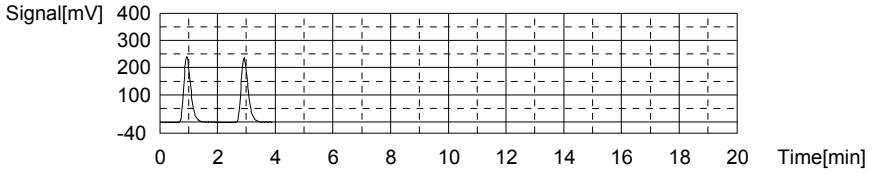
Mean Area 618.8
Mean Conc. 14.22mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	403.4	11.50mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 3:28:10 PM
2	399.2	11.37mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 3:32:45 PM

Mean Area 401.3
Mean Conc. 11.43mg/L



Sample

Sample Name: L17050731-25
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

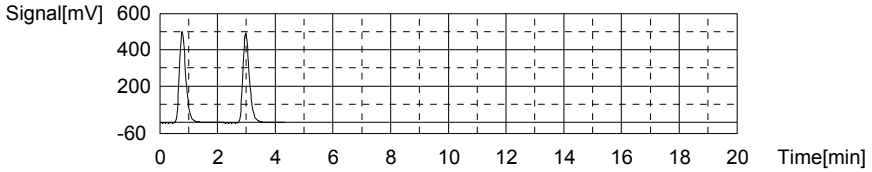
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.129mg/L TC:17.95mg/L IC:14.82mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	781.5	18.07mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 3:40:24 PM
2	771.7	17.83mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 3:44:57 PM

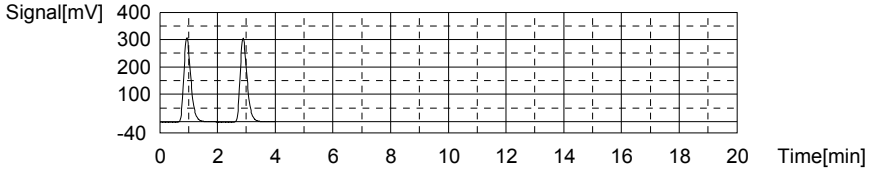
Mean Area 776.6
Mean Conc. 17.95mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	516.7	14.88mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 3:49:51 PM
2	512.7	14.76mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 3:54:38 PM

Mean Area 514.7
Mean Conc. 14.82mg/L



Sample

Sample Name: L17050731-27
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

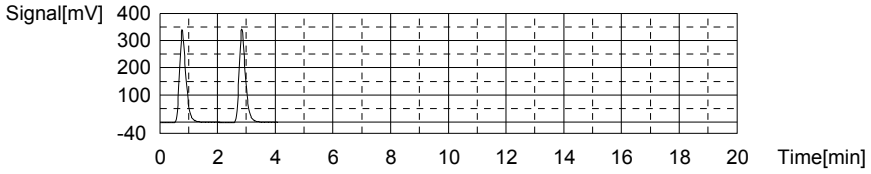
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.193mg/L TC:11.80mg/L IC:9.607mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	513.5	11.73mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 4:11:17 PM
2	519.1	11.87mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 4:15:35 PM

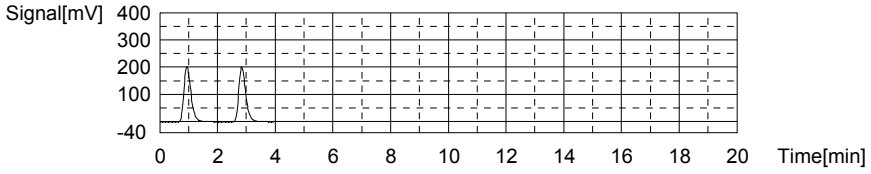
Mean Area 516.3
Mean Conc. 11.80mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	340.6	9.622mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 4:20:25 PM
2	339.6	9.592mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 4:25:11 PM

Mean Area 340.1
Mean Conc. 9.607mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

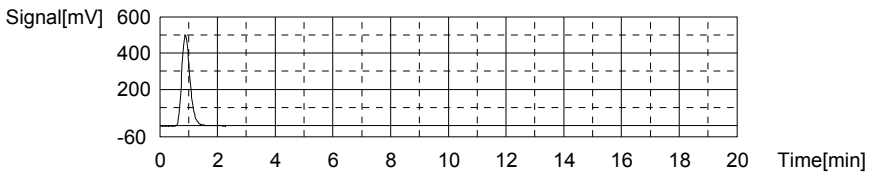
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.31mg/L TC:23.08mg/L IC:-0.2238mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	993.9	23.08mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 4:32:54 PM

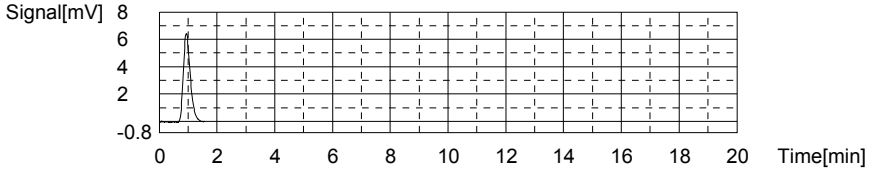
Mean Area 993.9
Mean Conc. 23.08mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.92	-0.2238mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 4:37:17 PM

Mean Area 10.92
Mean Conc. -0.2238mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

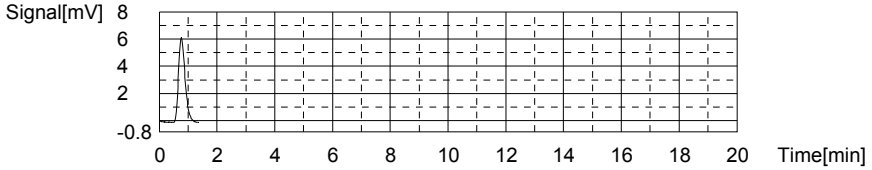
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1205mg/L TC:-0.1650mg/L IC:-0.2855mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.881	-0.1650mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 4:42:17 PM

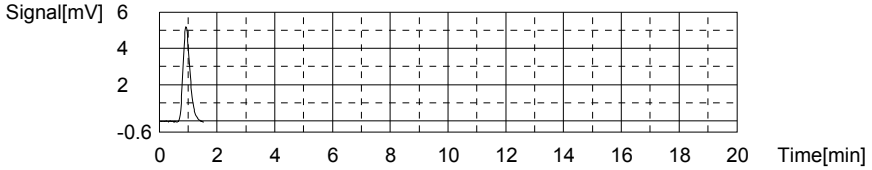
Mean Area 9.881
Mean Conc. -0.1650mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.855	-0.2855mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 4:46:12 PM

Mean Area 8.855
Mean Conc. -0.2855mg/L



Sample

Sample Name: L17050731-29
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

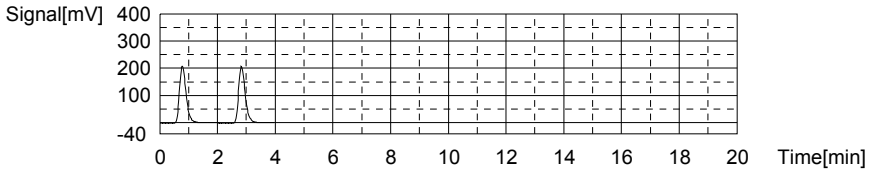
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.382mg/L TC:7.531mg/L IC:6.148mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	336.1	7.542mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 4:53:42 PM
2	335.1	7.519mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 4:57:53 PM

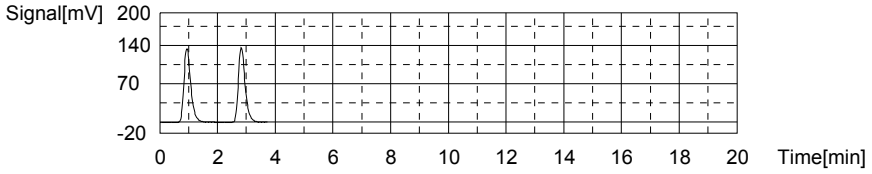
Mean Area 335.6
Mean Conc. 7.531mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	222.6	6.098mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 5:02:37 PM
2	226.0	6.199mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 5:07:04 PM

Mean Area 224.3
Mean Conc. 6.148mg/L



Sample

Sample Name: L17050731-32
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

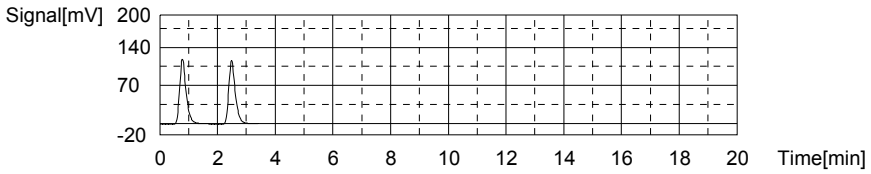
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.548mg/L TC:3.944mg/L IC:2.396mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	184.7	3.965mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 5:14:14 PM
2	182.9	3.923mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 5:18:13 PM

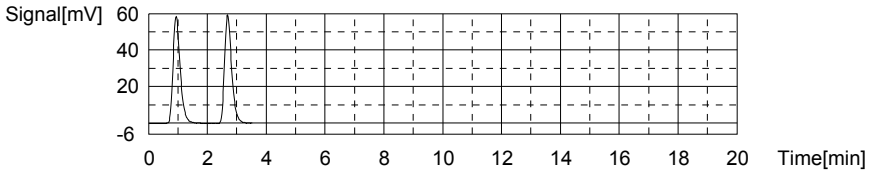
Mean Area 183.8
Mean Conc. 3.944mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	98.08	2.379mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/12/2017 5:22:48 PM
2	99.19	2.412mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/12/2017 5:27:12 PM

Mean Area 98.63
Mean Conc. 2.396mg/L



Sample

Sample Name: L17050731-34
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

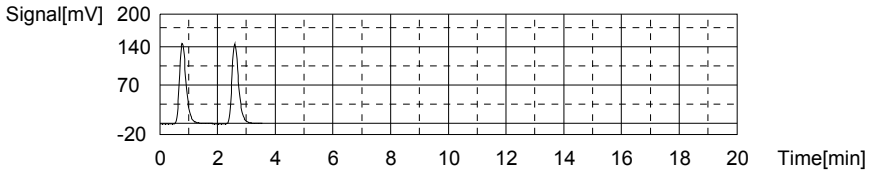
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.748mg/L TC:5.168mg/L IC:3.420mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	236.1	5.180mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 5:34:29 PM
2	235.1	5.156mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 5:38:30 PM

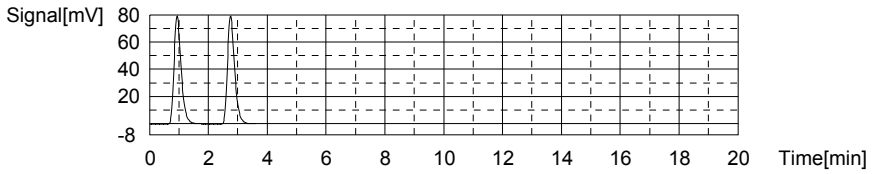
Mean Area 235.6
Mean Conc. 5.168mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	132.9	3.419mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/12/2017 5:43:10 PM
2	133.0	3.422mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/12/2017 5:47:37 PM

Mean Area 132.9
Mean Conc. 3.420mg/L



Sample

Sample Name: WG613997-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

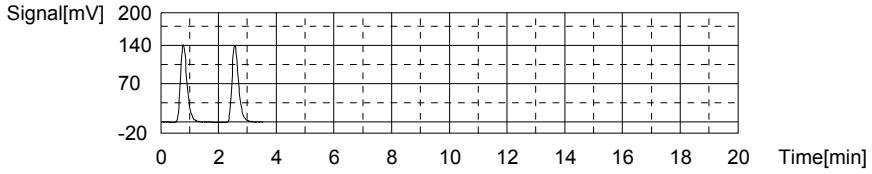
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.687mg/L TC:4.907mg/L IC:3.220mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	224.9	4.915mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 5:54:52 PM
2	224.2	4.899mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 5:58:55 PM

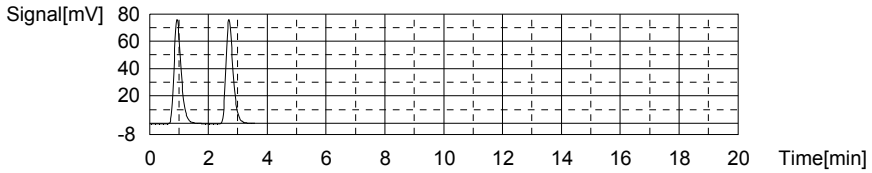
Mean Area 224.6
Mean Conc. 4.907mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	125.8	3.207mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 6:03:32 PM
2	126.7	3.234mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 6:07:56 PM

Mean Area 126.3
Mean Conc. 3.220mg/L



Sample

Sample Name: WG613997-06 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

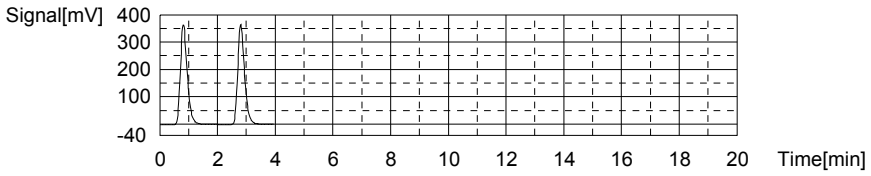
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:12.80mg/L TC:13.80mg/L IC:0.9928mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	599.0	13.75mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 6:15:24 PM
2	602.7	13.84mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 6:19:40 PM

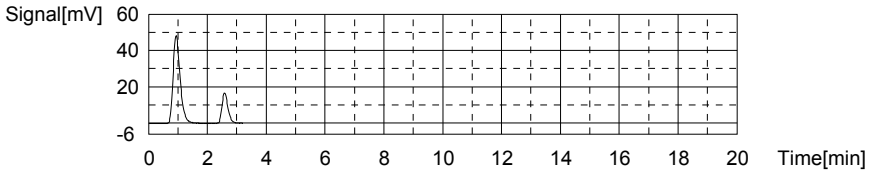
Mean Area 600.9
Mean Conc. 13.80mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	79.65	1.829mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 6:24:13 PM
2	23.67	0.1569mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 6:28:21 PM

Mean Area 51.66
Mean Conc. 0.9928mg/L



Sample

Sample Name: WG614084-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

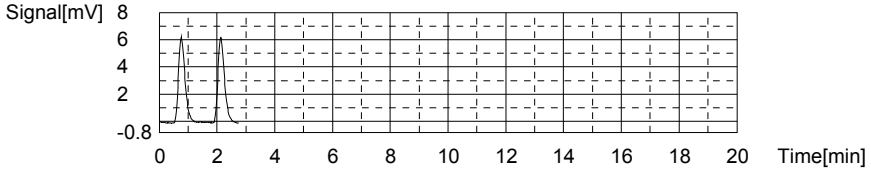
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1268mg/L TC:-0.1643mg/L IC:-0.2912mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.925	-0.1640mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 6:33:22 PM
2	9.894	-0.1647mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 6:36:53 PM

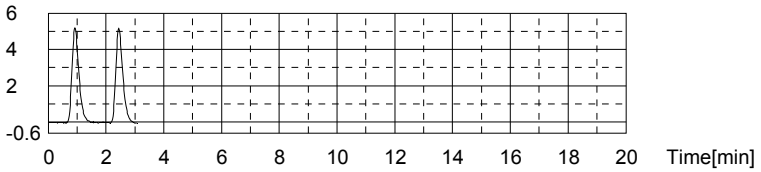
Mean Area 9.910
Mean Conc. -0.1643mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.653	-0.2915mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 6:40:46 PM
2	8.677	-0.2908mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 6:44:41 PM

Mean Area 8.665
Mean Conc. -0.2912mg/L



Sample

Sample Name: WG614084-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

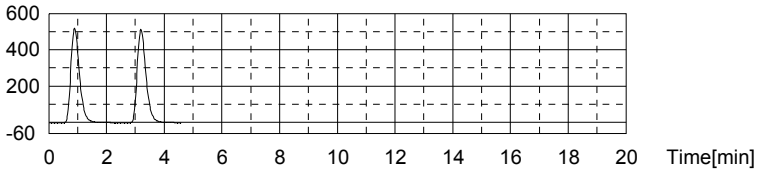
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.25mg/L TC:24.96mg/L IC:-0.2890mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1071	24.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 6:52:27 PM
2	1076	25.02mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 6:57:01 PM

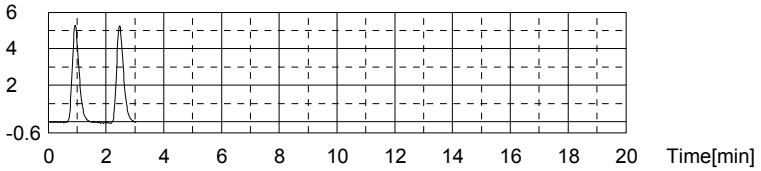
Mean Area 1074
Mean Conc. 24.96mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.703	-0.2900mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 7:01:22 PM
2	8.769	-0.2880mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 7:05:28 PM

Mean Area 8.736
Mean Conc. -0.2890mg/L



Sample

Sample Name: WG614084-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

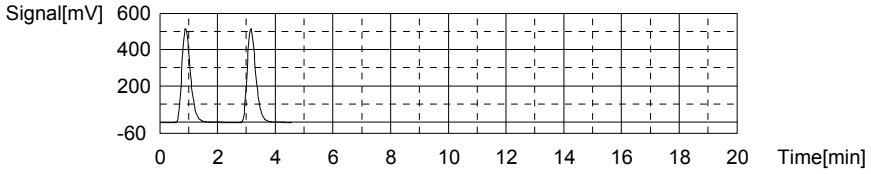
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.28mg/L TC:24.99mg/L IC:-0.2919mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1077	25.05mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 7:13:12 PM
2	1072	24.93mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 7:17:47 PM

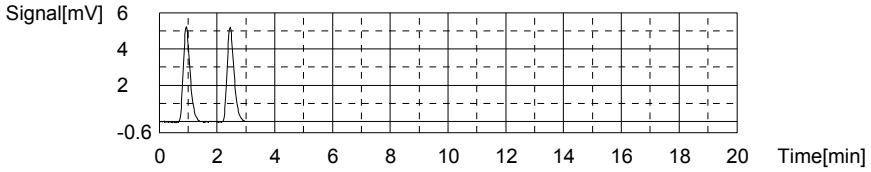
Mean Area 1075
Mean Conc. 24.99mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.637	-0.2920mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 7:22:08 PM
2	8.646	-0.2917mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 7:26:16 PM

Mean Area 8.642
Mean Conc. -0.2919mg/L



Sample

Sample Name: L17050675-02 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

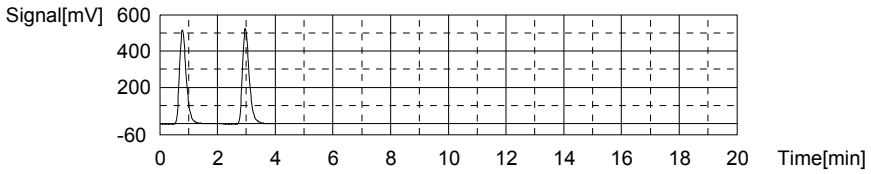
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.676mg/L TC:19.58mg/L IC:12.91mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	839.7	19.44mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 7:33:55 PM
2	851.6	19.72mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 7:38:14 PM

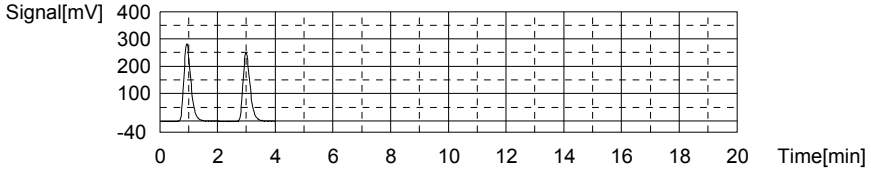
Mean Area 845.7
Mean Conc. 19.58mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	475.8	13.66mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 7:43:17 PM
2	425.3	12.15mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 7:47:52 PM

Mean Area 450.6
Mean Conc. 12.91mg/L



Sample

Sample Name: L17050675-03 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

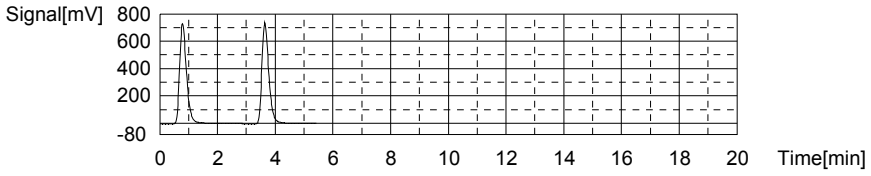
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:19.77mg/L TC:28.36mg/L IC:8.585mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1214	28.28mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 7:56:11 PM
2	1220	28.43mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:01:02 PM

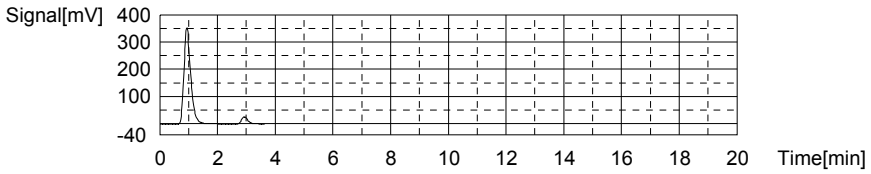
Mean Area 1217
Mean Conc. 28.36mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	571.9	16.53mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:06:03 PM
2	39.85	0.6401mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:10:18 PM

Mean Area 305.9
Mean Conc. 8.585mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

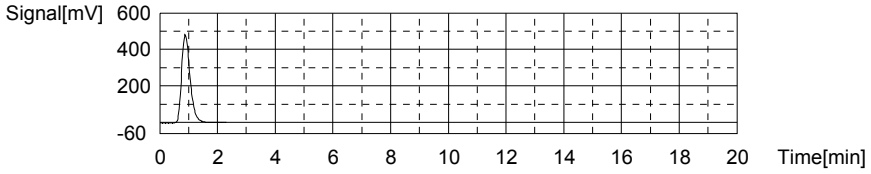
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.04mg/L TC:22.75mg/L IC:-0.2937mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	979.7	22.75mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:18:04 PM

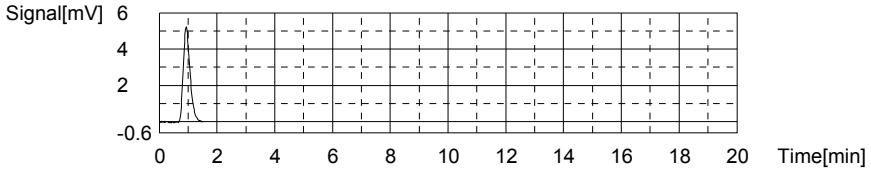
Mean Area 979.7
Mean Conc. 22.75mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.581	-0.2937mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:22:23 PM

Mean Area 8.581
Mean Conc. -0.2937mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

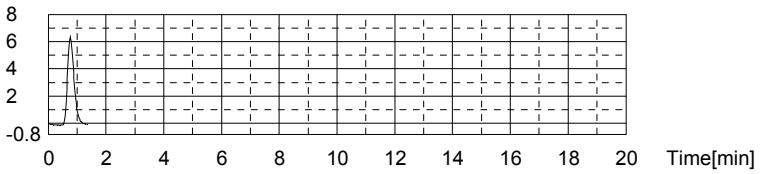
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1300mg/L TC:-0.1598mg/L IC:-0.2898mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.10	-0.1598mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:27:21 PM

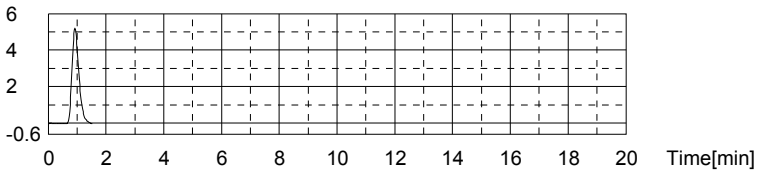
Mean Area 10.10
Mean Conc. -0.1598mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.709	-0.2898mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:31:19 PM

Mean Area 8.709
Mean Conc. -0.2898mg/L



Sample

Sample Name: L17050675-04 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

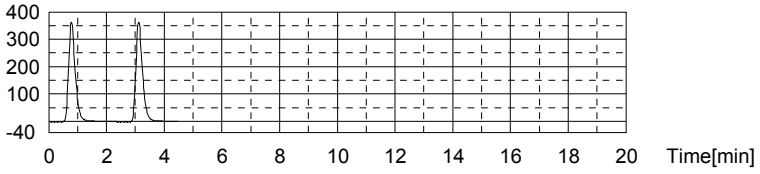
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:8.262mg/L TC:13.16mg/L IC:4.900mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	574.6	13.18mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:39:07 PM
2	573.3	13.15mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 8:43:44 PM

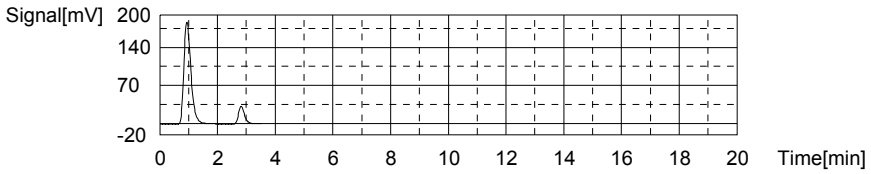
Mean Area 574.0
Mean Conc. 13.16mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	317.5	8.932mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:48:35 PM
2	47.50	0.8686mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 8:52:50 PM

Mean Area 182.5
Mean Conc. 4.900mg/L



Sample

Sample Name: L17050675-05 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

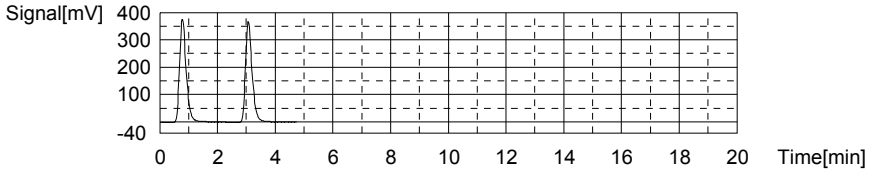
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:8.530mg/L TC:13.62mg/L IC:5.089mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	598.6	13.74mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:00:35 PM
2	588.0	13.49mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:05:27 PM

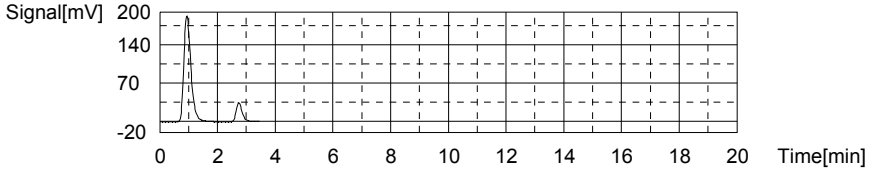
Mean Area 593.3
Mean Conc. 13.62mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	327.5	9.230mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:10:12 PM
2	50.18	0.9486mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:14:27 PM

Mean Area 188.8
Mean Conc. 5.089mg/L



Sample

Sample Name: L17050675-07 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

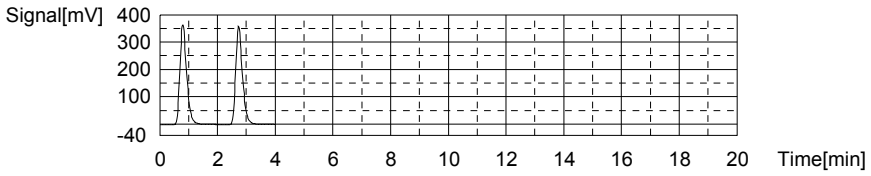
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:10.60mg/L TC:13.44mg/L IC:2.836mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	589.0	13.52mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:21:51 PM
2	582.3	13.36mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:26:10 PM

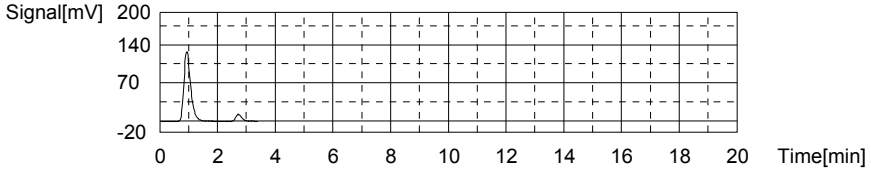
Mean Area 585.7
Mean Conc. 13.44mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	207.9	5.659mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:30:55 PM
2	18.85	0.01300mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:35:05 PM

Mean Area 113.4
Mean Conc. 2.836mg/L



Sample

Sample Name: L17050675-08 (5) MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

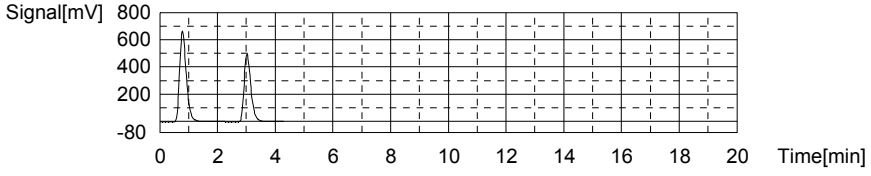
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:18.67mg/L TC:21.73mg/L IC:3.060mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1064	24.74mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:42:47 PM
2	808.9	18.71mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 9:47:13 PM

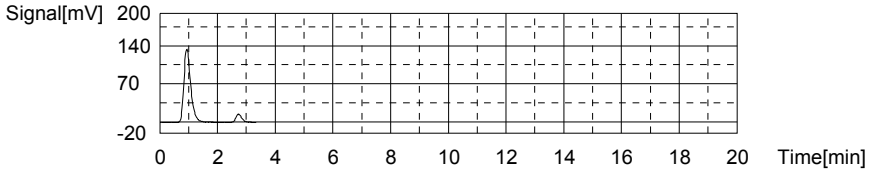
Mean Area 936.5
Mean Conc. 21.73mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	220.2	6.026mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:51:56 PM
2	21.57	0.09423mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 9:56:04 PM

Mean Area 120.9
Mean Conc. 3.060mg/L



Sample

Sample Name: L17050675-09 (5) MSD
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

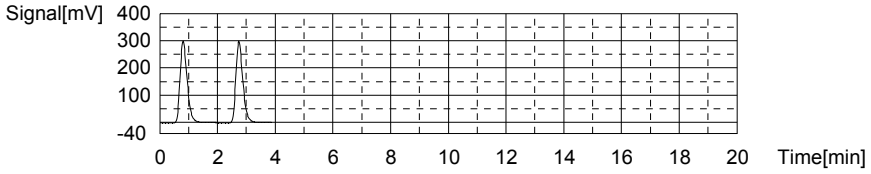
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:9.904mg/L TC:11.51mg/L IC:1.609mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	506.1	11.56mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:03:28 PM
2	502.2	11.47mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:07:41 PM

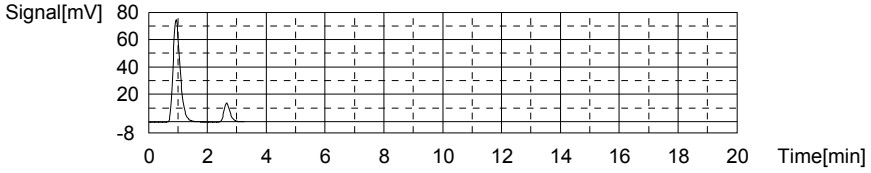
Mean Area 504.2
Mean Conc. 11.51mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	124.7	3.174mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:12:18 PM
2	19.87	0.04347mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:16:24 PM

Mean Area 72.28
Mean Conc. 1.609mg/L



Sample

Sample Name: L17050733-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

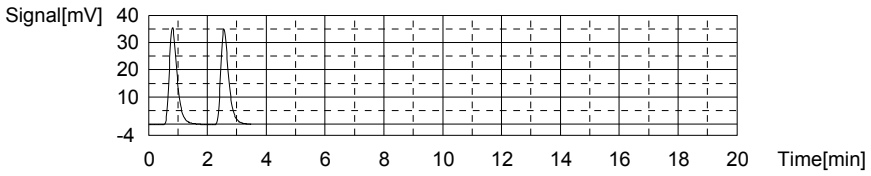
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:1.216mg/L TC:1.150mg/L IC:-0.06613mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	65.64	1.152mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:23:37 PM
2	65.45	1.148mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:27:38 PM

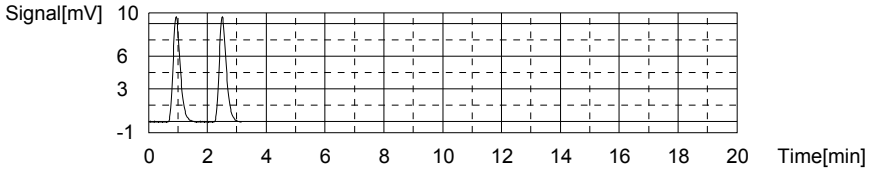
Mean Area 65.55
Mean Conc. 1.150mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	16.19	-0.06643mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:32:03 PM
2	16.21	-0.06583mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:36:17 PM

Mean Area 16.20
Mean Conc. -0.06613mg/L



Sample

Sample Name: L17050733-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

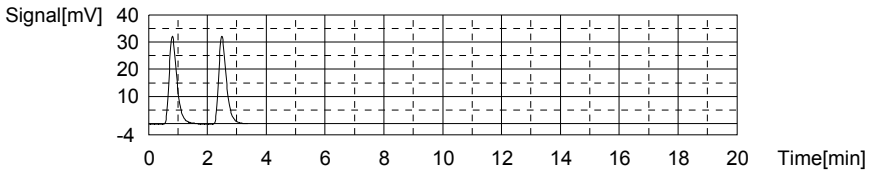
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:1.065mg/L TC:0.9844mg/L IC:-0.08092mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	58.49	0.9835mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:43:26 PM
2	58.57	0.9853mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 10:47:24 PM

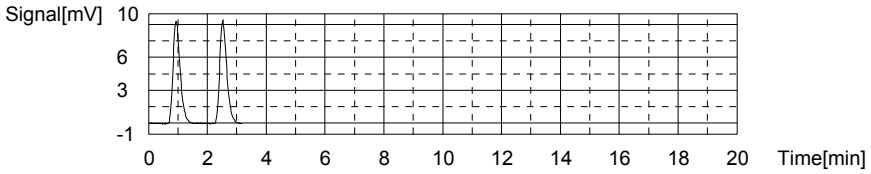
Mean Area 58.53
Mean Conc. 0.9844mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	15.72	-0.08047mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:51:48 PM
2	15.69	-0.08136mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 10:55:58 PM

Mean Area 15.71
Mean Conc. -0.08092mg/L



Sample

Sample Name: L17050733-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

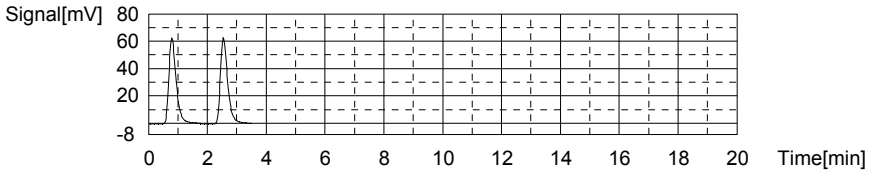
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.279mg/L TC:2.130mg/L IC:0.8510mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	106.5	2.118mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:03:12 PM
2	107.5	2.141mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:07:14 PM

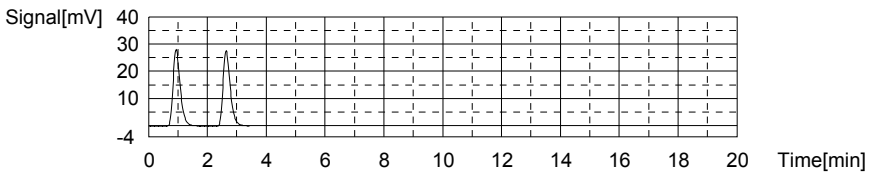
Mean Area 107.0
Mean Conc. 2.130mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	47.12	0.8572mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:11:47 PM
2	46.70	0.8447mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:16:07 PM

Mean Area 46.91
Mean Conc. 0.8510mg/L



Sample

Sample Name: L17050733-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

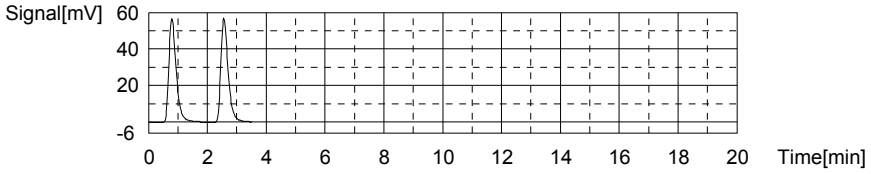
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.263mg/L TC:1.914mg/L IC:0.6515mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	97.76	1.911mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:23:22 PM
2	98.01	1.917mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:27:24 PM

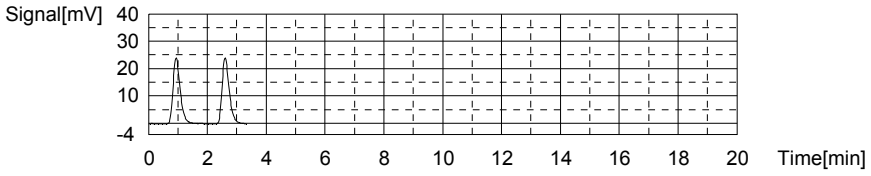
Mean Area 97.89
Mean Conc. 1.914mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	40.18	0.6500mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:31:53 PM
2	40.28	0.6530mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:36:09 PM

Mean Area 40.23
Mean Conc. 0.6515mg/L



Sample

Sample Name: L17050733-09
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

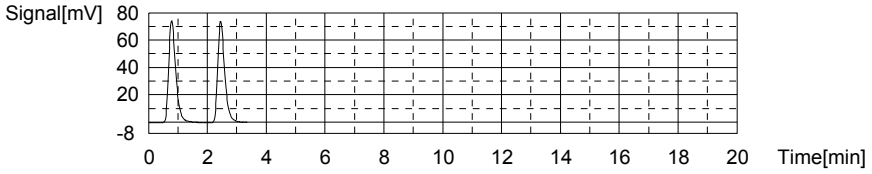
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.075mg/L TC:2.492mg/L IC:1.417mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	123.2	2.512mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:43:18 PM
2	121.5	2.472mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/12/2017 11:47:16 PM

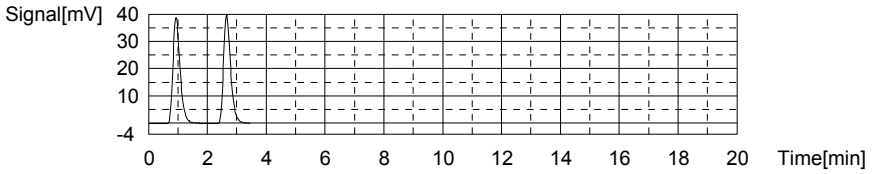
Mean Area 122.3
Mean Conc. 2.492mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	65.12	1.395mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:51:49 PM
2	66.61	1.439mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/12/2017 11:56:11 PM

Mean Area 65.87
Mean Conc. 1.417mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

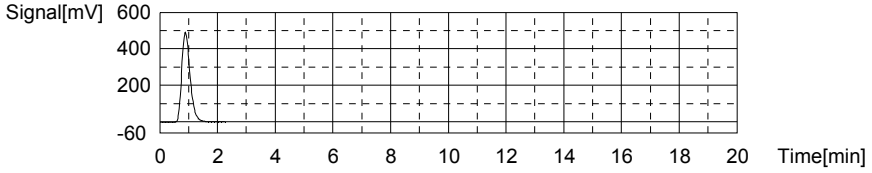
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.23mg/L TC:22.92mg/L IC:-0.3051mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	987.1	22.92mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 12:03:56 AM

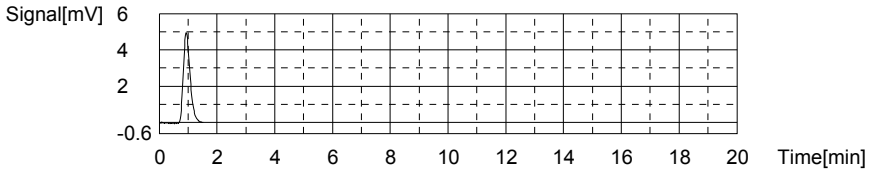
Mean Area 987.1
Mean Conc. 22.92mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.198	-0.3051mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/13/2017 12:08:18 AM

Mean Area 8.198
Mean Conc. -0.3051mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

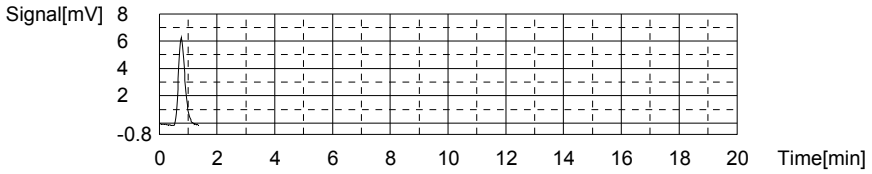
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1263mg/L TC:-0.1610mg/L IC:-0.2874mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.05	-0.1610mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 12:13:17 AM

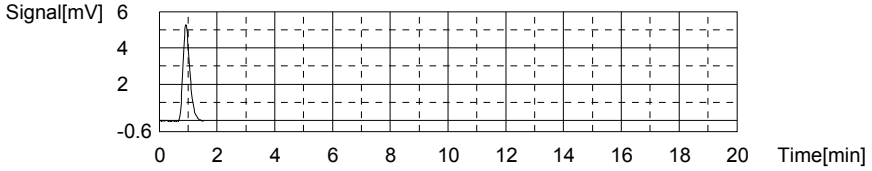
Mean Area 10.05
Mean Conc. -0.1610mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.792	-0.2874mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/13/2017 12:17:13 AM

Mean Area 8.792
Mean Conc. -0.2874mg/L



Sample

Sample Name: L17050733-11
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

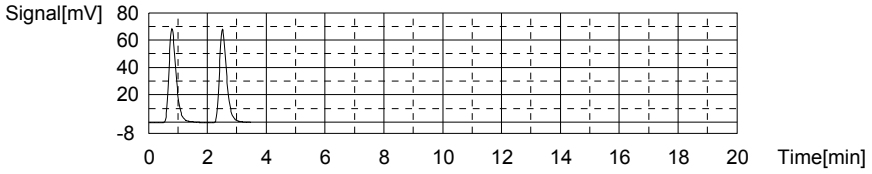
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.943mg/L TC:2.341mg/L IC:0.3981mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	115.9	2.340mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 12:24:25 AM
2	116.0	2.342mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 12:28:27 AM

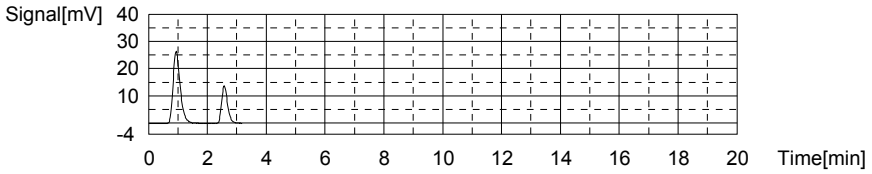
Mean Area 116.0
Mean Conc. 2.341mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	44.11	0.7674mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 12:32:58 AM
2	19.38	0.02883mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 12:37:03 AM

Mean Area 31.75
Mean Conc. 0.3981mg/L



Sample

Sample Name: L17050733-13
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

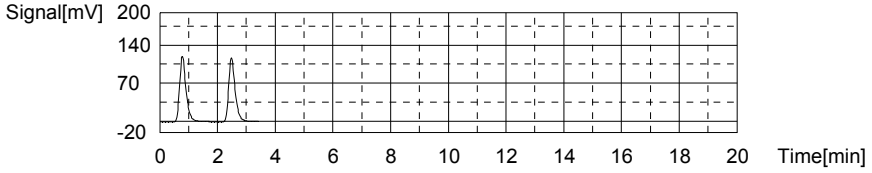
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.132mg/L TC:3.906mg/L IC:2.774mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	183.8	3.944mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 12:44:13 AM
2	180.6	3.868mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 12:48:13 AM

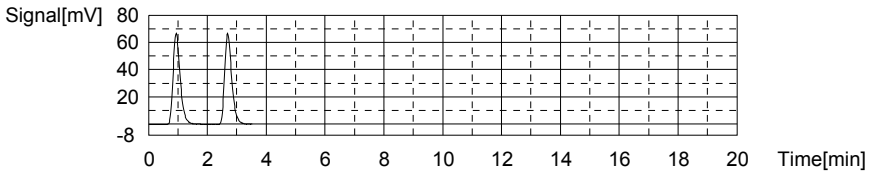
Mean Area 182.2
Mean Conc. 3.906mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	111.3	2.774mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 12:52:48 AM
2	111.3	2.774mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 12:57:12 AM

Mean Area 111.3
Mean Conc. 2.774mg/L



Sample

Sample Name: L17050733-15
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

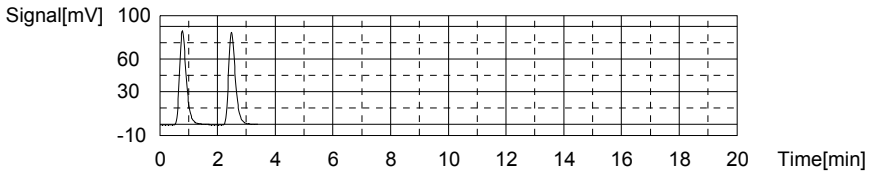
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.9987mg/L TC:2.881mg/L IC:1.882mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	138.9	2.883mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 1:04:23 AM
2	138.7	2.879mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 1:08:21 AM

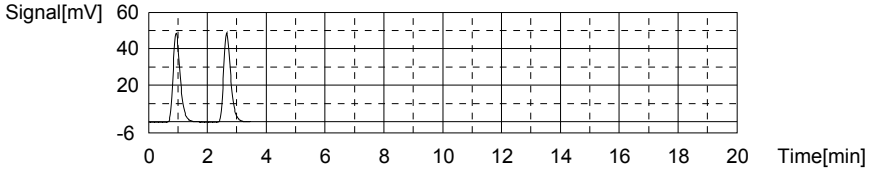
Mean Area 138.8
Mean Conc. 2.881mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	81.34	1.879mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 1:12:54 AM
2	81.54	1.885mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 1:17:14 AM

Mean Area 81.44
Mean Conc. 1.882mg/L



Sample

Sample Name: L17050760-02 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

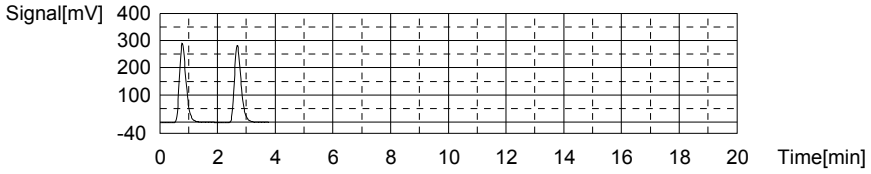
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.389mg/L TC:10.47mg/L IC:4.084mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	462.4	10.53mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 1:24:37 AM
2	457.9	10.42mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 1:28:46 AM

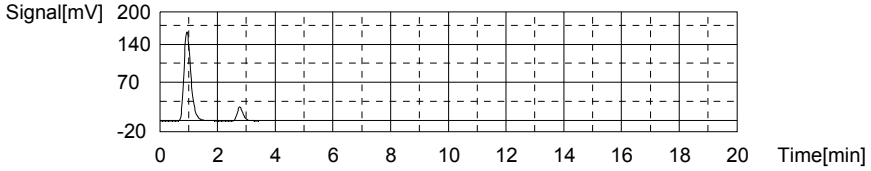
Mean Area 460.2
Mean Conc. 10.47mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	273.8	7.627mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 1:33:32 AM
2	36.55	0.5416mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 1:37:47 AM

Mean Area 155.2
Mean Conc. 4.084mg/L



Sample

Sample Name: <Untitled>
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

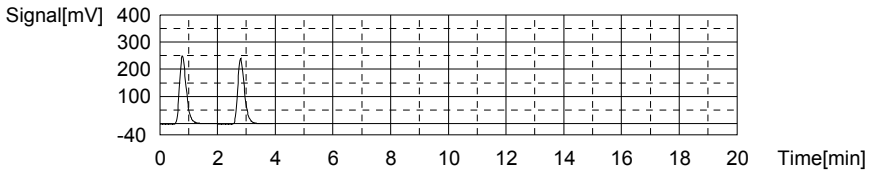
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.157mg/L TC:9.044mg/L IC:2.887mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	406.4	9.203mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 1:45:17 AM
2	392.9	8.884mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 1:49:27 AM

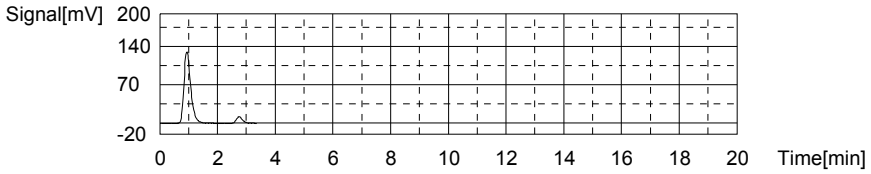
Mean Area 399.7
Mean Conc. 9.044mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	212.4	5.793mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 1:54:12 AM
2	17.76	-0.01955mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 1:58:19 AM

Mean Area 115.1
Mean Conc. 2.887mg/L



Sample

Sample Name: L17050760-04
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

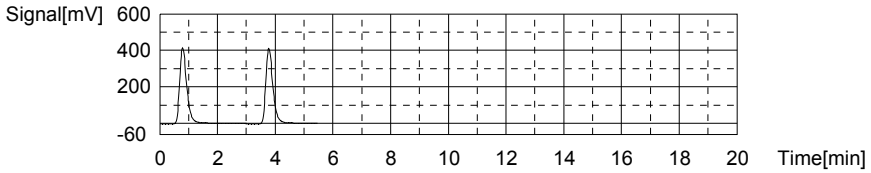
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:7.059mg/L TC:16.38mg/L IC:9.324mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	714.5	16.48mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 2:06:47 AM
2	706.1	16.28mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 2:11:44 AM

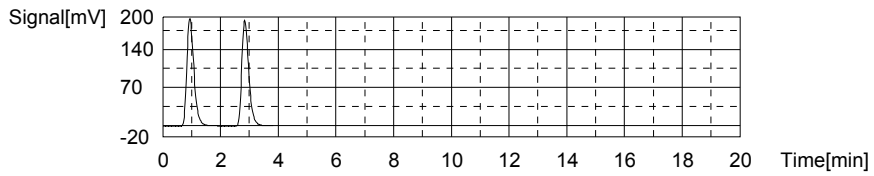
Mean Area 710.3
Mean Conc. 16.38mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	333.8	9.418mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 2:16:32 AM
2	327.5	9.230mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 2:21:08 AM

Mean Area 330.6
Mean Conc. 9.324mg/L



Sample

Sample Name: L17050760-05 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

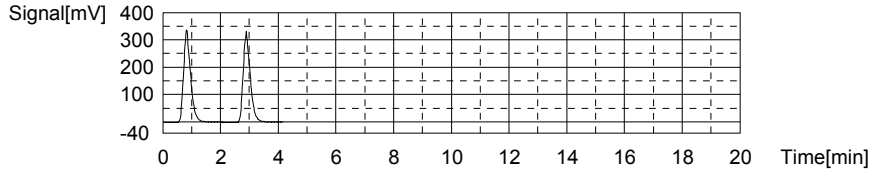
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:11.72mg/L TC:12.80mg/L IC:1.080mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	560.4	12.84mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 2:28:40 AM
2	556.8	12.76mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 2:33:07 AM

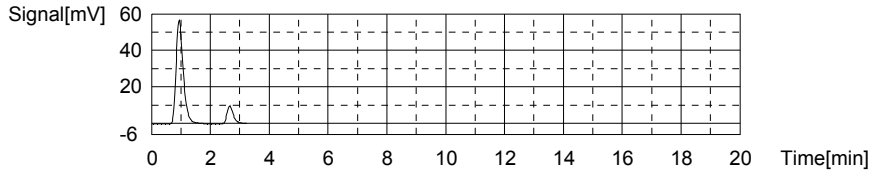
Mean Area 558.6
Mean Conc. 12.80mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	94.84	2.282mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 2:37:46 AM
2	14.32	-0.1223mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 2:41:52 AM

Mean Area 54.58
Mean Conc. 1.080mg/L



Sample

Sample Name: L17050768-01 (2)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

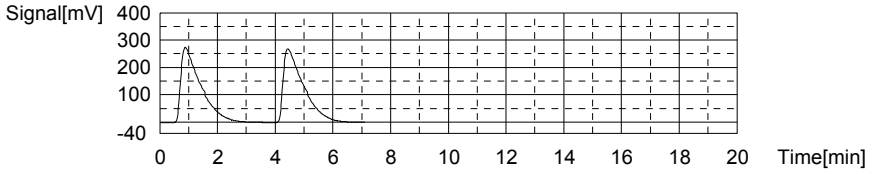
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:29.12mg/L TC:30.41mg/L IC:1.292mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1305	30.43mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 2:50:54 AM
2	1303	30.39mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 2:56:44 AM

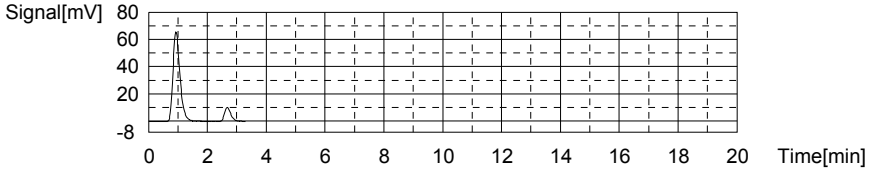
Mean Area 1304
Mean Conc. 30.41mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	108.0	2.675mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 3:01:20 AM
2	15.35	-0.09152mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 3:05:28 AM

Mean Area 61.67
Mean Conc. 1.292mg/L



Sample

Sample Name: WG614084-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

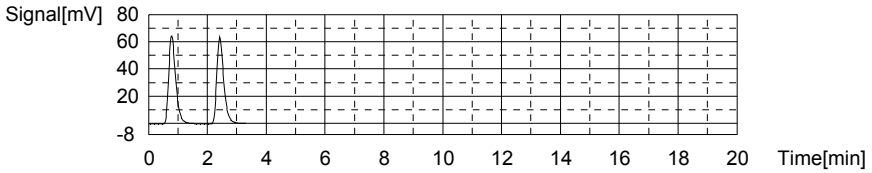
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.9582mg/L TC:2.089mg/L IC:1.131mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	106.2	2.111mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 3:12:35 AM
2	104.4	2.068mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 3:16:32 AM

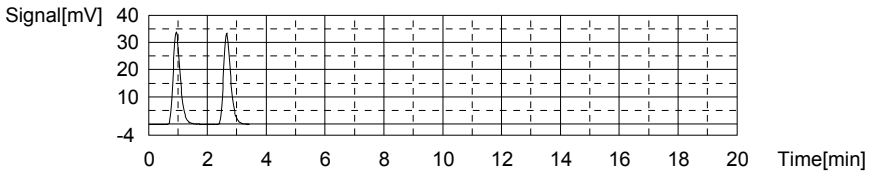
Mean Area 105.3
Mean Conc. 2.089mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	56.50	1.137mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/13/2017 3:21:06 AM
2	56.09	1.125mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/13/2017 3:25:26 AM

Mean Area 56.30
Mean Conc. 1.131mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

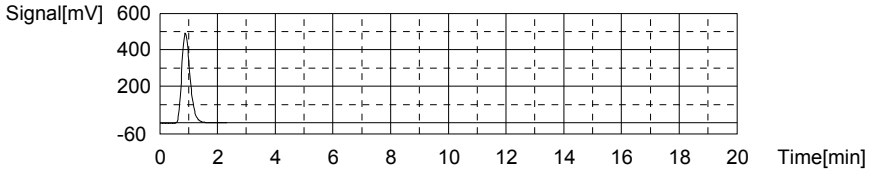
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.26mg/L TC:22.96mg/L IC:-0.2997mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	988.5	22.96mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 3:33:14 AM

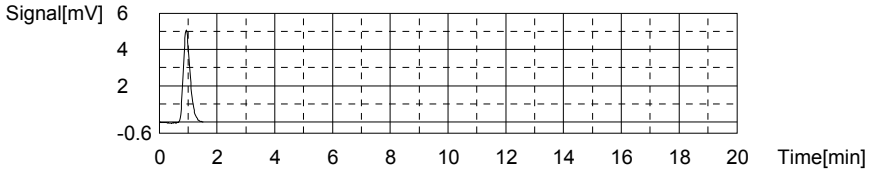
Mean Area 988.5
Mean Conc. 22.96mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.380	-0.2997mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/13/2017 3:37:36 AM

Mean Area 8.380
Mean Conc. -0.2997mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

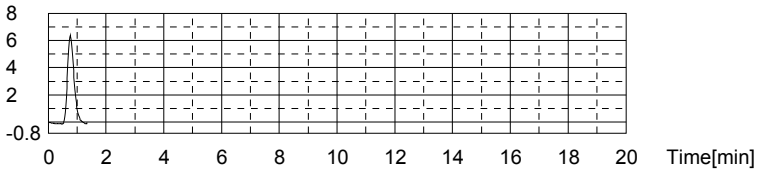
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1264mg/L TC:-0.1558mg/L IC:-0.2823mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.27	-0.1558mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/13/2017 3:42:35 AM

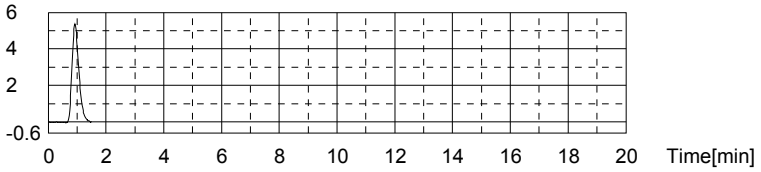
Mean Area 10.27
Mean Conc. -0.1558mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.963	-0.2823mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/13/2017 3:46:32 AM

Mean Area 8.963
Mean Conc. -0.2823mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
May 24, 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
May 24, 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
May 24, 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-SP650-6439-Grab	Water	05/11/17 / 15:00		2	X		X								H2SO4	
LH18/24-SP650-6439-Grab	Water	05/11/17 / 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	05/11/17	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: 05/12/2017 09:49
By: CARA STRICKLER 221000100804

Cara Strickler

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC

COOLER TEMP >6° C LOG

Cooler ID 804

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

CWD 5/12/17

pH Exceptions

pH Lot # HC693124

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

CWD 5/12/17

PRESERVATIVE EXCEPTIONS

✓ NONE

__ AS NOTED

CWD 5/12/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17050768
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 23-MAY-2017

Samplenum	Container ID	Products
L17050768-01	908510	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	12-MAY-2017 10:13	CLS		
2	ANALYZ	W1	SEM	19-MAY-2017 10:29	JWR	CLS	
3	STORE	SEM	A1	24-MAY-2017 10:33	CLS	JWR	

Samplenum	Container ID	Products
L17050768-01	908511	PO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	12-MAY-2017 10:13	CLS		
2	ANALYZ	W1	WET	12-MAY-2017 10:42	DLP	CLS	
3	STORE	WET	A1	16-MAY-2017 08:30	CLS	DLP	

Samplenum	Container ID	Products
L17050768-01	908512	TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	12-MAY-2017 10:13	CLS		<2
2	ANALYZ	W1	WET	12-MAY-2017 15:26	ADG	BRG	
3	STORE	DIG	A2	15-MAY-2017 08:51	CLS	ADG	

Samplenum	Container ID	Products
L17050768-01	908513	NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	12-MAY-2017 10:13	CLS		<2
2	ANALYZ	W1	WET	15-MAY-2017 09:41	EPT	CLS	
3	STORE	WET	A1	17-MAY-2017 11:02	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: L17051050

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 May 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 #: L17051050
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?
00114391	I	3.0		J4616881613	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 #: L17051050
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-SP650-6440	L17051050-01	05/17/2017 15:00	05/18/2017 09:33
TRIP BLANK	L17051050-02	05/17/2017 00:01	05/18/2017 09:33

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

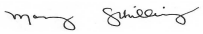
Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051050
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-05-31 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
Mary Schilling		Anaylst III	2017-05-31 13:41:05

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051050
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-05-31 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				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051050
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-05-31 00:00:00		

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				
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				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051050
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-05-31 00:00:00		

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					
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				

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051050
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-05-31 00:00:00		

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 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:**	L17051050
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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	2017-05-24 14:53:47

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051050
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG614890	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615167	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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	2017-05-24 14:50:38

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051050
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615167	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615167	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615167	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615167	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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:**	L17051050
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615167	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-24 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 #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP650-6440	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG614929	**Analyst:**	ADC	**Run Date:**	05/20/2017 01:17
Collect Date:	05/17/2017 15:00	**Dilution:**	1	**File ID:**	11M18529
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	5.35	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	0.501	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	3.12		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	107	70	120	
4-Bromofluorobenzene	115	75	120	
Dibromofluoromethane	103	85	115	
Toluene-d8	108	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 #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6440	**Prep Method:**	6850	**Prep Date:**	05/19/2017 10:50
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG614890	**Analyst:**	JWR	**Run Date:**	05/19/2017 20:21
Collect Date:	05/17/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39662
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	5.01		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L17051050-01	**PrePrep Method:**	N/A	**Instrument:**	IC3
Client ID:	LH18/24-SP650-6440	**Prep Method:**	9056	**Prep Date:**	05/22/2017 17:18
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	12/01/2016 17:22
Workgroup #:	WG615167	**Analyst:**	CAS	**Run Date:**	05/22/2017 20:01
Collect Date:	05/17/2017 15:00	**Dilution:**	5	**File ID:**	I3_052217-11
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	93.2		10.0	5.00	2.50

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

Microbac

Lab Report #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-01	**PrePrep Method:**	N/A	**Instrument:**	IC3
Client ID:	LH18/24-SP650-6440	**Prep Method:**	9056	**Prep Date:**	05/22/2017 17:18
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	12/01/2016 17:22
Workgroup #:	WG615167	**Analyst:**	CAS	**Run Date:**	05/22/2017 20:22
Collect Date:	05/17/2017 15:00	**Dilution:**	50	**File ID:**	I3_052217-12
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	541		20.0	10.0	5.00

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

Microbac

Lab Report #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-02	**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:**	05/16/2017 17:16
Workgroup #:	WG614929	**Analyst:**	ADC	**Run Date:**	05/19/2017 22:53
Collect Date:	05/17/2017 00:01	**Dilution:**	1	**File ID:**	11M18524
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	108	70	120	
4-Bromofluorobenzene	114	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	109	85	120	

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051050
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

Lab Report #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP650-6440	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG614929	**Analyst:**	ADC	**Run Date:**	05/20/2017 01:17
Collect Date:	05/17/2017 15:00	**Dilution:**	1	**File ID:**	11M18529
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	5.35	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	0.501	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	3.12		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	107	70	120	
4-Bromofluorobenzene	115	75	120	
Dibromofluoromethane	103	85	115	
Toluene-d8	108	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 #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-02	**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:**	05/16/2017 17:16
Workgroup #:	WG614929	**Analyst:**	ADC	**Run Date:**	05/19/2017 22:53
Collect Date:	05/17/2017 00:01	**Dilution:**	1	**File ID:**	11M18524
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	108	70	120	
4-Bromofluorobenzene	114	75	120	
Dibromofluoromethane	101	85	115	
Toluene-d8	109	85	120	

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051050
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)]

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 Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 050317
Analyst1: ADC Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 24,0
Method: 624 SOP: MSV10 Rev: 15
Method: 5035/ 5030B/ 5030C SOP: PAT01, OVAP PAT01 Rev: 18,1
Maintenance Log ID:

Internal Standard: STD81442 Surrogate Standard: STD81441
CCV: STD81698/STD81708 LCS: STD81656/STD81640 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG612363 WG612759

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M17986	WG612363-01 50ng BFB STD 8260	NA	1	1	STD81491	05/03/17 10:28
11M17987	RINSE	NA	1	1		05/03/17 10:52
11M17988	WG612363-02 .3ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 11:21
11M17989	WG612363-03 .4ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 11:50
11M17990	WG612363-04 1ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 12:19
11M17991	WG612363-05 2ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 12:48
11M17992	WG612363-06 5ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 13:17
11M17993	WG612363-07 20ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 13:46
11M17994	WG612363-08 50ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 14:15
11M17995	WG612363-09 100ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 14:44
11M17996	WG612363-10 200ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 15:13
11M17997	WG612363-11 300ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 15:42
11M17998	RINSE	NA	1	1		05/03/17 16:11
11M17999	WG612363-12 50ug/L ICV 8260	NA	1	1	STD81656	05/03/17 16:40
11M18000	WG612363-12 20ug/L ICV 8260	NA	1	1	STD81656	05/03/17 17:47
11M18001	WG612759-01 BFB 50ng A9FOO	NA	1	1	STD81491	05/03/17 19:14
11M18002	WG612759-02 5ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 19:42
11M18003	WG612759-03 20ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 20:10
11M18004	WG612759-04 50ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 20:39
11M18005	WG612759-05 100ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 21:08
11M18006	WG612759-06 200ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 21:36
11M18007	WG612759-07 300ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 22:05
11M18008	WG612759-08 400ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 22:34
11M18009	WG612759-09 500ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 23:02
11M18010	RINSE	NA	1	1		05/03/17 23:31
11M18011	WG612759-10 100ug/L STD A9FOO	NA	1	1	STD81640	05/04/17 00:00

Comments

Seq.	Rerun	Dil.	Reason	Analytes
14	X			
File ID: 11M17999				
WG612363-12 ICV had multiple failures. RR at 20ppb.				

Approved: May 09, 2017

Page: 1

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 051617
Analyst1: ADC 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:

Internal Standard: STD81876 Surrogate Standard: STD81877
CCV: STD81698 LCS: STD81861 MS/MSD: STD81861

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG614378 (ICAL)

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18429	WG614378-01 BFB 50ng 8260	NA	1	1	STD81491	05/16/17 12:01
11M18430	RINSE	NA	1	1		05/16/17 12:25
11M18431	WG614378-02 0.3ug/L CCV 8260	NA	1	1	STD81880	05/16/17 12:54
11M18432	WG614378-03 0.4ug/L CCV 8260	NA	1	1	STD81880	05/16/17 13:23
11M18433	WG614378-04 1.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 13:52
11M18434	WG614378-05 2.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 14:21
11M18435	WG614378-06 5.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 14:50
11M18436	WG614378-07 20.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 15:20
11M18437	WG614378-08 50.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 15:49
11M18438	WG614378-09 100.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 16:18
11M18439	WG614378-10 200.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 16:47
11M18440	WG614378-11 300.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 17:16
11M18441	RINSE	NA	1	1	STD81880	05/16/17 17:45
11M18442	WG614378-12 20.0ug/L ALT 8260	NA	1	1	STD81881	05/16/17 18:14

Approved: May 22, 2017

Page: 1

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 051917
Analyst1: ADC Analyst2: NA
Method: 8260B SOP: MSV01/OVAP MSV01 Rev: 24/0
Method: 5030B/5030C/5035A SOP: PAT01/OVAP PAT01 Rev: 18/1

Maintenance Log ID:

Internal Standard: STD81876 Surrogate Standard: STD81877
CCV: STD81880 LCS: STD8188 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG614929

Comments: L17050950-01,-02,-03 may need reanlayzed due to low 1,4-dioxane recovery in the LCS/LCSDUP.
L17051074-01,-03, and -05 are being reanalyzed more concentrated.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18505	WG614928-01 BFB 50ng 8260	NA	1	1	STD81491	05/19/17 13:44
11M18506	WG614928-02 50ug/L CCV 8260	NA	1	1	STD81880	05/19/17 14:09
11M18507	WGXXXXX-01 100ug/L CCV A9	NA	1	1	STD81708	05/19/17 14:42
11M18508	WG614929-01 BLANK 8260	NA	1	1		05/19/17 15:11
11M18509	WG614929-02 20ug/L LCS 8260	NA	1	1	STD81881	05/19/17 15:40
11M18510	WG614929-03 20ug/L LCSDUP 8260	NA	1	1	STD81881	05/19/17 16:09
11M18511	L17051093-10 B 100X 826-SPE	<2	1	100		05/19/17 16:38
11M18512	L17051074-01 B 5X 826-SPE	<2	1	5		05/19/17 17:07
11M18513	L17051074-05 B 5X 826-SPE	<2	1	5		05/19/17 17:36
11M18514	L17051074-03 B 20X 826-SPE	<2	1	20		05/19/17 18:05
11M18515	L17051074-03 B 10X 826-SPE	<2	1	10		05/19/17 18:34
11M18516	L17051093-03 B 10X 826-SPE	<2	1	10		05/19/17 19:03
11M18517	L17051093-04 B 10X 826-SPE	<2	1	10		05/19/17 19:32
11M18518	L17051093-06 B 20X 826-SPE	<2	1	20		05/19/17 20:00
11M18519	L17051093-07 B 5X 826-SPE	<2	1	5		05/19/17 20:29
11M18520	L17051093-08 B 50X 826-SPE	<2	1	50		05/19/17 20:58
11M18521	L17051093-09 B 50X 826-SPE	<2	1	50		05/19/17 21:27
11M18522	L17051093-11 B 100X 826-SPE	<2	1	10		05/19/17 21:56
11M18523	L17050950-03 B 826-SPE	<2	1	1		05/19/17 22:24
11M18524	L17051050-02 A 826-SPE	<2	1	1		05/19/17 22:53
11M18525	L17050625-01 B 826-VAP2	<2	1	1		05/19/17 23:22
11M18526	L17050821-02 B 826-LOW	<2	1	1		05/19/17 23:51
11M18527	L17050950-01 B 826-SPE	<2	1	1		05/20/17 00:20
11M18528	L17050950-02 B 826-SPE	<2	1	1		05/20/17 00:48
11M18529	L17051050-01 A 826-SPE	<2	1	1		05/20/17 01:17
11M18530	RINSE	NA	1	1		05/20/17 01:46
11M18531	RINSE	NA	1	1		05/20/17 02:16
11M18532	RINSE	NA	1	1		05/20/17 02:45

Approved: May 30, 2017

Page: 1

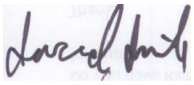
Microbac Laboratories Inc.

Data Checklist

Date: 03-MAY-2017
Analyst: ADC
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 81984
Analytical Workgroups: WG612363 WG612759

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	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	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:
08-MAY-2017



Secondary Reviewer:
09-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-09-2017 08:44:21

Microbac Laboratories Inc.

Data Checklist

Date: 16-MAY-2017
Analyst: ADC
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82278
Analytical Workgroups: WG614378

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	ADC
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	ADC
Secondary Reviewer	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:
19-MAY-2017

Secondary Reviewer:
22-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-22-2017 09:02:59

Microbac Laboratories Inc.

Data Checklist

Date: 19-MAY-2017
Analyst: ADC
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82318
Analytical Workgroups: WG614929

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	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	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:
22-MAY-2017

Secondary Reviewer:
30-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-30-2017 11:43:13

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B **AAB#:** WG614929

Login Number: L17051050

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-SP650-6440	01	05/17/17					05/20/2017	2.4	14		05/20/17	2.4	14	
TRIP BLANK	02	05/17/17					05/19/2017	3	14		05/19/17	3	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5305206
Report generated 05/31/2017 09:31

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17051050
Instrument Id: HPMS11
Workgroup (AAB#): WG614929

Method: 8260
CAL ID: HPMS11-16-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17051050-01	1.00	01	107	103	115	108
L17051050-02	1.00	01	108	101	114	109
WG614929-01	1.00	01	103	99.1	109	107
WG614929-02	1.00	01	104	102	104	105
WG614929-03	1.00	01	105	104	105	108

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: 5305215
Report generated: 05/31/2017 09:32

METHOD BLANK SUMMARY

Login Number:	L17051050	**Work Group:**	WG614929
Blank File ID:	11M18508	**Blank Sample ID:**	WG614929-01
Prep Date:	05/19/17 15:11	**Instrument ID:**	HPMS11
Analyzed Date:	05/19/17 15:11	**Method:**	8260B
Analyst:	ADC		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG614929-02	11M18509	05/19/17 15:40	01
LCS2	WG614929-03	11M18510	05/19/17 16:09	01
TRIP BLANK	L17051050-02	11M18524	05/19/17 22:53	01
LH18/24-SP650-6440	L17051050-01	11M18529	05/20/17 01:17	01

Report Name: BLANK_SUMMARY
PDF File ID: 5305207
Report generated 05/31/2017 09:31

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051050 Prep Date: 05/19/17 15:11 Sample ID: WG614929-01
Instrument ID: HPMS11 Run Date: 05/19/17 15:11 Prep Method: 5030B/5030C/503
File ID: 11M18508 Analyst: ADC Method: 8260B
Workgroup (AAB#): WG614929 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS11-16-MAY-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	103	70	-	120	PASS
4-Bromofluorobenzene	109	75	-	120	PASS
Dibromofluoromethane	99.1	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: 5305208
31-MAY-2017 09:31

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051050 Analyst: ADC Prep Method: 5030B/5030C/503
Instrument ID: HPMS11 Matrix: Water Method: 8260B
Workgroup (AAB#): WG614929 Units: ug/L
QC Key: DOD4 Lot #: STD81881

Sample ID: WG614929-02 LCS File ID: 11M18509 Run Date: 05/19/2017 15:40
Sample ID: WG614929-03 LCS2 File ID: 11M18510 Run Date: 05/19/2017 16:09

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	22.0	110	20.0	21.1	106	3.90	65 - 130	30	
1,1,2-Trichloroethane	20.0	20.6	103	20.0	20.3	102	1.22	75 - 125	30	
1,1-Dichloroethane	20.0	20.6	103	20.0	20.0	100	3.08	70 - 135	30	
1,1-Dichloroethene	20.0	21.4	107	20.0	20.3	101	5.39	70 - 130	30	
1,2-Dichloroethane	20.0	21.1	106	20.0	20.7	104	1.93	70 - 130	30	
Acetone	20.0	16.8	83.8	20.0	16.2	81.2	3.22	40 - 140	30	
Benzene	20.0	22.1	110	20.0	21.4	107	3.28	80 - 120	30	
Carbon tetrachloride	20.0	22.0	110	20.0	20.9	105	5.19	65 - 140	30	
Chloroform	20.0	19.6	98.1	20.0	19.0	95.0	3.25	65 - 135	30	
Ethylbenzene	20.0	21.1	106	20.0	20.6	103	2.49	75 - 125	30	
m,p-Xylene	40.0	45.0	113	40.0	44.0	110	2.36	75 - 130	30	
Methylene chloride	20.0	19.6	97.9	20.0	19.2	95.8	2.16	55 - 140	30	
o-Xylene	20.0	22.9	115	20.0	22.4	112	2.29	80 - 120	30	
Styrene	20.0	22.9	115	20.0	22.7	114	0.925	65 - 135	30	
Tetrachloroethene	20.0	22.5	113	20.0	21.9	109	2.77	45 - 150	30	
Toluene	20.0	22.6	113	20.0	22.1	110	2.31	75 - 120	30	
Trichloroethene	20.0	21.5	107	20.0	20.7	103	3.80	70 - 125	30	
Vinyl chloride	20.0	22.9	115	20.0	24.0	120	4.76	50 - 145	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,2-Dichloroethane-d4	104	105	70 - 120	PASS
Dibromofluoromethane	102	104	85 - 115	PASS
4-Bromofluorobenzene	104	105	75 - 120	PASS
Toluene-d8	105	108	85 - 120	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5305209
Report generated: 05/31/2017 09:31

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051050
Instrument: HPMS11
Analyst: FJB
Workgroup: WG612759

Tune ID: WG612759-01
Run Date: 05/03/2017
Run Time: 19:14
File ID: 11M18001
Cal ID: HPMS11-03-MAY-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	22.7	10582	PASS
75.0	95.0	30.0	60.0	49.6	23133	PASS
95.0	95.0	100	100	100	46626	PASS
96.0	95.0	5.00	9.00	6.81	3175	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	87.5	40784	PASS
175	174	5.00	9.00	8.19	3340	PASS
176	174	95.0	101	98.0	39952	PASS
177	176	5.00	9.00	6.40	2555	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG612759-02	STD	01	05/03/2017 19:42	
WG612759-03	STD	01	05/03/2017 20:10	
WG612759-04	STD	01	05/03/2017 20:39	
WG612759-05	STD-CCV	01	05/03/2017 21:08	
WG612759-06	STD	01	05/03/2017 21:36	
WG612759-07	STD	01	05/03/2017 22:05	
WG612759-08	STD	01	05/03/2017 22:34	
WG612759-09	STD	01	05/03/2017 23:02	
WG612759-10	SSCV	01	05/04/2017 00:00	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5305211
Report generated 05/31/2017 09:31

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051050
Instrument: HPMS11
Analyst: ADC
Workgroup: WG614378

Tune ID: WG614378-01
Run Date: 05/16/2017
Run Time: 12:01
File ID: 11M18429
Cal ID: HPMS11-16-MAY-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	24.1	5305	PASS
75.0	95.0	30.0	60.0	51.3	11296	PASS
95.0	95.0	100	100	100	22034	PASS
96.0	95.0	5.00	9.00	6.88	1516	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	87.2	19224	PASS
175	174	5.00	9.00	7.97	1532	PASS
176	174	95.0	101	97.2	18686	PASS
177	176	5.00	9.00	6.15	1149	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG614378-02	STD	01	05/16/2017 12:54	
WG614378-03	STD	01	05/16/2017 13:23	
WG614378-04	STD	01	05/16/2017 13:52	
WG614378-05	STD	01	05/16/2017 14:21	
WG614378-06	STD	01	05/16/2017 14:50	
WG614378-07	STD	01	05/16/2017 15:20	
WG614378-08	STD-CCV	01	05/16/2017 15:49	
WG614378-09	STD	01	05/16/2017 16:18	
WG614378-10	STD	01	05/16/2017 16:47	
WG614378-11	STD	01	05/16/2017 17:16	
WG614378-12	SSCV	01	05/16/2017 18:14	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5305211
Report generated 05/31/2017 09:31

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051050
Instrument: HPMS11
Analyst: ADC
Workgroup: WG614928

Tune ID: WG614928-01
Run Date: 05/19/2017
Run Time: 13:44
File ID: 11M18505
Cal ID: HPMS11-16-MAY-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	24.8	4262	PASS
75.0	95.0	30.0	60.0	52.6	9031	PASS
95.0	95.0	100	100	100	17180	PASS
96.0	95.0	5.00	9.00	6.51	1118	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	79.8	13707	PASS
175	174	5.00	9.00	7.00	960	PASS
176	174	95.0	101	97.6	13372	PASS
177	176	5.00	9.00	7.30	976	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG614928-02	CCV	01	05/19/2017 14:09	
WG614929-01	BLANK	01	05/19/2017 15:11	
WG614929-02	LCS	01	05/19/2017 15:40	
WG614929-03	LCS2	01	05/19/2017 16:09	
L17051050-02	TRIP BLANK	01	05/19/2017 22:53	
L17051050-01	LH18/24-SP650-6440	01	05/20/2017 01:17	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5305211
Report generated 05/31/2017 09:31

Calibration Table Report
Method: A9FOOWTR.M
Title: Appendix IX (SOP:OVL MSV01) Water 050317 HPMS11
Last Calibration: Thu May 04 07:07:15 2017
Curve: WG612759
Calibration Files

	Compound	5 11M18002.D	20 11M18003.D	50 11M18004.D	100 11M18005.D	200 11M18006.D	300 11M18007.D	400 11M18008.D	500 11M18009.D	Avg	%RSD	Linear	Quadratic
I	Fluorobenzene	ISTD											
T	Acetonitrile	0.028	0.032	0.033	0.032	0.034	0.033	0.034	0.035	0.033	6.933		
T	3-Chloro-1-propene	0.480	0.493	0.499	0.481	0.462	0.420	0.394	0.364	0.449	11.191		
T	2-Chloro-1,3-butadiene	0.439	0.462	0.480	0.471	0.458	0.418	0.395	0.364	0.436	9.323		
T	Methacrylonitrile	0.149	0.176	0.191	0.188	0.193	0.186	0.185	0.178	0.181	7.820		
T	Isobutyl Alcohol		0.009	0.012	0.011	0.012	0.013	0.014	0.014	0.012	13.767		
T	1-Butanol				0.005	0.006	0.006	0.007	0.007	0.006	11.655		
T	Cyclohexanone			0.008	0.008	0.010	0.010	0.011	0.011	0.010	12.441		
T	2-Nitropropane			0.066	0.071	0.076	0.078	0.081	0.080	0.075	7.608		
T	Ethyl Acetate	0.229	0.253	0.260	0.255	0.254	0.241	0.233	0.221	0.243	5.885		
T	Methyl methacrylate	0.186	0.234	0.248	0.249	0.251	0.240	0.233	0.220	0.233	9.226		
I	Chlorobenzene-d5	ISTD											
I	1,4-Dichlorobenzene-d4	ISTD											

Mon May 08 16:08:06 2017

Calibration Table Report
Method: 8260WT.M
Title: 8260B/624 (SOP: OVL MSV01) Water 051617 HPMS11
Last Calibration: Wed May 17 12:46:08 2017
Curve: WG614378
Calibration Files

Compound	0.3 11M18431.D	0.4 11M18432.D	1 11M18433.D	2 11M18434.D	5 11M18435.D	20 11M18436.D	50 11M18437.D	100 11M18438.D	200 11M18439.D	300 11M18440.D	Avg	%RSD	R^2 Linear	 Quadratic
Fluorobenzene	ISTD													
Dichlorodifluoromethane			0.317	0.353	0.357	0.424	0.407	0.378	0.368		0.372	9.541		
Chloromethane			0.560	0.639	0.584	0.630	0.536	0.486	0.439		0.553	13.227		
Vinyl Chloride		0.498	0.417	0.470	0.439	0.478	0.442	0.375	0.336		0.432	12.564		
1,3-Butadiene				0.343	0.282	0.295	0.228	0.162	0.153	0.130	0.227	36.032		1.002
Bromomethane			0.207	0.210	0.206	0.193	0.198	0.204	0.219		0.205	4.082		
Chloroethane			0.219	0.239	0.241	0.249	0.245	0.237	0.248		0.240	4.259		
Trichlorofluoromethane		0.441	0.417	0.471	0.462	0.480	0.472	0.439	0.448		0.454	4.729		
Diethyl ether			0.273	0.297	0.290	0.286	0.284	0.278		0.284	0.285	2.761		
Isoprene		0.305	0.365	0.389	0.401	0.441	0.443	0.441	0.439		0.403	12.220		
Acrolein			0.029	0.040	0.038	0.039	0.040	0.042		0.042	0.039	11.129		
1,1,2-Trichloro-1,2,2-Trifluoroet			0.195	0.234	0.242	0.249	0.253	0.241	0.255		0.239	8.688		
Acetone				0.089	0.093	0.091	0.092	0.093	0.097	0.090	0.092	2.806		
1,1-Dichloroethene		0.473	0.457	0.486	0.517	0.521	0.518	0.495	0.494		0.495	4.648		
Tert-Butyl Alcohol			0.023	0.027	0.027	0.028	0.031	0.032			0.028	11.816		
Dimethyl Sulfide		0.287	0.297	0.340	0.336	0.357	0.356	0.352	0.351		0.334	8.216		
Iodomethane			0.013	0.079	0.141	0.251	0.276	0.290	0.298		0.192	59.519	0.998	
Methyl acetate				0.215	0.241	0.249	0.254	0.256	0.266		0.247	7.124		
Methylene Chloride			0.335	0.334	0.310	0.314	0.305	0.293	0.302		0.313	5.038		
Carbon Disulfide			0.710	0.770	0.789	0.834	0.806	0.757	0.688		0.765	6.757		
Acrylonitrile			0.094	0.114	0.118	0.119	0.129	0.131		0.126	0.119	10.729		
Methyl Tert Butyl Ether		0.745	0.695	0.766	0.793	0.821	0.803	0.773	0.768		0.771	5.035		
trans-1,2-Dichloroethene		0.246	0.236	0.270	0.276	0.288	0.287	0.276	0.287		0.271	7.185		
n-Hexane				0.407	0.430	0.467	0.476	0.471	0.467		0.453	6.165		
Diisopropyl ether			1.117	1.264	1.233	1.203	1.164	1.017		0.915	1.130	11.071		
Vinyl Acetate				0.479	0.533	0.487	0.517	0.535	0.472	0.424	0.492	8.019		
1,1-Dichloroethane		0.640	0.593	0.611	0.604	0.645	0.631	0.596	0.577		0.612	3.958		
Ethyl-Tert-Butyl ether			0.964	1.097	1.071	1.046	1.027	0.914		0.834	0.993	9.488		
2-Butanone				0.137	0.139	0.143	0.147	0.152	0.157	0.155	0.147	5.313		
Propionitrile			0.034	0.041	0.043	0.044	0.045	0.047		0.050	0.043	11.768		
2,2-Dichloropropane		0.423	0.369	0.405	0.392	0.420	0.417	0.395	0.398		0.402	4.470		
cis-1,2-Dichloroethene		0.316	0.262	0.294	0.319	0.332	0.328	0.315	0.320		0.311	7.292		
Chloroform	0.668	0.681	0.536	0.542	0.526	0.550	0.525	0.494	0.481		0.556	12.730		
1-Bromopropane				0.040	0.054	0.061	0.060	0.058	0.061	0.059	0.056	13.246		
Bromochloromethane		0.129	0.172	0.187	0.196	0.199	0.196	0.192	0.198		0.184	12.931		
Tetrahydrofuran			0.158	0.115	0.106	0.104	0.106	0.106		0.108	0.115	16.890	0.999	
Dibromofluoromethane					0.280	0.262	0.272	0.271	0.260		0.269	3.091		
1,1,1-Trichloroethane		0.415	0.399	0.423	0.462	0.483	0.485	0.463	0.464		0.449	7.243		
Cyclohexane		0.581	0.524	0.578	0.607	0.650	0.644	0.623	0.599	0.540	0.594	7.282		
1,1-Dichloropropene		0.331	0.335	0.357	0.372	0.408	0.407	0.386	0.387		0.373	7.978		
Carbon Tetrachloride		0.304	0.349	0.379	0.396	0.420	0.430	0.409	0.410		0.387	10.874		
Tert-Amyl-Methyl ether			0.714	0.837	0.823	0.816	0.803	0.73		0.677	0.77142	8.15202		
1,2-Dichloroethane-d4					0.363	0.317	0.338	0.335	0.317		0.33379	5.69157		
1,2-Dichloroethane		0.442	0.419	0.47	0.476	0.478	0.468	0.436	0.423		0.45135	5.33453		
Benzene		1.156	1.084	1.179	1.185	1.199	1.141	1.011	0.878		1.104	10.0158		
Trichloroethene		0.226	0.251	0.301	0.301	0.325	0.317	0.301	0.309		0.29146	11.7841		
Methylcyclohexane		0.477	0.383	0.443	0.467	0.507	0.501	0.477	0.464	0.423	0.46019	8.49006		
1,2-Dichloropropane		0.313	0.286	0.342	0.342	0.369	0.363	0.345	0.352		0.33917	8.04796		
1,4-Dioxane				0.002	0.003	0.003	0.003	0.003		0.003	0.00293	13.9596		
Bromodichloromethane		0.343	0.298	0.345	0.37	0.408	0.403	0.393	0.389		0.36867	10.1709		
Dibromomethane		0.12	0.153	0.171	0.163	0.188	0.182	0.176	0.183		0.16712	13.2633		
2-Chloroethyl Vinyl Ether			0.14	0.162	0.18	0.202	0.21	0.215	0.22	0.208	0.19218	14.9182		
4-Methyl-2-Pentanone					0.099	0.116	0.122	0.127	0.138	0.133	0.12257	11.2898		
cis-1,3-Dichloropropene		0.334	0.303	0.37	0.402	0.455	0.472	0.45	0.443		0.40378	15.4416	0.999	
Dimethyl Disulfide				0.147	0.173	0.237	0.271	0.28	0.288	0.269	0.23782	23.5484	0.999	
Chlorobenzene-d5	ISTD													
Toluene-d8					1.507	1.348	1.404	1.335	1.146		1.34813	9.77146		
Toluene		2.389	1.827	1.753	1.819	1.767	1.658	1.41			1.80307	16.3818	0.991	
Ethyl Methacrylate			0.303	0.369	0.419	0.482	0.512	0.503	0.484	0.461	0.44178	16.5839	0.998	
trans-1,3-Dichloropropene			0.496	0.468	0.517	0.577	0.593	0.574	0.53		0.53644	8.70041		
1,1,2-Trichloroethane		0.319	0.306	0.337	0.349	0.367	0.361	0.35	0.342		0.34131	5.95867		
2-Hexanone					0.257	0.302	0.314	0.319	0.323	0.318	0.30532	8.13831		
1,3-Dichloropropane		0.632	0.563	0.598	0.616	0.627	0.611	0.573	0.539		0.59471	5.61804		
Tetrachloroethene		0.237	0.276	0.301	0.34	0.35	0.354	0.336	0.331		0.31574	13.0405		
Dibromochloromethane		0.302	0.303	0.328	0.364	0.422	0.438	0.419	0.416		0.37379	15.2048	0.999	
1,2-Dibromoethane		0.218	0.277	0.297	0.323	0.336	0.338	0.324	0.324		0.30457	13.3219		
1-Chlorohexane		0.435	0.368	0.42	0.471	0.528	0.54	0.528	0.493	0.454	0.47077	12.2378		
Chlorobenzene		1.06	1.029	1.093	1.095	1.14	1.091	0.982	0.852		1.04267	8.68375		
1,1,1,2-Tetrachloroethane		0.333	0.343	0.376	0.375	0.422	0.428	0.418	0.412		0.38822	9.55907		
Ethylbenzene			0.49	0.553	0.573	0.617	0.631	0.597	0.568		0.5756	8.15775		
m-,p-Xylene		0.624	0.61	0.662	0.73	0.738	0.723	0.635	0.52		0.6552	11.3677		
o-Xylene		0.611	0.542	0.601	0.714	0.734	0.742	0.699	0.654		0.66201	10.9201		
Styrene		0.915	0.841	0.944	1.039	1.186	1.213	1.116	0.962		1.02697	13.0703		
Bromoform			0.169	0.221	0.229	0.278	0.299	0.304	0.316		0.25955	20.9192	0.999	
Isopropylbenzene		1.54	1.47	1.654	1.773	1.858	1.79	1.534	1.228		1.60558	12.8593		
1,4-Dichlorobenzene-d4	ISTD													
1,1,2,2-Tetrachloroethane		0.602	0.603	0.738	0.784	0.799	0.755	0.759	0.712		0.71899	10.6759		
p-Bromofluorobenzene					0.94	0.932	0.941	0.959	0.874		0.92914	3.499		
1,2,3-Trichloropropane			0.192	0.203	0.227	0.25	0.237	0.238	0.241		0.22684	9.47455		
trans-1,4-Dichloro-2-Butene			0.145	0.197	0.252	0.276	0.273	0.283	0.283	0.259	0.24598	20.0146	0.998	

n-Propylbenzene		3.443	3.25	3.731	4.084	4.255	3.72	3.078			3.6516	11.7041	
Bromobenzene	0.765	0.798	0.769	0.857	0.913	0.978	0.915	0.884	0.825		0.85586	8.52037	
1,3,5-Trimethylbenzene		2.528	2.343	2.64	2.841	3.025	2.723	2.375	1.866		2.54273	14.0286	
2-Chlorotoluene		2.677	2.489	2.82	2.937	3.017	2.639	2.322	1.813		2.58925	14.9669	
4-Chlorotoluene		1.945	1.885	2.066	2.17	2.308	2.123	1.844	1.421		1.97015	13.7289	
a-Methylstyrene					1.273	1.545	1.523	1.47	1.247	1.119	1.36309	12.7744	
tert-Butylbenzene			0.452	0.537	0.622	0.676	0.646	0.63	0.606		0.59568	12.8233	
1,2,4-Trimethylbenzene			2.375	2.721	2.996	3.128	2.834	2.449			2.75056	10.8088	
sec-Butylbenzene			2.835	3.307	3.628	3.804	3.444	2.938			3.32593	11.4512	
p-Isopropyltoluene			2.257	2.755	2.988	3.212	2.941	2.558			2.7853	12.2258	
1,3-Dichlorobenzene		1.381	1.452	1.581	1.675	1.801	1.669	1.574	1.332		1.5582	10.2657	
1,4-Dichlorobenzene		1.654	1.501	1.619	1.747	1.774	1.655	1.555	1.316		1.60264	9.16319	
n-Butylbenzene			2.011	2.347	2.567	2.939	2.747	2.426			2.50625	12.9532	
1,2-Dichlorobenzene	1.749	1.667	1.454	1.685	1.649	1.757	1.617	1.532	1.299		1.60101	9.3155	
1,2-Dibromo-3-Chloropropane				0.092	0.133	0.151	0.154	0.157	0.168		0.14243	19.0803	0.999
1,2,4-Trichlorobenzene		0.9	0.961	1.064	1.102	1.251	1.175	1.143	1.07		1.08325	10.4409	
Hexachlorobutadiene		0.336	0.503	0.513	0.584	0.642	0.617	0.623	0.616		0.55426	18.444	1
Naphthalene		2.035	1.958	2.204	2.525	2.772	2.535	2.227	1.831		2.26105	14.3669	
1,2,3-Trichlorobenzene	0.922	0.878	0.94	1.027	1.136	1.237	1.159	1.103	1.065		1.05185	11.4386	

Thu May 18 10:46:55 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051050 Run Date: 05/16/2017 Sample ID: WG614378-12
Instrument ID: HPMS11 Run Time: 18:14 Method: 8260B
File ID: 11M18442 Analyst: ADC QC Key: DOD4
ICal Workgroup: WG614378 Cal ID: HPMS11 - 16-MAY-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	18.4	ug/L	0.455	8.00	20	
Chloroform	CCC	20.0	18.3	ug/L	0.508	8.60	20	
Ethylbenzene	CCC	20.0	20.8	ug/L	0.599	4.10	20	
Toluene	CCC	20.0	21.7	ug/L	1.68	8.60	20	
Vinyl Chloride	CCC	20.0	21.6	ug/L	0.467	8.20	20	
1,1,2,2-Tetrachloroethane	SPCC	20.0	19.6	ug/L	0.704	2.10	20	
Chloromethane	SPCC	20.0	22.3	ug/L	0.617	11.5	20	
Bromoform	SPCC	20.0	16.5	ug/L	0.246	17.6	20	
Chlorobenzene	SPCC	20.0	20.9	ug/L	1.09	4.40	20	
1,1-Dichloroethane	SPCC	20.0	19.1	ug/L	0.586	4.30	20	
1,1,1-Trichloroethane		20.0	20.4	ug/L	0.459	2.10	20	
1,1,2-Trichloroethane		20.0	20.4	ug/L	0.348	2.00	20	
1,2-Dichloroethane		20.0	19.6	ug/L	0.443	1.90	20	
Acetone		20.0	19.5	ug/L	0.0897	2.60	20	
Benzene		20.0	20.5	ug/L	1.13	2.30	20	
Carbon Tetrachloride		20.0	20.2	ug/L	0.392	1.20	20	
Methylene Chloride		20.0	18.3	ug/L	0.286	8.60	20	
m-,p-Xylene		40.0	43.6	ug/L	0.715	9.10	20	
o-Xylene		20.0	22.2	ug/L	0.733	10.8	20	
Styrene		20.0	22.5	ug/L	1.16	12.6	20	
Tetrachloroethene		20.0	21.4	ug/L	0.338	6.90	20	
Trichloroethene		20.0	21.9	ug/L	0.319	9.30	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5305210
Report generated 05/31/2017 09:31

Login Number: L17051050 Run Date: 05/19/2017 Sample ID: WG614928-02
Instrument ID: HPMS11 Run Time: 14:09 Method: 8260B
File ID: 11M18506 Analyst: ADC QC Key: DOD4
Workgroup (AAB#): WG614929 Cal ID: HPMS11 - 16-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	52.0	ug/L	0.353	3.94	20	
1,1-Dichloroethene	CCC	50.0	50.7	ug/L	0.502	1.45	20	
Chloroform	CCC	50.0	46.1	ug/L	0.513	7.71	20	
Ethylbenzene	CCC	50.0	52.2	ug/L	0.601	4.33	20	
Toluene	CCC	50.0	52.0	ug/L	1.59	3.91	20	
Vinyl Chloride	CCC	50.0	53.1	ug/L	0.459	6.21	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	51.9	ug/L	0.746	3.74	20	
Bromoform	SPCC	50.0	45.0	ug/L	0.275	10.0	20	
Chlorobenzene	SPCC	50.0	50.4	ug/L	1.05	0.824	20	
Chloromethane	SPCC	50.0	48.8	ug/L	0.540	2.48	20	
1,1-Dichloroethane	SPCC	50.0	50.3	ug/L	0.615	0.541	20	
Xylenes		150	160	ug/L	0.703	6.66	20	
1,1,1-Trichloroethane		50.0	51.3	ug/L	0.461	2.67	20	
1,1,2-Trichloroethane		50.0	49.0	ug/L	0.335	1.90	20	
1,2-Dichloroethane		50.0	49.0	ug/L	0.443	1.96	20	
Acetone		50.0	44.3	ug/L	0.0817	11.4	20	
Benzene		50.0	49.6	ug/L	1.10	0.775	20	
Carbon Tetrachloride		50.0	52.6	ug/L	0.407	5.22	20	
Methylene Chloride		50.0	46.8	ug/L	0.293	6.40	20	
m-,p-Xylene		100	107	ug/L	0.699	6.63	20	
o-Xylene		50.0	53.4	ug/L	0.706	6.71	20	
Styrene		50.0	57.2	ug/L	1.17	14.3	20	
Tetrachloroethene		50.0	54.5	ug/L	0.344	9.03	20	
Trichloroethene		50.0	50.2	ug/L	0.293	0.347	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5305213
Report generated 05/31/2017 09:32

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

Login Number: L17051050
Instrument ID: HPMS11
Workgroup (AAB#): WG614929

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	183063	318734	440982
Upper Limit	NA	NA	366126	637468	881964
Lower Limit	NA	NA	91532	159367	220491
L17051050-01	1.00	01	110400	227533	328414
L17051050-02	1.00	01	112531	227603	330271
WG614929-01	1.00	01	121089	239948	351787
WG614929-02	1.00	01	141019	262246	363466
WG614929-03	1.00	01	145156	266039	373557

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: 5305214
Report generated 05/31/2017 09:32

Microbac Laboratories Inc.

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

Login Number: L17051050
Instrument ID: HPMS11
Workgroup (AAB#): WG614929

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	16.96	14.14	10.52
Upper Limit	NA	NA	17.46	14.64	11.02
Lower Limit	NA	NA	16.46	13.64	10.02
L17051050-01	1.00	01	16.94	14.12	10.49
L17051050-02	1.00	01	16.94	14.12	10.49
WG614929-01	1.00	01	16.94	14.12	10.49
WG614929-02	1.00	01	16.94	14.12	10.49
WG614929-03	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: 5305216
Report generated: 05/31/2017 09:32

2.2 General Chromatography Data

2.2.1 LC/MS Data (6850)

2.2.1.1 Summary Data

Microbac

Lab Report #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6440	**Prep Method:**	6850	**Prep Date:**	05/19/2017 10:50
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG614890	**Analyst:**	JWR	**Run Date:**	05/19/2017 20:21
Collect Date:	05/17/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39662
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	5.01		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: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)

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

Comments: ICAL WG611288 : Alternate Source STD80234
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39494	WG611288-01 CCB	1	1		04/24/17 13:27
2	1LM.LM39495	WG611288-02 STD (0.1 ug/L)	1	1	STD80232	04/24/17 13:46
3	1LM.LM39496	WG611288-03 STD (0.2 ug/L)	1	1	STD80232	04/24/17 14:05
4	1LM.LM39497	WG611288-04 STD (0.5 ug/L)	1	1	STD80232	04/24/17 14:24
5	1LM.LM39498	WG611288-05 STD (1.0 ug/L)	1	1	STD80232	04/24/17 14:43
6	1LM.LM39499	WG611288-06 STD (2.0 ug/L)	1	1	STD80232	04/24/17 15:02
7	1LM.LM39500	WG611288-07 STD (5.0 ug/L)	1	1	STD80232	04/24/17 15:21
8	1LM.LM39501	WG611288-08 STD (10 ug/L)	1	1	STD80232	04/24/17 15:40
9	1LM.LM39502	WG611288-09 SSCV (1.0 ug/L)	1	1	STD80234	04/24/17 15:59
10	1LM.LM39503	WG611330-01 CCB	1	1		04/24/17 16:18
11	1LM.LM39504	WG611330-02 CCV (1.0ug/L)	1	1	STD80232	04/24/17 16:37
12	1LM.LM39505	WG611327-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 16:56
13	1LM.LM39506	WG611327-01 MCT (0.2ug/L)	1	1	STD80234	04/24/17 17:14
14	1LM.LM39507	WG611327-02 BLANK	1	1		04/24/17 17:34
15	1LM.LM39508	WG611327-03 LCS (0.2ug/L)	1	1	STD80234	04/24/17 17:52
16	1LM.LM39509	L17040713-06 RS	1	1		04/24/17 18:11
17	1LM.LM39510	L17040713-07 MS	1	1	STD80234	04/24/17 18:30
18	1LM.LM39511	L17040713-08 MSD	1	1	STD80234	04/24/17 18:49
19	1LM.LM39512	L17040713-01	1	1		04/24/17 19:08
20	1LM.LM39513	L17040713-02	1	1		04/24/17 19:27
21	1LM.LM39514	L17040713-03	1	1		04/24/17 19:46
22	1LM.LM39515	L17040713-04	1	1		04/24/17 20:05
23	1LM.LM39516	WG611330-03 CCV (1.0ug/L)	1	1	STD80232	04/24/17 20:24
24	1LM.LM39517	WG611327-08 MRL (0.2ug/L)	1	1	STD80232	04/24/17 20:43
25	1LM.LM39518	WG611330-04 CCB	1	1		04/24/17 21:02
26	1LM.LM39519	L17040713-05	1	1		04/24/17 21:21
27	1LM.LM39520	L17040713-09	1	1		04/24/17 21:40
28	1LM.LM39521	L17040713-10	1	1		04/24/17 21:59
29	1LM.LM39522	L17040713-11	1	1		04/24/17 22:17
30	1LM.LM39523	L17040713-12	1	1		04/24/17 22:36
31	1LM.LM39524	L17040713-13	1	1		04/24/17 22:55
32	1LM.LM39525	WG611330-05 CCV (1.0ug/L)	1	1	STD80232	04/24/17 23:14
33	1LM.LM39526	WG611327-09 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:33

Page: 1 Approved: 25-APR-17

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 042417_JWR.TXT

Analyst1: JWR 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: Analytical WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)

CCV STD: STD80232 LCS STD: STD80234 STD80234

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM39527	WG611328-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:52
35	1LM.LM39528	WG611330-06 CCB	1	1		04/25/17 00:11
36	1LM.LM39529	WG611328-01 MCT (0.2ug/L)	1	1	STD80234	04/25/17 00:30
37	1LM.LM39530	WG611328-02 BLANK	1	1		04/25/17 00:49
38	1LM.LM39531	WG611328-03 LCS (0.2ug/L)	1	1	STD80234	04/25/17 01:08
39	1LM.LM39532	L17040841-08 RS	1	1		04/25/17 01:27
40	1LM.LM39533	L17040841-09 MS	1	1	STD80234	04/25/17 01:46
41	1LM.LM39534	L17040841-10 MSD	1	1	STD80234	04/25/17 02:05
42	1LM.LM39535	L17040841-01	1	1		04/25/17 02:23
43	1LM.LM39536	L17040841-02	1	1		04/25/17 02:42
44	1LM.LM39537	L17040841-03	1	1		04/25/17 03:01
45	1LM.LM39538	L17040841-04	1	1		04/25/17 03:20
46	1LM.LM39539	WG611330-07 CCV (1.0ug/L)	1	1	STD80232	04/25/17 03:39
47	1LM.LM39540	WG611328-08 MRL (0.2ug/L)	1	1	STD80232	04/25/17 03:58
48	1LM.LM39541	WG611330-08 CCB	1	1		04/25/17 04:17
49	1LM.LM39542	L17040841-05	1	1		04/25/17 04:36
50	1LM.LM39543	L17040841-06	1	1		04/25/17 04:55
51	1LM.LM39544	L17040841-07	1	1		04/25/17 05:14
52	1LM.LM39545	L17040841-11	1	1		04/25/17 05:33
53	1LM.LM39546	L17040841-12	1	1		04/25/17 05:52
54	1LM.LM39547	L17040841-13	1	1		04/25/17 06:11
55	1LM.LM39548	WG611330-09 CCV (1.0ug/L)	1	1	STD80232	04/25/17 06:30
56	1LM.LM39549	WG611328-09 MRL (0.2ug/L)	1	1	STD80232	04/25/17 06:49
57	1LM.LM39550	WG611330-10 CCB	1	1		04/25/17 07:07

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 25-APR-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 051917_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 WG614890 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39639	WG614892-01 CCB	1	1		05/19/17 13:05
2	1LM.LM39640	WG614892-02 CCV (1.0ug/L)	1	1	STD80232	05/19/17 13:24
3	1LM.LM39641	WG614890-07 MRL (0.2ug/L)	1	1	STD80232	05/19/17 13:43
4	1LM.LM39642	WG614890-01 MCT (0.2ug/L)	1	1	STD80234	05/19/17 14:02
5	1LM.LM39643	WG614890-02 BLANK	1	1		05/19/17 14:21
6	1LM.LM39644	WG614890-03 LCS (0.2ug/L)	1	1	STD80234	05/19/17 14:40
7	1LM.LM39645	L17050772-02 RS	1	1		05/19/17 14:59
8	1LM.LM39646	L17050772-04 MS	1	1	STD80234	05/19/17 15:18
9	1LM.LM39647	L17050772-06 MSD	1	1	STD80234	05/19/17 15:37
10	1LM.LM39648	L17050772-01	1	1		05/19/17 15:56
11	1LM.LM39649	L17050772-08	1	1		05/19/17 16:15
12	1LM.LM39650	L17050772-10	1	1		05/19/17 16:34
13	1LM.LM39651	L17050988-01	1	1		05/19/17 16:53
14	1LM.LM39652	WG614892-03 CCV (1.0ug/L)	1	1	STD80232	05/19/17 17:12
15	1LM.LM39653	WG614890-08 MRL (0.2ug/L)	1	1	STD80232	05/19/17 17:31
16	1LM.LM39654	WG614892-04 CCB	1	1		05/19/17 17:49
17	1LM.LM39655	L17050988-03	1	1		05/19/17 18:08
18	1LM.LM39656	L17050988-03 (RR 5x) (NR)	1	5		05/19/17 18:27
19	1LM.LM39657	L17050988-05	1	1		05/19/17 18:46
20	1LM.LM39658	L17050988-05 (RR 5x) (NR)	1	5		05/19/17 19:05
21	1LM.LM39659	L17050988-07	1	1		05/19/17 19:24
22	1LM.LM39660	L17050988-07 (RR 5x) (NR)	1	5		05/19/17 19:43
23	1LM.LM39661	L17050768-01	1	1		05/19/17 20:02
24	1LM.LM39662	L17051050-01	1	1		05/19/17 20:21
25	1LM.LM39663	WG614892-05 CCV (1.0ug/L)	1	1	STD80232	05/19/17 20:40
26	1LM.LM39664	WG614890-09 MRL (0.2ug/L)	1	1	STD80232	05/19/17 20:59
27	1LM.LM39665	WG614892-06 CCB	1	1		05/19/17 21:18

Comments

Seq.	Rerun	Dil.	Reason	Analytes
18				
	L17050988-03 (RR 5x) (NR) : the result for this sample at this dilution is not needed			
20				

Page: 1 Approved: 23-MAY-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 051917_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 WG614890 (waters)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)

CCV STD: STD80232 LCS STD: STD80234 STD80234

Comments

Seq.	Rerun	Dil.	Reason	Analytes
	L17050988-05 (RR 5x) (NR) : the result for this sample at this dilution is not needed			
22				
	L17050988-07 (RR 5x) (NR) : the result for this sample at this dilution is not needed			

Page: 2 Approved: 23-MAY-17

Microbac Laboratories Inc.

Data Checklist

Date: 24-APR-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG611288
Runlog ID: 81726
Analytical Workgroups: L17040713, L17040841

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	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:
25-APR-2017
John Richards

Secondary Reviewer:
25-APR-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: APR-25-2017 14:21:32

Microbac Laboratories Inc.

Data Checklist

Date: 19-MAY-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 82337
Analytical Workgroups: L17050768, L17050772, L17050988, L17051050

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	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	ECL

Primary Reviewer:
23-MAY-2017
John Richards

Secondary Reviewer:
23-MAY-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-23-2017 14:46:49

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG614890

Login Number: L17051050

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-SP650-6440	01	05/17/17					05/19/2017	1.8	28		05/19/17	.4	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5306365
Report generated 05/24/2017 08:31

METHOD BLANK SUMMARY

Login Number: L17051050 **Work Group:** WG614890
Blank File ID: 1LM.LM39643 **Blank Sample ID:** WG614890-02
Prep Date: 05/19/17 10:50 **Instrument ID:** LCMS1
Analyzed Date: 05/19/17 14:21 **Method:** 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG614890-07	1LM.LM39641	05/19/17 13:43	01
MCT	WG614890-01	1LM.LM39642	05/19/17 14:02	01
LCS	WG614890-03	1LM.LM39644	05/19/17 14:40	01
QCMRL	WG614890-08	1LM.LM39653	05/19/17 17:31	01
LH18/24-SP650-6440	L17051050-01	1LM.LM39662	05/19/17 20:21	01
QCMRL	WG614890-09	1LM.LM39664	05/19/17 20:59	01

Report Name: BLANK_SUMMARY
PDF File ID: 5306366
Report generated 05/24/2017 08:31

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051050 Prep Date: 05/19/17 10:50 Sample ID: WG614890-02
Instrument ID: LCMS1 Run Date: 05/19/17 14:21 Prep Method: 6850
File ID: 1LM.LM39643 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-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: 5306367
24-MAY-2017 08:31

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051050 Run Date: 05/19/2017 Sample ID: WG614890-03
Instrument ID: LCMS1 Run Time: 14:40 Prep Method: 6850
File ID: 1LM.LM39644 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD80234 Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.202	101	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5306368
Report generated: 05/24/2017 08:31

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17051050
Analytical Method: 6850
ICAL Workgroup: WG611288

Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.286	4.98	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: 5307586
Report generated 05/24/2017 08:31

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17051050
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-02			WG611288-03			WG611288-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	21000.0000	1.332	0.200	38200.0000	1.222	0.500	104000.000	1.335

INT_CAL - Modified 03/06/2008
PDF File ID: 5307586
Report generated 05/24/2017 08:31

Login Number: L17051050
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-05			WG611288-06			WG611288-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	206000.000	1.288	2.00	412000.000	1.312	5.00	955000.000	1.270

INT_CAL - Modified 03/06/2008
PDF File ID: 5307586
Report generated 05/24/2017 08:31

Login Number: L17051050
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-08		
	CONC	RESP	RF
Perchlorate	10.0	1860000.00	1.244

INT_CAL - Modified 03/06/2008
PDF File ID: 5307586
Report generated 05/24/2017 08:31

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051050 Run Date: 04/24/2017 Sample ID: WG611288-09
Instrument ID: LCMS1 Run Time: 15:59 Method: 6850
File ID: 1LM.LM39502 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG611288 Cal ID: LCMS1 - 24-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.977	ug/L	1.24	2.30	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5307587
Report generated 05/24/2017 08:31

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051050 | Run Date: 05/19/2017 | Sample ID: WG614892-01
Instrument ID: LCMS1 | Run Time: 13:05 | Method: 6850
File ID: 1LM.LM39639 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG614890 | Cal ID: LCMS1 - 24-APR-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: 5306371
Report generated 05/24/2017 08:31

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051050 | Run Date: 05/19/2017 | Sample ID: WG614892-04
Instrument ID: LCMS1 | Run Time: 17:49 | Method: 6850
File ID: 1LM.LM39654 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG614890 | Cal ID: LCMS1 - 24-APR-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: 5306371
Report generated 05/24/2017 08:31

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17051050	Run Date:	05/19/2017	Sample ID:	WG614892-06
Instrument ID:	LCMS1	Run Time:	21:18	Method:	6850
File ID:	1LM.LM39665	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG614890	Cal ID:	LCMS1 - 24-APR-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: 5306371
Report generated 05/24/2017 08:31

Login Number: L17051050 Run Date: 05/19/2017 Sample ID: WG614892-02
Instrument ID: LCMS1 Run Time: 13:24 Method: 6850
File ID: 1LM.LM39640 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG614890 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.07	ug/L	1.36	7.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5306370
Report generated 05/24/2017 08:31

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051050 Run Date: 05/19/2017 Sample ID: WG614892-03
Instrument ID: LCMS1 Run Time: 17:12 Method: 6850
File ID: 1LM.LM39652 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG614890 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.06	ug/L	1.35	6.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5306370
Report generated 05/24/2017 08:31

Login Number: L17051050 Run Date: 05/19/2017 Sample ID: WG614892-05
Instrument ID: LCMS1 Run Time: 20:40 Method: 6850
File ID: 1LM.LM39663 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG614890 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.06	ug/L	1.34	6.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5306370
Report generated 05/24/2017 08:31

Login Number: L17051050 Run Date: 05/19/2017 Sample ID: WG614890-07
Instrument ID: LCMS1 Run Time: 13:43 Prep Method: 6850
File ID: 1LM.LM39641 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.211	106	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5306369
Report generated 05/24/2017 08:31

Login Number: L17051050 Run Date: 05/19/2017 Sample ID: WG614890-08
Instrument ID: LCMS1 Run Time: 17:31 Prep Method: 6850
File ID: 1LM.LM39653 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.209	105	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5306369
Report generated 05/24/2017 08:31

Login Number: L17051050 Run Date: 05/19/2017 Sample ID: WG614890-09
Instrument ID: LCMS1 Run Time: 20:59 Prep Method: 6850
File ID: 1LM.LM39664 Analyst: JWR Method: 6850
Workgroup (AAB#): WG614890 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.208	104	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5306369
Report generated 05/24/2017 08:31

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

Login Number: L17051050
Instrument ID: LCMS1
Workgroup (AAB#): WG614890

ICAL CCV Number: WG611288-05
CAL ID: LCMS1-24-APR-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG611288	NA	NA	777000
Upper Limit	NA	NA	1165500
Lower Limit	NA	NA	388500
L17051050-01	1.00	01	625000
WG614890-02	1.00	01	735000
WG614890-03	1.00	01	725000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5306372
Report generated 05/24/2017 08:31

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**	6850	**Samplenum:**	L17051050-01
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39662
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 20:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	790000	255000	3.10	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG611288-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39495
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 13:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21000	6820	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG611288-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39496
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 14:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38200	13500	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG611288-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39497
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 14:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	104000	33400	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG611288-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39498
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 14:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	65300	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG611288-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39499
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 15:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	412000	130000	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG611288-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39500
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 15:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	955000	298000	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG611288-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39501
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 15:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1860000	603000	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG611288-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39502
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	04/24/2017 15:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	65000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**	6850	**Samplenum:**	WG614890-01
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39642
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 14:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36600	11700	3.13	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**	6850	**Samplenum:**	WG614890-02
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39643
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 14:21	**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 #:	L17051050	**Prep Method:**	6850	**Samplenum:**	WG614890-03
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39644
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 14:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38400	12100	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**	6850	**Samplenum:**	WG614890-07
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39641
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 13:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	40500	13800	2.93	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**	6850	**Samplenum:**	WG614890-08
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39653
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 17:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	46100	14400	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**	6850	**Samplenum:**	WG614890-09
Instrument:	LCMS1	**Prep Date:**	05/19/2017 10:50	**File ID:**	1LM.LM39664
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 20:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	49300	16900	2.92	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG614892-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39639
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 13:05	**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 #:	L17051050	**Prep Method:**		**Samplenum:**	WG614892-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39640
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 13:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	188000	60200	3.12	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG614892-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39652
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 17:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	217000	69700	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG614892-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39654
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 17:49	**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 #:	L17051050	**Prep Method:**		**Samplenum:**	WG614892-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39663
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 20:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	227000	73300	3.10	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051050	**Prep Method:**		**Samplenum:**	WG614892-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39665
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG614890	**Analysis Date:**	05/19/2017 21:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	429	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 #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-01	**PrePrep Method:**	N/A	**Instrument:**	IC3
Client ID:	LH18/24-SP650-6440	**Prep Method:**	9056	**Prep Date:**	05/22/2017 17:18
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	12/01/2016 17:22
Workgroup #:	WG615167	**Analyst:**	CAS	**Run Date:**	05/22/2017 20:01
Collect Date:	05/17/2017 15:00	**Dilution:**	5	**File ID:**	I3_052217-11
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	93.2		10.0	5.00	2.50

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

Microbac

Lab Report #: L17051050
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051050-01	**PrePrep Method:**	N/A	**Instrument:**	IC3
Client ID:	LH18/24-SP650-6440	**Prep Method:**	9056	**Prep Date:**	05/22/2017 17:18
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	12/01/2016 17:22
Workgroup #:	WG615167	**Analyst:**	CAS	**Run Date:**	05/22/2017 20:22
Collect Date:	05/17/2017 15:00	**Dilution:**	50	**File ID:**	I3_052217-12
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	541		20.0	10.0	5.00

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

Microbac

Lab Report #: L17051050
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: 120116 IC3 ICAL.SEQ_OL
Analyst1: CAS Analyst2: NA
Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#: RGT385836

Workgroups: Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM
Analytical WGs: 593355 (LOD/LOQ Waters) 593356 (LOD/LOQ Soils)
Internal STD: NA Surrogate STD: NA Calibration STD STD77046 01-DEC-2016
CCV STD: STD77046 LCS STD: STD79166 MS/MSD STD: NA

Comments: System Backpressure: 2166 psi

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I3_120116-01	ELUENT	1	1		12/01/16 15:00
2	I3_120116-02	DI WATER	1	1		12/01/16 15:20
3	I3_120116-03	WG593545-01 STD	1	1	STD77046	12/01/16 15:40
4	I3_120116-04	WG593545-02 STD	1	1	STD77046	12/01/16 16:01
5	I3_120116-05	WG593545-03 STD	1	1	STD77046	12/01/16 16:21
6	I3_120116-06	WG593545-04 STD	1	1	STD77046	12/01/16 16:41
7	I3_120116-07	WG593545-05 STD	1	1	STD77046	12/01/16 17:02
8	I3_120116-08	WG593545-06 STD	1	1	STD77046	12/01/16 17:22
9	I3_120116-09	WG593545-07 SSCV	1	1	STD79166	12/01/16 17:43
10	I3_120116-10	LCRV @ Lvl 6	1	1	STD79166	12/01/16 18:03
11	I3_120116-11	LCRV @ Lvl 4	1	1	STD79166	12/01/16 18:23
12	I3_120116-12	LCRV @ Lvl 2	1	1	STD79166	12/01/16 18:44
13	I3_120116-13	LCRV @ Lvl 0	1	1		12/01/16 19:04
14	I3_120116-14	WG593357-01 ANION CCV	1	1	STD77046	12/01/16 19:24
15	I3_120116-15	WG593357-02 ANION CCB	1	1		12/01/16 19:45
16	I3_120116-16	WG593355-01 ANION BLANK	1	1		12/01/16 20:05
17	I3_120116-17	WG593355-02 ANION LCS	1	1	STD79166	12/01/16 20:25
18	I3_120116-18	WG593355-03 ANION LCS2	1	1	STD79166	12/01/16 20:46
19	I3_120116-19	L16100002-01 LOD (F,CL,BR,SO4)	1	1		12/01/16 21:06
20	I3_120116-20	L16100002-01 LOD (NO2,NO3)	1	1		12/01/16 21:27
21	I3_120116-21	L16100004-01 LOQ (F,CL,BR,SO4)	1	1		12/01/16 21:47
22	I3_120116-22	L16100004-01 LOQ (NO2,NO3)	1	1		12/01/16 22:07
23	I3_120116-23	L16100004-09 LOQ (F,CL,BR,SO4)	1	1		12/01/16 22:28
24	I3_120116-24	L16100004-09 LOQ (NO2,NO3)	1	1		12/01/16 22:48
25	I3_120116-25	WG593357-03 ANION CCV	1	1	STD77046	12/01/16 23:08
26	I3_120116-26	WG593357-04 ANION CCB	1	1		12/01/16 23:29
27	I3_120116-27	WG593356-01 ANION BLANK-SOIL	7	1		12/01/16 23:49
28	I3_120116-28	WG593356-02 ANION LCS-SOIL	7	1	STD79166	12/02/16 00:09
29	I3_120116-29	WG593356-03 ANION LCS2-SOIL	7	1	STD79166	12/02/16 00:30
30	I3_120116-30	L16100003-01 LOD (F,CL,BR,SO4)	7	1		12/02/16 00:50
31	I3_120116-31	L16100003-01 LOD (NO2,NO3)	7	1		12/02/16 01:11
32	I3_120116-32	L16100005-01 LOQ (F,CL,BR,SO4)	7	1		12/02/16 01:31
33	I3_120116-33	L16100005-01 LOQ (NO2,NO3)	7	1		12/02/16 01:51

Page: 1 Approved: 05-DEC-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC3 Dataset: 120116 IC3 ICAL.SEQ_OL

Analyst1: CAS Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#: RGT385836

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

Analytical WGs: 593355 (LOD/LOQ Waters) 593356 (LOD/LOQ Soils)

Internal STD: NA Surrogate STD: NA STD77046 01-DEC-2016

CCV STD: STD77046 LCS STD: STD79166 NA

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	I3_120116-34	L16100005-10 LOQ (F,CL,BR,SO4)	7	1		12/02/16 02:12
35	I3_120116-35	L16100005-10 LOQ (NO2,NO3)	7	1		12/02/16 02:32
36	I3_120116-36	WG593357-05 ANION CCV	1	1	STD77046	12/02/16 02:52
37	I3_120116-37	WG593357-06 ANION CCB	1	1		12/02/16 03:13
38	I3_120116-38	END	1	1		12/02/16 03:33

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 05-DEC-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC3 Dataset: 052217 IC3.SEQ
Analyst1: CAS Analyst2: NA
Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 160804254
Eluent ID#: RGT40239

Workgroups: Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM
Analytical WG615167 (Waters)

Internal STD: NA Surrogate STD: NA Calibration STD STD77046 01-DEC-2016
CCV STD: STD81395 LCS STD: STD81396 MS/MSD STD: STD81396

Comments: System Backpressure: 2179 psi

Samples L17050956-01, L17051050-01, and L17051074 (-01,03,05) we re analyzed at dilutions only due to pre-run screen results for chloride, which were greater than 200 ppm.

Sample L17051031-01 was analyzed at a dilution only due to its pre-run screen result for chloride, which was greater than the calibration maximum.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I3_052217-01	ELUENT	1	1		05/22/17 16:38
2	I3_052217-02	DI WATER	1	1		05/22/17 16:58
3	I3_052217-03	WG615168-01 ANION CCV	1	1	STD81395	05/22/17 17:18
4	I3_052217-04	WG615168-02 ANION CCB	1	1		05/22/17 17:39
5	I3_052217-05	WG615167-01 ANION BLANK	1	1		05/22/17 17:59
6	I3_052217-06	WG615167-02 ANION LCS	1	1	STD81396	05/22/17 18:19
7	I3_052217-07	WG615167-03 ANION LCS2	1	1	STD81396	05/22/17 18:40
8	I3_052217-08	L17050956-01 (CL,SO4) 10x	1	10		05/22/17 19:00
9	I3_052217-09	L17050956-01 RR CL 100x	1	100		05/22/17 19:20
10	I3_052217-10	L17051031-01 (CL) 200x	2	200		05/22/17 19:41
11	I3_052217-11	L17051050-01 (CL,SO4) 5x	1	5		05/22/17 20:01
12	I3_052217-12	L17051050-01 RR CL 50x	1	50		05/22/17 20:22
13	I3_052217-13	L17051067-01 (CL,SO4) REF	1	1		05/22/17 20:42
14	I3_052217-14	WG615167-05 DUP 1067-01	2	1		05/22/17 21:02
15	I3_052217-15	WG615168-03 ANION CCV	1	1	STD81395	05/22/17 21:23
16	I3_052217-16	WG615168-04 ANION CCB	1	1		05/22/17 21:43
17	I3_052217-17	L17051067-02 (CL,SO4)	2	1		05/22/17 22:03
18	I3_052217-18	L17051069-01 (CL,SO4)	2	1		05/22/17 22:24
19	I3_052217-19	L17051069-02 (CL,SO4)	2	1		05/22/17 22:44
20	I3_052217-20	L17051069-03 (CL,SO4)	2	1		05/22/17 23:04
21	I3_052217-21	L17051069-04 (CL,SO4)	2	1		05/22/17 23:25
22	I3_052217-22	L17051071-01 (CL,SO4)	2	1		05/22/17 23:45
23	I3_052217-23	L17051071-01 RR CL 10x	2	10		05/23/17 00:05
24	I3_052217-24	L17051071-02 (CL,SO4) REF	1	1		05/23/17 00:26
25	I3_052217-25	WG615167-07 DUP 1071-02	2	1		05/23/17 00:46
26	I3_052217-26	WG615168-05 ANION CCV	1	1	STD81395	05/23/17 01:07
27	I3_052217-27	WG615168-06 ANION CCB	1	1		05/23/17 01:27
28	I3_052217-28	L17051074-01 (F,CL,BR,SO4) 2x	1	2		05/23/17 01:47
29	I3_052217-29	L17051074-01 RR CL 20x	1	20		05/23/17 02:08
30	I3_052217-30	L17051074-03 (F,CL,BR,SO4) 5x	1	5		05/23/17 02:28

Page: 1 Approved: 23-MAY-17

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC3 Dataset: 052217 IC3.SEQ

Analyst1: CAS Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 160804254

Eluent ID#: RGT40239

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

Analytical WG615167 (Waters)

Internal STD: NA Surrogate STD: NA STD77046 01-DEC-2016

CCV STD: STD81395 LCS STD: STD81396 STD81396

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
31	I3_052217-31	L17051074-03 RR CL 50x	1	50		05/23/17 02:48
32	I3_052217-32	L17051074-05 (F,CL,BR,SO4) 2x	1	2		05/23/17 03:09
33	I3_052217-33	L17051074-05 RR CL 20x	1	20		05/23/17 03:29
34	I3_052217-34	WG615168-07 ANION CCV	1	1	STD81395	05/23/17 03:49
35	I3_052217-35	WG615168-08 ANION CCB	1	1		05/23/17 04:10
36	I3_052217-36	WG615168-09 ANION CCV	1	1	STD81395	05/23/17 09:08
37	I3_052217-37	WG615168-10 ANION CCB	1	1		05/23/17 09:28
38	I3_052217-38	L17051069-03 RR CL 5x	2	5		05/23/17 09:49
39	I3_052217-39	L17051069-04 RR CL 5x	2	5		05/23/17 10:09
40	I3_052217-40	L17051071-02 RR CL 10x	1	10		05/23/17 10:30
41	I3_052217-41	WG615168-11 ANION CCV	1	1	STD81395	05/23/17 10:50
42	I3_052217-42	WG615168-12 ANION CCB	1	1		05/23/17 11:10
43	I3_052217-43	END	1	1		05/23/17 11:31

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 23-MAY-17

Microbac Laboratories Inc.

Data Checklist

Date: 01-DEC-2016
Analyst: CAS
Analyst: NA
Method: 300/9056
Instrument: IC3
Curve Workgroup: WG593545
Runlog ID: 79020
Analytical Workgroups: L16100002, L16100003, L16100004, L16100005

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)	2166PSI
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	NA
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:
05-DEC-2016

Secondary Reviewer:
05-DEC-2016

CHECKLIST1 - Modified 03/05/2008
Generated: DEC-05-2016 16:27:53

Microbac Laboratories Inc.

Data Checklist

Date: 22-MAY-2017
Analyst: CAS
Analyst: NA
Method: 300/9056
Instrument: IC3
Curve Workgroup: NA
Runlog ID: 82352
Analytical Workgroups: L17050956, 1031, 1050, 1067, 1069, 1071, 1074

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)	2179 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	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	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:
23-MAY-2017

Secondary Reviewer:
23-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-23-2017 16:33:18

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 9056 **AAB#:** WG615167

Login Number: L17051050

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-SP650-6440	01	05/17/17					05/22/2017	5.1	2	*	05/22/17	5.2	2	*
LH18/24-SP650-6440	01	05/17/17					05/22/2017	5.1	2	*	05/22/17	5.2	2	*

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5307032
Report generated 05/24/2017 09:53

METHOD BLANK SUMMARY

Login Number: L17051050
Work Group: WG615167
Blank File ID: I3_052217-05
Blank Sample ID: WG615167-01
Prep Date: 05/22/17 17:18
Instrument ID: IC3
Analyzed Date: 05/22/17 17:59
Method: 9056
Analyst: CAS

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615167-02	I3_052217-06	05/22/17 18:19	01
LCS2	WG615167-03	I3_052217-07	05/22/17 18:40	01
LH18/24-SP650-6440	L17051050-01	I3_052217-11	05/22/17 20:01	DL01
LH18/24-SP650-6440	L17051050-01	I3_052217-12	05/22/17 20:22	DL02
DUP	WG615167-05	I3_052217-14	05/22/17 21:02	01
DUP	WG615167-07	I3_052217-25	05/23/17 00:46	01

Report Name: BLANK_SUMMARY
PDF File ID: 5307033
Report generated 05/24/2017 09:53

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051050 Prep Date: 05/22/17 17:18 Sample ID: WG615167-01
Instrument ID: IC3 Run Date: 05/22/17 17:59 Prep Method: 9056
File ID: I3_052217-05 Analyst: CAS Method: 9056
Workgroup (AAB#): WG615167 Matrix: Water Units: mg/L
Contract #: Cal ID: IC3-01-DEC-16

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: 5307034
24-MAY-2017 09:53

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051050 Run Date: 05/22/2017 Sample ID: WG615167-02
Instrument ID: IC3 Run Time: 18:19 Prep Method: 9056
File ID: I3_052217-06 Analyst: CAS Method: 9056
Workgroup (AAB#): WG615167 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD81396 Cal ID: IC3-01-DEC-16

Analytes	Expected	Found	% Rec	LCS Limits	Q
Chloride	8.00	8.08	101	90 - 110	
Sulfate	40.0	40.7	102	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5307035
Report generated: 05/23/2017 15:05

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051050 Analyst: CAS Prep Method: 9056
Instrument ID: IC3 Matrix: Water Method: 9056
Workgroup (AAB#): WG615167 Units: mg/L
QC Key: DOD4 Lot #: STD81396

Sample ID: WG615167-02 LCS File ID: I3_052217-06 Run Date: 05/22/2017 18:19
Sample ID: WG615167-03 LCS2 File ID: I3_052217-07 Run Date: 05/22/2017 18:40

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	8.00	8.08	101	8.00	8.10	101	0.260	90 - 110	20	
Sulfate	40.0	40.7	102	40.0	40.8	102	0.128	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5307036
Report generated: 05/24/2017 09:53

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17051050
Analytical Method: 9056
ICAL Workgroup: WG593545

Instrument ID: IC3
Initial Calibration Date: 01-DEC-16 17:22
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Chloride		5.791	5.91		1.00000
Sulfate		7.754	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: 5308027
Report generated 05/24/2017 09:53

Login Number: L17051050
Analytical Method: 9056
Instrument ID: IC3
Initial Calibration Date: 01-DEC-16 17:22
Column ID: F

Analyte	WG593545-01			WG593545-02			WG593545-03		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloride	0.200	0.0343000000	5.831	1.00	0.162700000	6.146	4.00	0.663600000	6.028
Sulfate	1.00	0.121500000	8.230	5.00	0.598000000	8.361	20.0	2.48560000	8.046

INT_CAL - Modified 03/06/2008
PDF File ID: 5308027
Report generated 05/24/2017 09:53

Login Number: L17051050
Analytical Method: 9056
Instrument ID: IC3
Initial Calibration Date: 01-DEC-16 17:22
Column ID: F

Analyte	WG593545-04			WG593545-05			WG593545-06		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloride	8.00	1.36840000	5.846	12.0	2.11410000	5.676	24.0	4.60140000	5.216
Sulfate	40.0	5.18840000	7.710	60.0	8.07990000	7.426	120	17.7738000	6.752

INT_CAL - Modified 03/06/2008
PDF File ID: 5308027
Report generated 05/24/2017 09:53

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051050 Run Date: 12/01/2016 Sample ID: WG593545-07
Instrument ID: IC3 Run Time: 17:43 Method: 9056
File ID: I3_120116-09 Analyst: CAS QC Key: DOD4
ICal Workgroup: WG593545 Cal ID: IC3 - 01-DEC-16

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Chloride		8.00	8.01	mg/L	5.85	0.100	10	
Sulfate		40.0	40.2	mg/L	7.71	0.500	10	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5308028
Report generated 05/24/2017 09:53

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17051050	Run Date:	05/22/2017	Sample ID:	WG615168-02
Instrument ID:	IC3	Run Time:	17:39	Method:	9056
File ID:	I3_052217-04	Analyst:	CAS	Units:	mg/L
Workgroup (AAB#):	WG615167	Cal ID:	IC3 - 01-DEC-16		
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: 5307038
Report generated 05/24/2017 09:53

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17051050	Run Date:	05/22/2017	Sample ID:	WG615168-04
Instrument ID:	IC3	Run Time:	21:43	Method:	9056
File ID:	I3_052217-16	Analyst:	CAS	Units:	mg/L
Workgroup (AAB#):	WG615167	Cal ID:	IC3 - 01-DEC-16		
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: 5307038
Report generated 05/24/2017 09:53

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051050 Run Date: 05/22/2017 Sample ID: WG615168-01

Instrument ID: IC3 Run Time: 17:18 Method: 9056

File ID: I3_052217-03 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG615167 Cal ID: IC3 - 01-DEC-16

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.11	mg/L	5.77	1.43	10	
Sulfate		40.0	40.7	mg/L	7.60	1.87	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5307037

Report generated 05/24/2017 09:53

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051050 Run Date: 05/22/2017 Sample ID: WG615168-03

Instrument ID: IC3 Run Time: 21:23 Method: 9056

File ID: I3_052217-15 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG615167 Cal ID: IC3 - 01-DEC-16

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.11	mg/L	5.77	1.38	10	
Sulfate		40.0	40.7	mg/L	7.60	1.81	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5307037

Report generated 05/24/2017 09:53

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
May 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
May 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
May 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 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	CHLORIDE, SULFATE	PERCHLORATE							Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650-6440	Water	05/17/17 / 15:00		3	3									HCL	
LH18/24-SP650-6440	Water	05/17/17 / 15:00		2		1	1							NONE	
Trip Blank	Water	05/03/17		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	05/17/17	15:30									

9For 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: 05/18/2017 09:33
By: CARA STRICKLER 221000101033

Cara Strickler

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

00855933

MICROBAC®

COOLER TEMP >6° C LOG

Cooler ID 1033

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

CHD 5/18/17

pH Exceptions

pH Lot # HC601354

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

CHD 5/18/17

PRESERVATIVE EXCEPTIONS

✓ NONE

__ AS NOTED

CHD 5/18/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17051050
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 30-MAY-2017

Samplenum	Container ID	Products
L17051050-01	910431	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	18-MAY-2017 11:36	CLS		
2	ANALYZ	V1	ORG4	18-MAY-2017 12:30	HRF	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	18-MAY-2017 11:36	CLS		
2	ANALYZ	V1	ORG4	18-MAY-2017 12:30	HRF	CLS	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	18-MAY-2017 11:36	CLS		
2	ANALYZ	V1	ORG4	18-MAY-2017 12:30	HRF	CLS	

Samplenum	Container ID	Products
L17051050-01	910432	9056

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	18-MAY-2017 11:36	CLS		
2	PREP	W1	SEM	22-MAY-2017 13:23	CAS	BRG	
3	STORE	SEM	A1	26-MAY-2017 15:17	CLS	CAS	

Samplenum	Container ID	Products
L17051050-01	910433	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	18-MAY-2017 11:36	CLS		
2	ANALYZ	W1	SEM	19-MAY-2017 10:29	JWR	CLS	
3	STORE	SEM	A1	24-MAY-2017 10:33	CLS	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: L17051050
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 30-MAY-2017

Samplenum	Container ID	Products
L17051050-02	910434	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	18-MAY-2017 11:36	CLS		
2	ANALYZ	V1	ORG4	18-MAY-2017 12:30	HRF	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	18-MAY-2017 11:36	CLS		
2	ANALYZ	V1	ORG4	18-MAY-2017 12:30	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: L17051123

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 May 24 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 #: L17051123
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?
00114773	H	1.0		J4616881622	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 #: L17051123
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-SP650-6441-GRAB	L17051123-01	05/18/2017 15:00	05/19/2017 09:27

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:**	L17051123
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615184	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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	2017-05-24 16:31:46

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051123
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615184	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615184	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615184	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615184	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615184	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614897	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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	2017-05-24 16:30:54

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051123
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614897	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614897	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614897	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614897	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG614897	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615180	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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	2017-05-24 16:32:13

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051123
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615180	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615180	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615180	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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:**	L17051123
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615180	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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).

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Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051123
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615180	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-24 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 #: L17051123
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051123-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6441-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	05/23/2017 09:16
Workgroup #:	WG615184	**Analyst:**	TMM	**Run Date:**	05/23/2017 10:03
Collect Date:	05/18/2017 15:00	**Dilution:**	4	**File ID:**	S2170523001.042
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	6.95		0.800	0.400	0.200

Certificate of Analysis

Sample #:	L17051123-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP650-6441-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	03/09/2017 11:26
Workgroup #:	WG614897	**Analyst:**	ADG	**Run Date:**	05/19/2017 14:00
Collect Date:	05/18/2017 15:00	**Dilution:**	5	**File ID:**	00.1705191400-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	1.91		0.500	0.250	0.125

Certificate of Analysis

Sample #:	L17051123-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6441-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG615180	**Analyst:**	ADG	**Run Date:**	05/23/2017 09:41
Collect Date:	05/18/2017 15:00	**Dilution:**	5	**File ID:**	TC05232017.008
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	59.4		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 #: L17051123
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051123-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6441-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	05/23/2017 09:16
Workgroup #:	WG615184	**Analyst:**	TMM	**Run Date:**	05/23/2017 10:03
Collect Date:	05/18/2017 15:00	**Dilution:**	4	**File ID:**	S2170523001.042
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	6.95		0.800	0.400	0.200

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: 23-MAY-2017
Analyst: TMM
Analyst: NA
Method: NH3
Instrument: SC2
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG615184

Calibration/Linearity	5/23/17
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:
23-MAY-2017

Secondary Reviewer:
24-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-24-2017 09:22:04

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1 AAB#: WG615184

Login Number: L17051123

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-SP650-6441-GRAB	01	05/18/17					05/23/2017	4.8	28		05/23/17	4.8	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5307632
Report generated 05/24/2017 08:57

METHOD BLANK SUMMARY

Login Number:	L17051123	**Work Group:**	WG615184
Blank File ID:	S2170523001.011	**Blank Sample ID:**	WG615184-01
Prep Date:	05/23/17 09:20	**Instrument ID:**	SMARTCHEM2
Analyzed Date:	05/23/17 09:20	**Method:**	350.1
Analyst:	TMM		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615184-02	S2170523001.012	05/23/17 09:21	01
DUP	WG615184-04	S2170523001.030	05/23/17 09:39	01
LH18/24-SP650-6441-GRAB	L17051123-01	S2170523001.042	05/23/17 10:03	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5307633
Report generated 05/24/2017 08:57

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051123 Prep Date: 05/23/17 09:20 Sample ID: WG615184-01
Instrument ID: SMARTCHEM2 Run Date: 05/23/17 09:20 Prep Method: 350.1
File ID: S2170523001.011 Analyst: TMM Method: 350.1
Workgroup (AAB#): WG615184 Matrix: Water Units: mg/L
Contract #: Cal ID: SMARTC-23-MAY-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.200	0.0892	1	J

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: 5307634
24-MAY-2017 08:57

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051123 **Run Date:** 05/23/2017 **Sample ID:** WG615184-02
Instrument ID: SMARTCHEM2 **Run Time:** 09:21 **Prep Method:** 350.1
File ID: S2170523001.012 **Analyst:** TMM **Method:** 350.1
Workgroup (AAB#): WG615184 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80299 **Cal ID:** SMARTC-23-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.93	96.7	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5307635
Report generated: 05/24/2017 08:57

2.1 General Chemistry Data

2.1.2 Orthophosphate Data

2.1.2.1 Summary Data

Microbac

Lab Report #: L17051123
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051123-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP650-6441-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	03/09/2017 11:26
Workgroup #:	WG614897	**Analyst:**	ADG	**Run Date:**	05/19/2017 14:00
Collect Date:	05/18/2017 15:00	**Dilution:**	5	**File ID:**	00.1705191400-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	1.91		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: 19-MAY-2017
Analyst: ADG
Analyst: NA
Method: PO4
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG614897

Calibration/Linearity	05/19/17
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:
23-MAY-2017

Secondary Reviewer:
23-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-23-2017 11:36:10

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.2 **AAB#:** WG614897

Login Number: L17051123

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-SP650-6441-GRAB	01	05/18/17					05/19/2017	1	2		05/19/17	1	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5306464
Report generated 05/23/2017 11:34

METHOD BLANK SUMMARY

Login Number:	L17051123	**Work Group:**	WG614897
Blank File ID:	00.1705191400-03	**Blank Sample ID:**	WG614897-01
Prep Date:	05/19/17 14:00	**Instrument ID:**	V-1200
Analyzed Date:	05/19/17 14:00	**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	WG614897-02	00.1705191400-04	05/19/17 14:00	
LCS2	WG614897-03	00.1705191400-05	05/19/17 14:00	
LH18/24-SP650-6441-GRAB	L17051123-01	00.1705191400-06	05/19/17 14:00	
DUP	WG614897-05	00.1705191400-07	05/19/17 14:00	

Report Name: BLANK_SUMMARY
PDF File ID: 5306465
Report generated 05/23/2017 11:34

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051123 Prep Date: 05/19/17 14:00 Sample ID: WG614897-01
Instrument ID: V-1200 Run Date: 05/19/17 14:00 Prep Method: 365.2
File ID: 00.1705191400-03 Analyst: ADG Method: 365.2
Workgroup (AAB#): WG614897 Matrix: Water Units: mg/L
Contract #: Cal ID: V-1200-12-APR-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: 5306466
23-MAY-2017 11:34

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051123 Analyst: ADG Prep Method: 365.2
Instrument ID: V-1200 Matrix: Water Method: 365.2
Workgroup (AAB#): WG614897 Units: mg/L
QC Key: DOD4 Lot #: STD81905

Sample ID: WG614897-02 LCS File ID: 00.1705191400-04 Run Date: 05/19/2017 14:00
Sample ID: WG614897-03 LCS2 File ID: 00.1705191400-05 Run Date: 05/19/2017 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Orthophosphate	1.00	1.03	103	1.00	1.03	103	0.00	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5306467
Report generated: 05/23/2017 11:34

2.1.2.3 Raw Data

Curves

Parameter: PO4

Spectrophotometer: V-1200

Calibration (Curve) standard stock: 79640

Concentration: 1000 mg/L

Recipe for preparation of curve standards found in:
SOP: 3653 Revision: M Page: 9

Second Source Stock: Std180857 (concentration: 10)

Daily Preparation: 10(10)/100 / 2

concentration = 1.0

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
1.0	50	1cm	880	0.635
0.7	↓	↓	↓	0.440
0.5				0.318
0.2				0.129
0.1				0.067
0.05				0.038
0				0.007
2nd Source 1.0	↓	↓	↓	0.631

Analyst: April Greene Date/Time: 3/9/12 @ 0925

DCN#124439

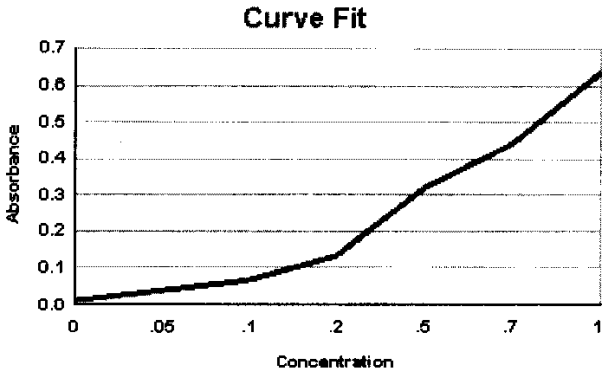
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG605653
Analytical Method:300
Instrument ID:V-1200

Analyst:ADG
Initial Calibration Date:03/09/2017

Analyte: ORTHOPHOSPHATE
Number of Points: 7
Slope: 0.626650
Y-Intercept: 0.00514888
Coef. Of Correlation (R^2): 0.999901
Coef. Of Correlation (R): 0.999951

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00700	0.00	0.00	0.00514888
0.0500	0.0380	0.00250	0.00190	0.0364814
0.100	0.0670	0.0100	0.00670	0.0678139
0.200	0.129	0.0400	0.0258	0.130479
0.500	0.318	0.250	0.159	0.318474
0.700	0.440	0.490	0.308	0.443804
1.00	0.635	1.00	0.635	0.631799



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 03/09/2017 12:03

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG605653
File ID: 00.1703091126-08
CCV ID: WG605653-08
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 03/09/2017
Run Time: 11:26
Analyst: ADG
Cal ID: V-1200 - 09-MAR-17 11:26:07

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	1	0.999	0.631	0.1	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 03/09/2017 12:06

[redacted]

WORKGROUP: WG614897

Orthophosphate
(orthophosphate1)

EPA 365.2 / SM4500-P E
SOP K3653 Rev 17
Color Reagent Chemicals
Rgt 39679
Rgt 38726
Rgt 39475
COA 152278

CCV: 81906
Daily Dilution: 5(5)/50 =
Daily Dilution: = 0.5
Spectrophotometer: UV2410

LCS: 81905
Daily Dilution: 10(10)/100
Daily Dilution: = 1.0
Curve ID: 3-10-17

Spike: 81905
Daily Dilution: 2(10)/50
Daily Dilution: = 0.4

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: mg/L	50	✓		0.323
BLK/CCB:	50	✓		0.001
LCS: ppm	50	✓		0.652
LCSD: ppm	50	✓		0.652
1123-01	50	✓	1/5	0.244
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP: 1123-01	50	✓	1/5	0.245
MS: ( ) 1123-01	50	✓	1/5	0.289
MSD: ( )	50			
CCV: ( )	50	✓		0.324
CCB:	50	✓		0.007

Analyst: April Greene

Date / Time: 5/19/17 / 1400

DCN#125965

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG614897
Analyte: ORTHOPHOSPHATE
Analyst: ADG
Date: 05/19/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG614897-01	50	50	0.00100	0.6267	0.005149	-0.0066207	-0.0066207	1	mg/L
WG614897-02	50	50	0.652	0.6267	0.005149	1.0322	1.0322	1	mg/L
WG614897-03	50	50	0.652	0.6267	0.005149	1.0322	1.0322	1	mg/L
L17051123-01	50	50	0.244	0.6267	0.005149	0.38116	1.9058	5	mg/L
WG614897-04	50	50	0.244	0.6267	0.005149	0.38116	1.9058	5	mg/L
WG614897-05	50	50	0.245	0.6267	0.005149	0.38275	1.9138	5	mg/L
WG614897-06	50	50	0.289	0.6267	0.005149	0.45297	2.2648	5	mg/L

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 05/23/2017 09:50

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG615239
File ID: 00.1705191400-01
CCV ID: WG615239-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 05/19/2017
Run Time: 14:00
Analyst: ADG
Cal ID: V-1200 - 12-APR-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.507	0.646	1.4	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/23/2017 09:48

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG615239
File ID: 00.1705191400-09
CCV ID: WG615239-03
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: V-1200
Run Date: 05/19/2017
Run Time: 14:00
Analyst: ADG
Cal ID: V-1200 - 12-APR-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.509	0.648	1.8	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/23/2017 09:48

2.1 General Chemistry Data

2.1.3 Total Organic Carbon Data

2.1.3.1 Summary Data

Microbac

Lab Report #: L17051123
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051123-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6441-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG615180	**Analyst:**	ADG	**Run Date:**	05/23/2017 09:41
Collect Date:	05/18/2017 15:00	**Dilution:**	5	**File ID:**	TC05232017.008
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	59.4		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)

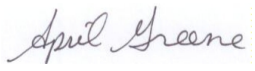
Microbac Laboratories Inc.

Data Checklist

Date: 23-MAY-2017
Analyst: ADG
Analyst: NA
Method: TOC
Instrument: TOCWPM
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG615180

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	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:
23-MAY-2017



Secondary Reviewer:
23-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-23-2017 15:06:47

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 415.1 **AAB#:** WG615180

Login Number: L17051123

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-SP650-6441-GRAB	01	05/18/17					05/23/2017	4.8	28		05/23/17	4.8	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5306971
Report generated 05/23/2017 14:57

METHOD BLANK SUMMARY

Login Number:	L17051123	Work Group:	WG615180
Blank File ID:	TC05232017.004	Blank Sample ID:	WG615180-01
Prep Date:	05/23/17 08:18	Instrument ID:	TOC-VWP
Analyzed Date:	05/23/17 08:18	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	WG615180-02	TC05232017.005	05/23/17 08:38	01
LCS2	WG615180-03	TC05232017.006	05/23/17 08:59	01
LH18/24-SP650-6441-GRAB	L17051123-01	TC05232017.008	05/23/17 09:41	DL01
DUP	WG615180-05	TC05232017.010	05/23/17 10:23	01

Report Name: BLANK_SUMMARY
PDF File ID: 5306972
Report generated 05/23/2017 14:57

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051123 Prep Date: 05/23/17 08:18 Sample ID: WG615180-01
Instrument ID: TOC-VWP Run Date: 05/23/17 08:18 Prep Method: 415.1
File ID: TC05232017.004 Analyst: ADG Method: 415.1
Workgroup (AAB#): WG615180 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: 5306973
23-MAY-2017 14:57

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051123 Analyst: ADG Prep Method: 415.1
Instrument ID: TOC-VWP Matrix: Water Method: 415.1
Workgroup (AAB#): WG615180 Units: mg/L
QC Key: DOD4 Lot #: STD80787

Sample ID: WG615180-02 LCS File ID: TC05232017.005 Run Date: 05/23/2017 08:38
Sample ID: WG615180-03 LCS2 File ID: TC05232017.006 Run Date: 05/23/2017 08:59

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	26.0	104	25.0	26.2	105	0.844	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5306974
Report generated: 05/23/2017 14:57

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 for point Preparation	
53		
54		
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

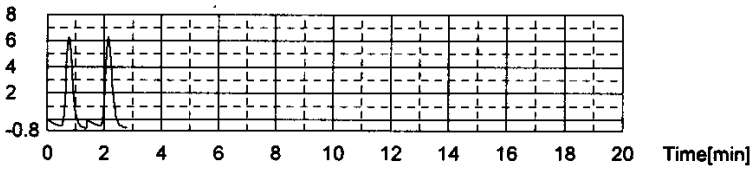
Sample Name:	TCCURVE
Sample ID:	Untitled
Cal. Curve:	TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status	Completed

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

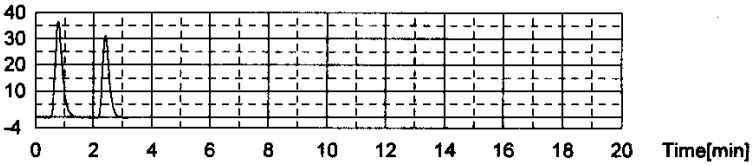
Acid Add. 0.000%
Mean Area 10.82



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

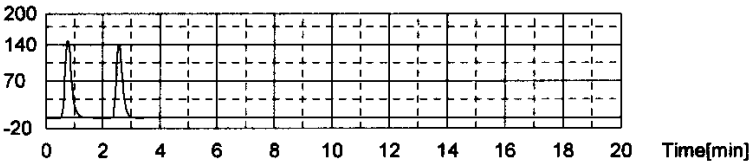
Acid Add. 0.000%
Mean Area 57.92



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

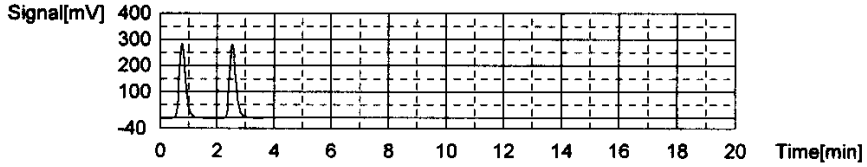
Acid Add. 0.000%
Mean Area 227.4



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

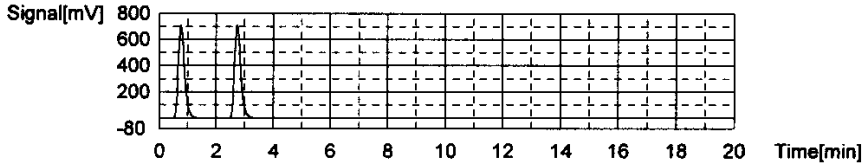
Acid Add. 0.000%
Mean Area 440.2



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

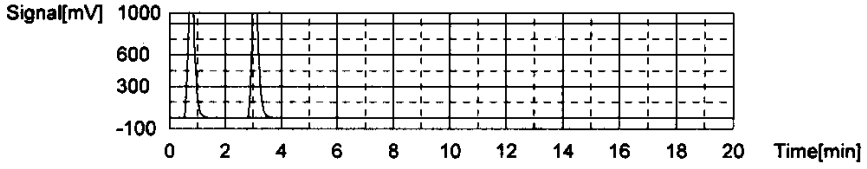
Acid Add. 0.000%
Mean Area 1092



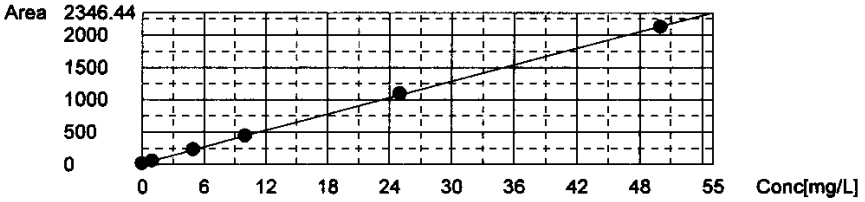
Conc: 50.00mg/L

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

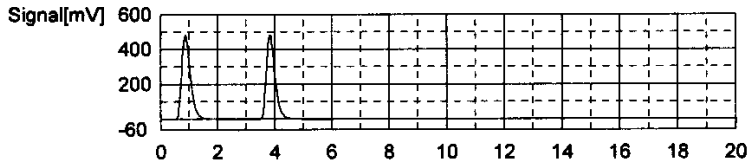
1. Det

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

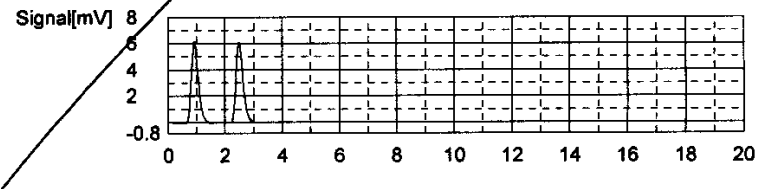
Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed

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

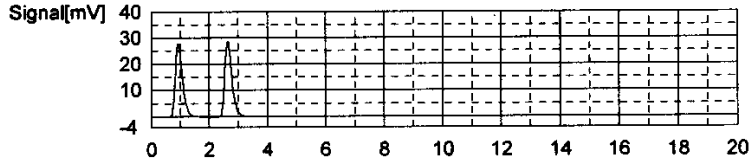
Acid Add. 3.000%
Mean Area 10.51



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



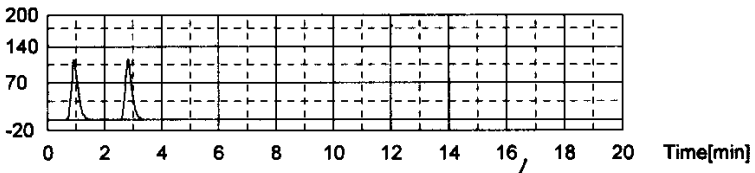
Conc: 5.000mg/L

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

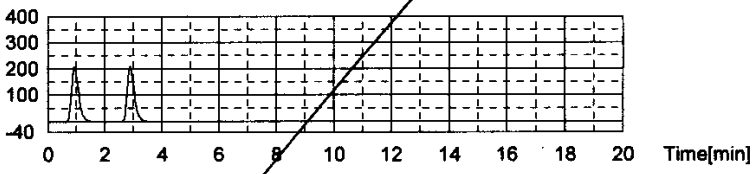
Acid Add. 3.000%
Mean Area 189.6



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

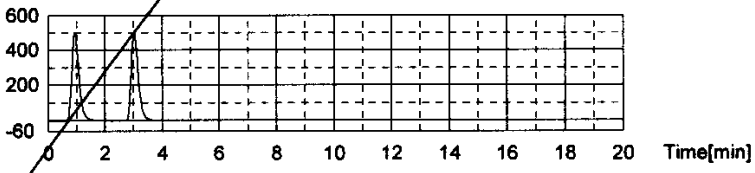
Acid Add. 3.000%
Mean Area 361.4



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

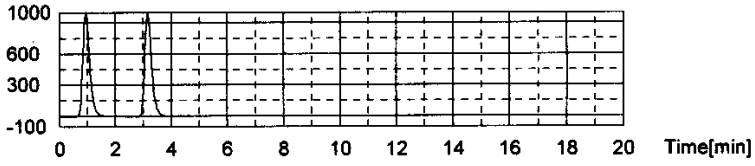
Acid Add. 3.000%
Mean Area 858.1



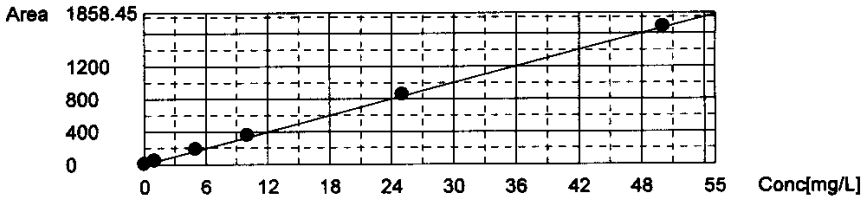
Conc: 50.00mg/L

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

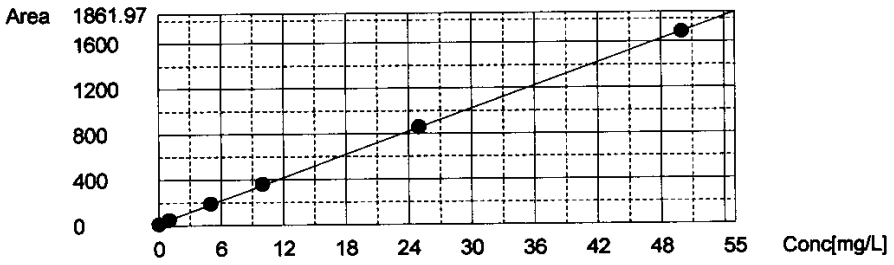
Acid Add.	3.000%
Mean Area	858.1
SD Area	1.697
CV Area	0.20%
Vial	4

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

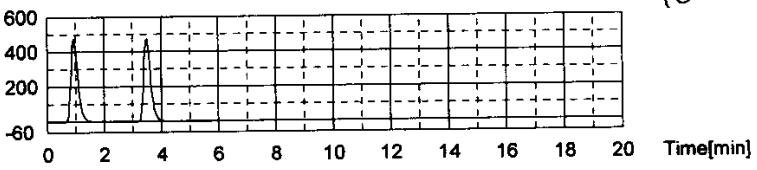
1. Det

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

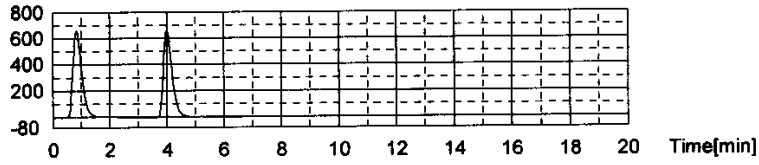
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

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

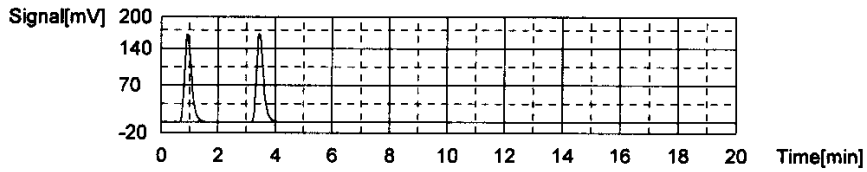
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

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

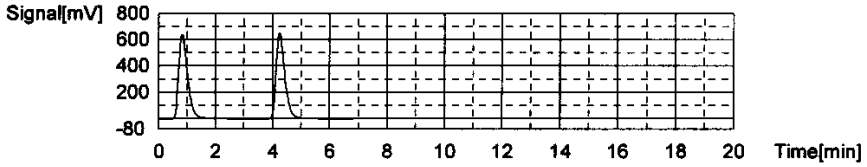
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

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: WG615180

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): 80414
(5/200)(1000) = 25mg/L

MS (TOC): 80787
0.4(1000)/40 = 10

Calibration Curve Date: 2/10/17

Reagent: 40069
392666

☐ SM5310-C Matrix 2 WG 615180
☑ EPA 415.1/9060A(mod): Matrix 1 WG____________ WG____________

SOP: K 1451 Rev. 19

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	Position	Sample ID	Dilution	Position	Sample ID	Dilution
1	TIC		26			51		
2	TOC/TIC		27			52		
3	CCV		28			53		
4	WBlk		29			54		
5	LCS		30			55		
6	LCS Dup		31			56		
7	1116-01		32			57		
8	1123-01	1/5	33			58		
9	1145-01		34			59		
10	1145-01 Dup		35			60		
11	1145 01 MS		36			61		
12	CCV		37			62		
13	CCB		38			63		
14			39			64		
15			40			65		
16			41			66		
17			42			67		
18			43			68		
19			44			69		
20			45			70		
21			46			71		
22			47			72		
23			48			73		
24			49			74		
25			50			75		

Analyst: Ann Shine

Date/Time: 5/23/17

DCN#126011

C:\TOC3201\Data\05-23-2017-ADG-TOC.t32

	Analysis	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:1.845mg/L TC:28.40mg/L IC:26.56mg/L	Complete	5/23/2017 7:49:	1
2	TOC	TOC/TIC	TOC:27.18mg/L TC:35.75mg/L IC:8.570mg/L	Complete	5/23/2017 8:01:	2
3	TOC	CCV	!!Error!! TOC:23.51mg/L TC:23.21mg/L IC:-0.3053mg/L	Complete	5/23/2017 8:13:	3
4	TOC	WG615180-01 BLK	!!Error!! TOC:0.1113mg/L TC:-0.1463mg/L IC:-0.2575mg/	Complete	5/23/2017 8:30:	0
5	TOC	WG615180-02 LCS	!!Error!! TOC:25.95mg/L TC:25.63mg/L IC:-0.3202mg/L	Complete	5/23/2017 8:51:	5
6	TOC	WG615180-03 LCSDUP	!!Error!! TOC:26.17mg/L TC:25.85mg/L IC:-0.3168mg/L	Complete	5/23/2017 9:12:	6
7	TOC	L17051116-01	TOC:8.250mg/L TC:12.56mg/L IC:4.312mg/L	Complete	5/23/2017 9:33:	7
8	TOC	L17051123-01 (5)	TOC:11.87mg/L TC:15.98mg/L IC:4.102mg/L	Complete	5/23/2017 9:55:	8
9	TOC	L17051145-01	TOC:1.911mg/L TC:9.681mg/L IC:7.770mg/L	Complete	5/23/2017 10:1	9
10	TOC	WG615180-05 DUP	TOC:1.958mg/L TC:9.003mg/L IC:7.044mg/L	Complete	5/23/2017 10:3	10
11	TOC	WG615180-06 MS	TOC:10.14mg/L TC:10.96mg/L IC:0.8202mg/L	Complete	5/23/2017 10:5	11
12	TOC	CCV	!!Error!! TOC:23.37mg/L TC:23.08mg/L IC:-0.2854mg/L	Complete	5/23/2017 11:1	12
13	TOC	CCB	!!Error!! TOC:0.1046mg/L TC:-0.1633mg/L IC:-0.2678mg/	Complete	5/23/2017 11:1	0

5/23/2017 12:40:28 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

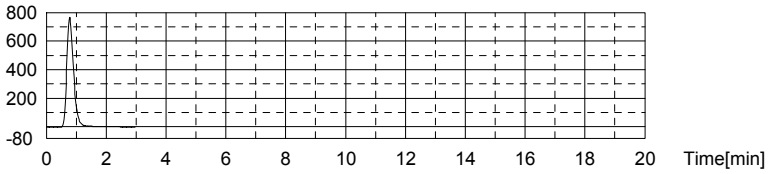
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.845mg/L TC:28.40mg/L IC:26.56mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1219	28.40mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 7:43:48 AM

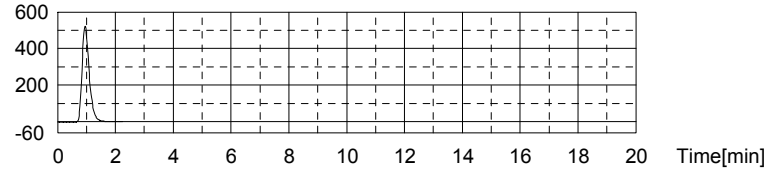
Mean Area 1219
Mean Conc. 28.40mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	907.7	26.56mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 7:49:07 AM

Mean Area 907.7
Mean Conc. 26.56mg/L



Sample

Sample Name: TOC/TIC
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

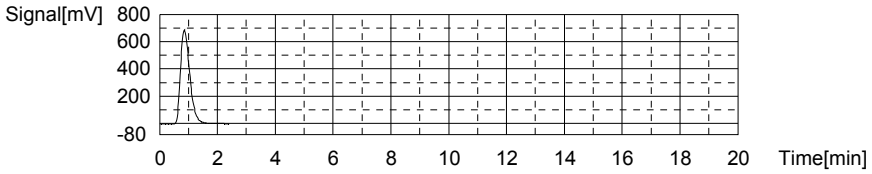
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:27.18mg/L TC:35.75mg/L IC:8.570mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1530	35.75mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/23/2017 7:56:57 AM

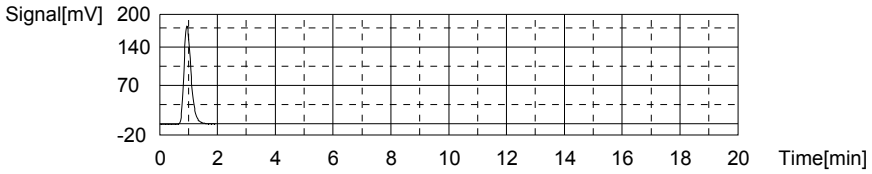
Mean Area 1530
Mean Conc. 35.75mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	305.4	8.570mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 8:01:50 AM

Mean Area 305.4
Mean Conc. 8.570mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

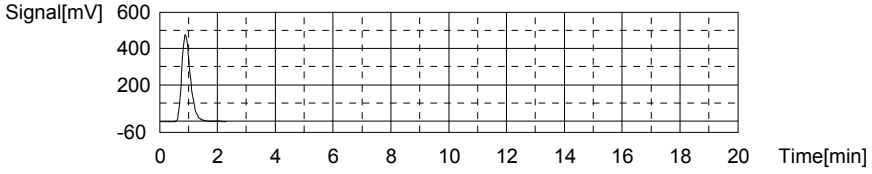
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.51mg/L TC:23.21mg/L IC:-0.3053mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	999.2	23.21mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/23/2017 8:09:34 AM

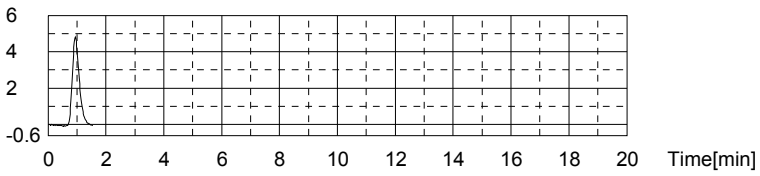
Mean Area 999.2
Mean Conc. 23.21mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.192	-0.3053mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 8:13:59 AM

Mean Area 8.192
Mean Conc. -0.3053mg/L



Sample

Sample Name: WG615180-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

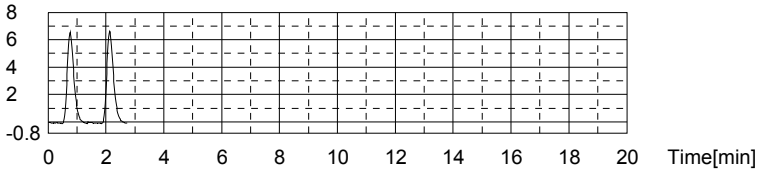
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1113mg/L TC:-0.1463mg/L IC:-0.2575mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.61	-0.1478mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 8:18:59 AM
2	10.74	-0.1447mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 8:22:30 AM

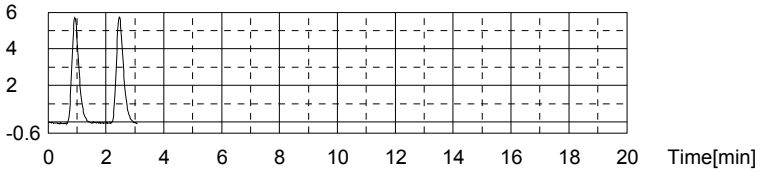
Mean Area 10.68
Mean Conc. -0.1463mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.697	-0.2603mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 8:26:24 AM
2	9.885	-0.2547mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 8:30:21 AM

Mean Area 9.791
Mean Conc. -0.2575mg/L



Sample

Sample Name: WG615180-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

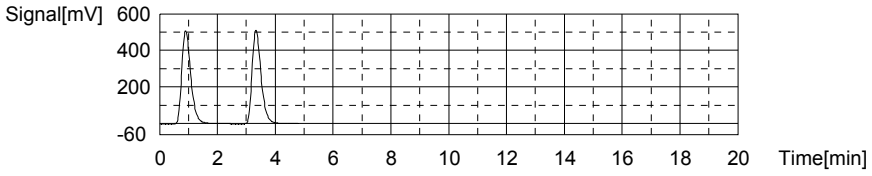
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.95mg/L TC:25.63mg/L IC:-0.3202mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1102	25.64mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 8:38:14 AM
2	1101	25.61mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 8:42:52 AM

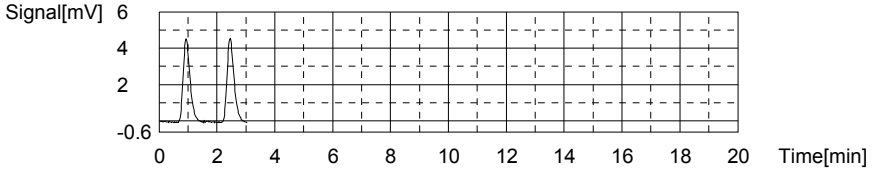
Mean Area 1102
Mean Conc. 25.63mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.653	-0.3214mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 8:47:14 AM
2	7.734	-0.3190mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 8:51:24 AM

Mean Area 7.694
Mean Conc. -0.3202mg/L



Sample

Sample Name: WG615180-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

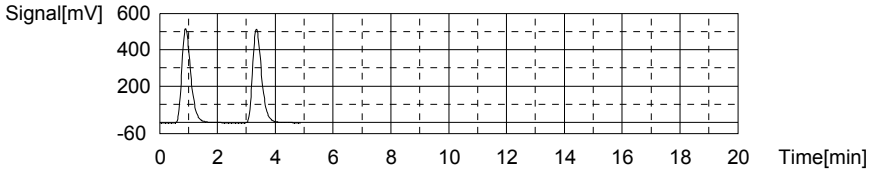
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.17mg/L TC:25.85mg/L IC:-0.3168mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1114	25.92mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 8:59:18 AM
2	1108	25.78mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 9:03:59 AM

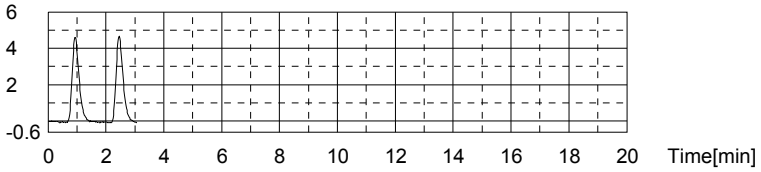
Mean Area 1111
Mean Conc. 25.85mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.702	-0.3199mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 9:08:19 AM
2	7.913	-0.3136mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 9:12:31 AM

Mean Area 7.808
Mean Conc. -0.3168mg/L



Sample

Sample Name: L17051116-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

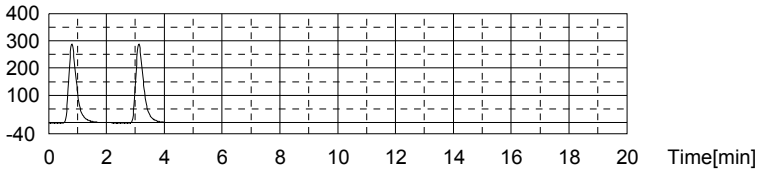
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:8.250mg/L TC:12.56mg/L IC:4.312mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	546.0	12.50mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 9:20:17 AM
2	551.1	12.62mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 9:24:47 AM

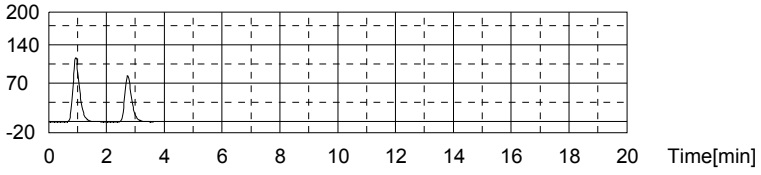
Mean Area 548.5
Mean Conc. 12.56mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	186.2	5.011mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 9:29:27 AM
2	139.4	3.613mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 9:33:55 AM

Mean Area 162.8
Mean Conc. 4.312mg/L



Sample

Sample Name: L17051123-01 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

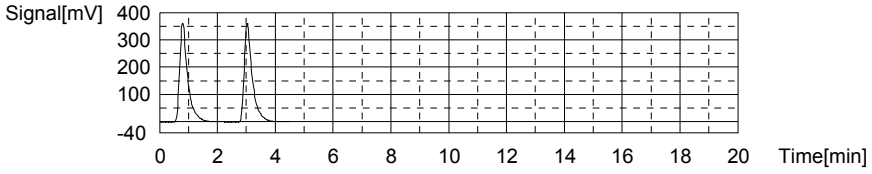
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:11.87mg/L TC:15.98mg/L IC:4.102mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	692.2	15.96mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 9:41:36 AM
2	693.9	16.00mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 9:46:16 AM

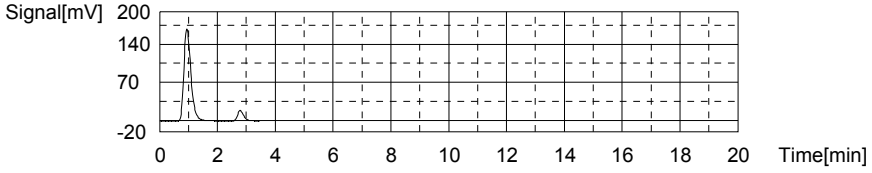
Mean Area 693.0
Mean Conc. 15.98mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	283.3	7.910mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 9:51:06 AM
2	28.24	0.2934mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 9:55:24 AM

Mean Area 155.8
Mean Conc. 4.102mg/L



Sample

Sample Name: L15071145-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

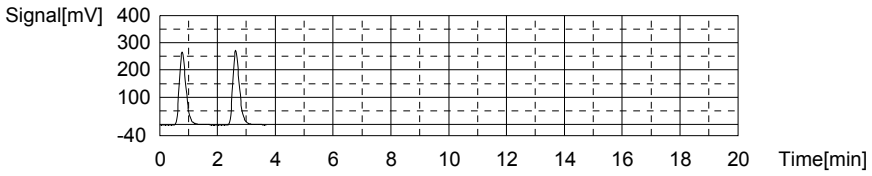
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.911mg/L TC:9.681mg/L IC:7.770mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	421.6	9.562mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 10:02:42 AM
2	431.6	9.799mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 10:06:48 AM

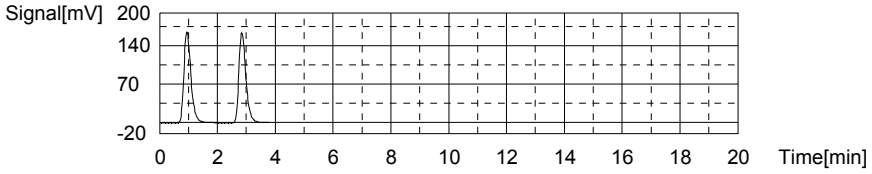
Mean Area 426.6
Mean Conc. 9.681mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	278.9	7.779mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 10:11:35 AM
2	278.3	7.761mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 10:16:10 AM

Mean Area 278.6
Mean Conc. 7.770mg/L



Sample

Sample Name: WG615180-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

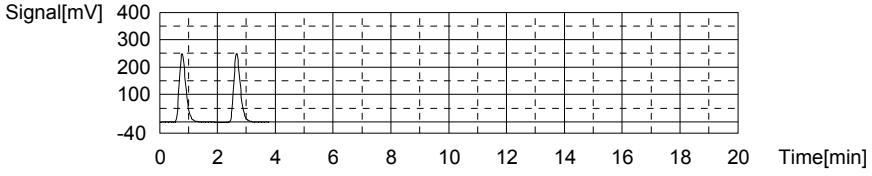
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.958mg/L TC:9.003mg/L IC:7.044mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	396.8	8.977mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/23/2017 10:23:30 AM
2	399.0	9.029mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/23/2017 10:27:40 AM

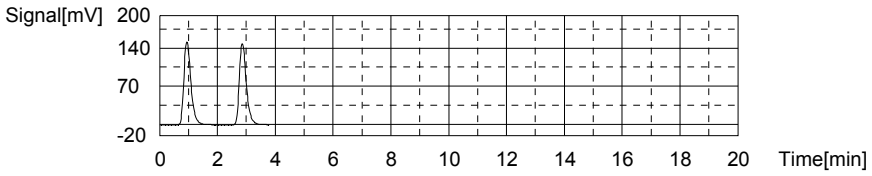
Mean Area 397.9
Mean Conc. 9.003mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	256.5	7.110mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 10:32:30 AM
2	252.1	6.979mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 10:37:03 AM

Mean Area 254.3
Mean Conc. 7.044mg/L



Sample

Sample Name: WG615180-6 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

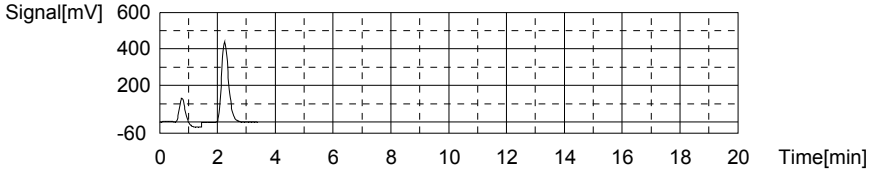
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:10.14mg/L TC:10.96mg/L IC:0.8202mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	218.6	4.766mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 10:44:01 AM
2	743.3	17.16mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 10:49:39 AM

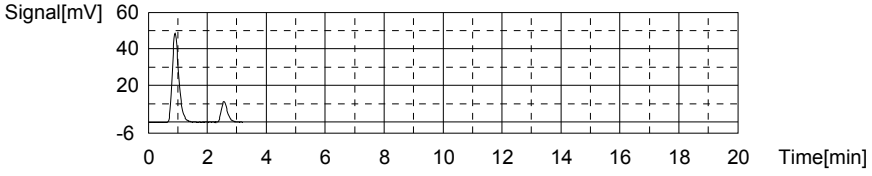
Mean Area 481.0
Mean Conc. 10.96mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	75.29	1.698mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 10:54:11 AM
2	16.47	-0.05807mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 10:58:22 AM

Mean Area 45.88
Mean Conc. 0.8202mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

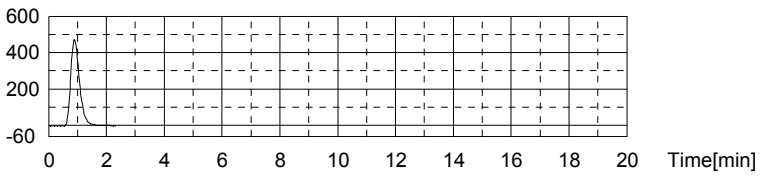
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.37mg/L TC:23.08mg/L IC:-0.2854mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	993.9	23.08mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 11:06:07 AM

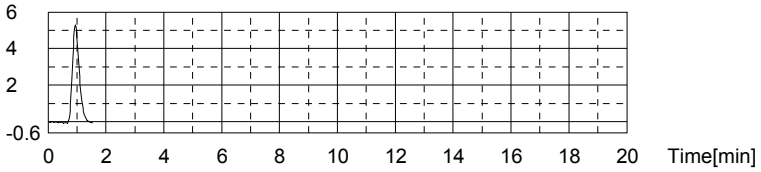
Mean Area 993.9
Mean Conc. 23.08mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.859	-0.2854mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/23/2017 11:10:30 AM

Mean Area 8.859
Mean Conc. -0.2854mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

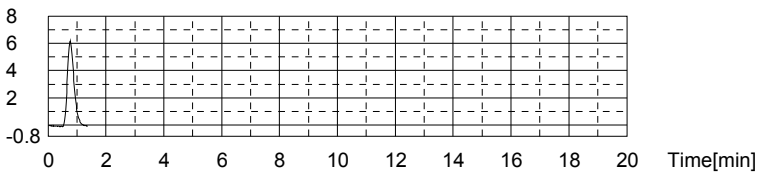
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1046mg/L TC:-0.1633mg/L IC:-0.2678mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.955	-0.1633mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/23/2017 11:15:31 AM

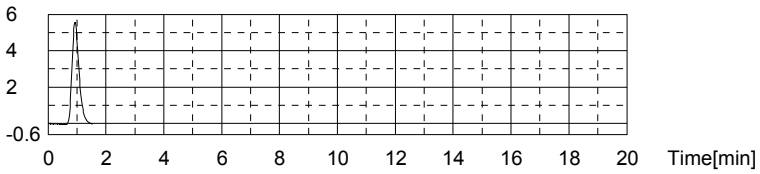
Mean Area 9.955
Mean Conc. -0.1633mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.446	-0.2678mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/23/2017 11:19:30 AM

Mean Area 9.446
Mean Conc. -0.2678mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
May 24, 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
May 24, 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
May 24, 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-SP650-6441-Grab	Water	05/18/17 / 15:00		2	X		X							H2SO4	
LH18/24-SP650-6441-Grab	Water	05/18/17 / 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	05/18/17	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: 05/19/2017 09:27
By: BRENDA GREGORY 221000101090

Brenda Gregory

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

MICROBAC

Cooler ID 1090

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

CAD 5/19/17

pH Exceptions

pH Lot # HC601354

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

CAD 5/19/17

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

CAD 5/19/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17051123
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 30-MAY-2017

Samplenum	Container ID	Products
L17051123-01	911224	

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	19-MAY-2017 10:21	CLS		
2	ANALYZ	W1	SEM	19-MAY-2017 10:29	JWR	CLS	
3	STORE	SEM	A1	24-MAY-2017 10:33	CLS	JWR	

Comments:Products cancelled.

Samplenum	Container ID	Products
L17051123-01	911225	PO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	19-MAY-2017 10:21	CLS		
2	ANALYZ	W1	WET	19-MAY-2017 11:01	EPT	BRG	

Samplenum	Container ID	Products
L17051123-01	911226	TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	19-MAY-2017 10:21	CLS		<2
2	ANALYZ	W1	DIG	23-MAY-2017 07:30	ADG	AZH	

Samplenum	Container ID	Products
L17051123-01	911227	NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	19-MAY-2017 10:21	CLS		<2
2	ANALYZ	W1	WET	22-MAY-2017 08:10	EPT	CLS	
3	STORE	WET	A1	24-MAY-2017 08:03	CLS	EPT	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

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: L17051371

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 May 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 #: L17051371
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?
00112534	H	2.0		J4616881659	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 #: L17051371
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-SP650-6443-GRAB	L17051371-01	05/24/2017 15:00	05/25/2017 09:38

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:**	L17051371
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615960	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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	2017-05-31 18:22:09

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051371
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615960	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615960	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615960	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615960	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	NH3
Prep Batch Number(s):	WG615960	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG615589	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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	2017-05-31 18:21:34

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051371
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG615589	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG615589	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG615589	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG615589	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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);

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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:**	L17051371
Project Name:		**Method:**	PO4
Prep Batch Number(s):	WG615589	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615834	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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	2017-05-31 18:27:27

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051371
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615834	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615834	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615834	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051371
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615834	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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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Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051371
Project Name:		**Method:**	TOC
Prep Batch Number(s):	WG615834	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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 #: L17051371
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051371-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6443-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	05/31/2017 08:14
Workgroup #:	WG615960	**Analyst:**	DCM	**Run Date:**	05/31/2017 08:29
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	S2170531001.023
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	8.67		1.00	0.500	0.250

Certificate of Analysis

Sample #:	L17051371-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6443-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	03/09/2017 11:25
Workgroup #:	WG615589	**Analyst:**	TMM	**Run Date:**	05/25/2017 13:25
Collect Date:	05/24/2017 15:00	**Dilution:**	2	**File ID:**	00.1705251325-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	1.12		0.200	0.100	0.0500

Certificate of Analysis

Sample #:	L17051371-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6443-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG615834	**Analyst:**	ADG	**Run Date:**	05/30/2017 09:32
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	TC05302017.007
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	54.8		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 #: L17051371
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051371-01	**PrePrep Method:**	N/A	**Instrument:**	SMARTCHEM2
Client ID:	LH18/24-SP650-6443-GRAB	**Prep Method:**	350.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	350.1	**Cal Date:**	05/31/2017 08:14
Workgroup #:	WG615960	**Analyst:**	DCM	**Run Date:**	05/31/2017 08:29
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	S2170531001.023
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Nitrogen, Ammonia	7664-41-7	8.67		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: 31-MAY-2017
Analyst: DCM
Analyst: NA
Method: NH3
Instrument: SC2
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG615960 WG615968

Calibration/Linearity	05-31-2017
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:
31-MAY-2017

Secondary Reviewer:
31-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-31-2017 13:59:47

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 350.1 **AAB#:** WG615960

Login Number: L17051371

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-SP650-6443-GRAB	01	05/24/17					05/31/2017	6.7	28		05/31/17	6.7	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5316612
Report generated 05/31/2017 11:16

METHOD BLANK SUMMARY

Login Number:	L17051371	**Work Group:**	WG615960
Blank File ID:	S2170531001.046	**Blank Sample ID:**	WG615960-01
Prep Date:	05/31/17 08:53	**Instrument ID:**	SMARTCHEM2
Analyzed Date:	05/31/17 08:53	**Method:**	350.1
Analyst:	DCM		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS2	WG615960-03	S2170531001.013	05/31/17 08:19	01
LH18/24-SP650-6443-GRAB	L17051371-01	S2170531001.023	05/31/17 08:29	DL01
DUP	WG615960-05	S2170531001.024	05/31/17 08:32	01
LCS	WG615960-02	S2170531001.047	05/31/17 08:53	01

Report Name: BLANK_SUMMARY
PDF File ID: 5316613
Report generated 05/31/2017 11:16

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051371 Prep Date: 05/31/17 08:53 Sample ID: WG615960-01
Instrument ID: SMARTCHEM2 Run Date: 05/31/17 08:53 Prep Method: 350.1
File ID: S2170531001.046 Analyst: DCM Method: 350.1
Workgroup (AAB#): WG615960 Matrix: Water Units: mg/L
Contract #: Cal ID: SMARTC-31-MAY-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: 5316615
31-MAY-2017 11:16

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051371 Analyst: DCM Prep Method: 350.1
Instrument ID: SMARTCHEM2 Matrix: Water Method: 350.1
Workgroup (AAB#): WG615960 Units: mg/L
QC Key: DOD4 Lot #: STD80299

Sample ID: WG615960-02 LCS File ID: S2170531001.047 Run Date: 05/31/2017 08:53
Sample ID: WG615960-03 LCS2 File ID: S2170531001.013 Run Date: 05/31/2017 08:19

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.89	94.3	2.00	1.97	98.5	4.39	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5316616
Report generated: 05/31/2017 11:16

2.1 General Chemistry Data

2.1.2 Orthophosphate Data

2.1.2.1 Summary Data

Microbac

Lab Report #: L17051371
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051371-01	**PrePrep Method:**	N/A	**Instrument:**	UV-2600
Client ID:	LH18/24-SP650-6443-GRAB	**Prep Method:**	365.2	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	365.2	**Cal Date:**	03/09/2017 11:25
Workgroup #:	WG615589	**Analyst:**	TMM	**Run Date:**	05/25/2017 13:25
Collect Date:	05/24/2017 15:00	**Dilution:**	2	**File ID:**	00.1705251325-06
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Orthophosphate	14265-44-2	1.12		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: 25-MAY-2017
Analyst: TMM
Analyst: NA
Method: PO4
Instrument: UV-2600
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG615589

Calibration/Linearity	3/10/17
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	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:
25-MAY-2017

Secondary Reviewer:
30-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-30-2017 09:33:52

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 365.2 AAB#: WG615589

Login Number: L17051371

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-SP650-6443-GRAB	01	05/24/17					05/25/2017	.9	2		05/25/17	.9	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5312112
Report generated 05/26/2017 09:52

METHOD BLANK SUMMARY

Login Number:	L17051371	**Work Group:**	WG615589
Blank File ID:	00.1705251325-03	**Blank Sample ID:**	WG615589-01
Prep Date:	05/25/17 13:25	**Instrument ID:**	UV-2600
Analyzed Date:	05/25/17 13:25	**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	WG615589-02	00.1705251325-04	05/25/17 13:25	
LCS2	WG615589-03	00.1705251325-05	05/25/17 13:25	
LH18/24-SP650-6443-GRAB	L17051371-01	00.1705251325-06	05/25/17 13:25	
DUP	WG615589-05	00.1705251325-08	05/25/17 13:25	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5312113
Report generated 05/26/2017 09:52

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051371 Prep Date: 05/25/17 13:25 Sample ID: WG615589-01
Instrument ID: UV-2600 Run Date: 05/25/17 13:25 Prep Method: 365.2
File ID: 00.1705251325-03 Analyst: TMM Method: 365.2
Workgroup (AAB#): WG615589 Matrix: Water Units: mg/L
Contract #: Cal ID: UV-260-11-MAY-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: 5312115
26-MAY-2017 09:52

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051371 Analyst: TMM Prep Method: 365.2
Instrument ID: UV-2600 Matrix: Water Method: 365.2
Workgroup (AAB#): WG615589 Units: mg/L
QC Key: DOD4 Lot #: STD82048

Sample ID: WG615589-02 LCS File ID: 00.1705251325-04 Run Date: 05/25/2017 13:25
Sample ID: WG615589-03 LCS2 File ID: 00.1705251325-05 Run Date: 05/25/2017 13:25

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Orthophosphate	1.00	0.997	99.7	1.00	0.999	99.9	0.160	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5312116
Report generated: 05/26/2017 09:52

2.1.2.3 Raw Data

UG 0057657

Curves

Parameter: PO4

Spectrophotometer: UV-2600

Calibration (Curve) standard stock: Std 79640

Concentration: 1000mg/L

Recipe for preparation of curve standards found in:

SOP: 3165 Revision: 17 Page: 69

Second Source Stock: Std 80857 Ag 3/9/17 (concentration: ~~1000~~ 100)

Daily Preparation: Std 80857
10(10) | 100

concentration = =1.0

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance
1.0	50	1cm	880	0.632
0.7				0.438
0.5				0.317
0.2				0.129
0.1				0.067
0.05				0.039
0.00			3/9/17 Ag	~~0.043~~ 0.001
2nd Source 1.0	↓	↓	↓	0.633

Analyst: April Greene Date/Time: 3/9/17 1125

DCN#124440

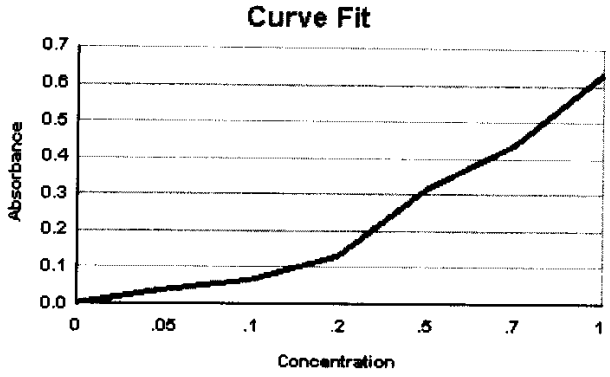
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup:WG605651
Analytical Method:300
Instrument ID:UV-2600

Analyst:ADG
Initial Calibration Date:03/09/2017

Analyte: ORTHOPHOSPHATE
Number of Points: 7
Slope: 0.625674
Y-Intercept: 0.00393300
Coef. Of Correlation (R^2): 0.999869
Coef. Of Correlation (R): 0.999935

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.00100	0.00	0.00	0.00393300
0.0500	0.0390	0.00250	0.00195	0.0352167
0.100	0.0670	0.0100	0.00670	0.0665004
0.200	0.129	0.0400	0.0258	0.129068
0.500	0.317	0.250	0.159	0.316770
0.700	0.438	0.490	0.307	0.441905
1.00	0.632	1.00	0.632	0.629607



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 03/09/2017 11:49

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG605651
File ID: 00.1703091125-08
CCV ID: WG605651-08
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 03/09/2017
Run Time: 11:25
Analyst: ADG
Cal ID: UV-260 - 09-MAR-17 11:25:07

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	1	1.01	0.633	1.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 03/09/2017 11:50

[redacted]

WG615589

Orthophosphate

(orthophosphate1)

EPA 365.2 / SM4500-P E
SOP K3653 Rev 17
Color Reagent Chemicals
39679
38726
39475
COA

CCV: 82047 Daily Dilution: 5(5)/50 Daily Dilution: =0.5
LCS: 82048 Daily Dilution: 10(10)/100 Daily Dilution: =1.0
Spectrophotometer: UV-2600 Curve ID: 3/10/17
Spike: Std 81454 Daily Dilution: 2(10)/50 Daily Dilution: =0.4

SAMPLE	VOLUME	PH < 8.2	DILUTION	ABSORBANCE @ 880 nm
CCV: mg/L	50	✓		0.321
BLK/CCB:	50	✓		0.002
LCS: ppm	50	✓		0.628
LCSD: ppm	50	✓		0.629
05-1371-01	50	✓	½	0.355
05-1371-01	50		⅕	0.219
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
CCV:	50			
CCB:	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
	50			
DUP 05-1371-01	50		⅕	0.224
MS: ( ) ↓	50		⅕	~~0.22~~ 0.258
MSD: ( )	50			
CCV: ( )	50			0.320
CCB:	50			0.004

Analyst: Tammy Mann Date / Time: 5/25/17 @ 1325

DCN#126068

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG615589
Analyte: ORTHOPHOSPHATE

Analyst: TMM
Date: 05/25/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG615589-01	50	50	0.00200	0.6257	0.003933	-0.0030895	-0.0030895	1	mg/L
WG615589-02	50	50	0.628	0.6257	0.003933	0.99743	0.99743	1	mg/L
WG615589-03	50	50	0.629	0.6257	0.003933	0.99903	0.99903	1	mg/L
L17051371-01	50	50	0.355	0.6257	0.003933	0.56110	1.1222	2	mg/L
WG615589-04	50	50	0.355	0.6257	0.003933	0.56110	1.1222	2	mg/L
WG615589-04	50	50	0.219	0.6257	0.003933	0.34374	1.7187	5	mg/L
L17051371-01	50	50	0.219	0.6257	0.003933	0.34374	1.7187	5	mg/L
WG615589-05	50	50	0.224	0.6257	0.003933	0.35173	1.7586	5	mg/L
WG615589-06	50	50	0.258	0.6257	0.003933	0.40607	2.0303	5	mg/L

[redacted]

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 05/25/2017 16:27

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG615615
File ID: 00.1705251325-01
CCV ID: WG615615-01
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 05/25/2017
Run Time: 13:25
Analyst: TMM
Cal ID: UV-260 - 11-MAY-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.507	0.642	1.4	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/25/2017 16:28

[redacted]

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG615615
File ID: 00.1705251325-10
CCV ID: WG615615-03
Units: mg/L
Analyte: ORTHOPHOSPHATE

Instrument ID: UV-2600
Run Date: 05/25/2017
Run Time: 13:25
Analyst: TMM
Cal ID: UV-260 - 11-MAY-17

Analyte	Expected	Found	RF	%D	Q
Orthophosphate	.5	0.505	0.640	1.0	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/25/2017 16:28

[redacted]

2.1 General Chemistry Data

2.1.3 Total Organic Carbon Data

2.1.3.1 Summary Data

Microbac

Lab Report #: L17051371
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051371-01	**PrePrep Method:**	N/A	**Instrument:**	TOC-VWP
Client ID:	LH18/24-SP650-6443-GRAB	**Prep Method:**	415.1	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	415.1	**Cal Date:**	02/10/2017 10:25
Workgroup #:	WG615834	**Analyst:**	ADG	**Run Date:**	05/30/2017 09:32
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	TC05302017.007
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Total Organic Carbon	TOC	54.8		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: 30-MAY-2017
Analyst: ADG
Analyst: NA
Method: TOC
Instrument: TOCVMP
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG615834 615927

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	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:
31-MAY-2017

Secondary Reviewer:
31-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-31-2017 15:22:23

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 415.1 **AAB#:** WG615834

Login Number: L17051371

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-SP650-6443-GRAB	01	05/24/17					05/30/2017	5.8	28		05/30/17	5.8	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5317169
Report generated 05/31/2017 15:17

METHOD BLANK SUMMARY

Login Number:	L17051371	**Work Group:**	WG615834
Blank File ID:	TC05302017.004	**Blank Sample ID:**	WG615834-01
Prep Date:	05/30/17 08:07	**Instrument ID:**	TOC-VWP
Analyzed Date:	05/30/17 08:07	**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	WG615834-02	TC05302017.005	05/30/17 08:19	01
LCS2	WG615834-03	TC05302017.006	05/30/17 08:31	01
LH18/24-SP650-6443-GRAB	L17051371-01	TC05302017.007	05/30/17 09:32	DL01
DUP	WG615834-05	TC05302017.031	05/30/17 15:12	01

Report Name: BLANK_SUMMARY
PDF File ID: 5317170
Report generated 05/31/2017 15:17

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051371 Prep Date: 05/30/17 08:07 Sample ID: WG615834-01
Instrument ID: TOC-VWP Run Date: 05/30/17 08:07 Prep Method: 415.1
File ID: TC05302017.004 Analyst: ADG Method: 415.1
Workgroup (AAB#): WG615834 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: 5317171
31-MAY-2017 15:17

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051371 Analyst: ADG Prep Method: 415.1
Instrument ID: TOC-VWP Matrix: Water Method: 415.1
Workgroup (AAB#): WG615834 Units: mg/L
QC Key: DOD4 Lot #: STD80787

Sample ID: WG615834-02 LCS File ID: TC05302017.005 Run Date: 05/30/2017 08:19
Sample ID: WG615834-03 LCS2 File ID: TC05302017.006 Run Date: 05/30/2017 08:31

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Organic Carbon	25.0	26.4	106	25.0	26.3	105	0.341	85 - 115	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5317172
Report generated: 05/31/2017 15:17

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

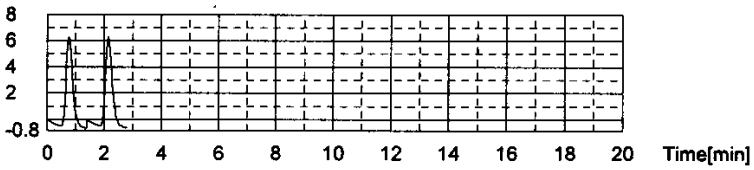
Sample Name:	TCCURVE
Sample ID:	Untitled
Cal. Curve:	TCCURVE-02-10-2017.2017_02_10_09_32_59.cal
Status	Completed

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

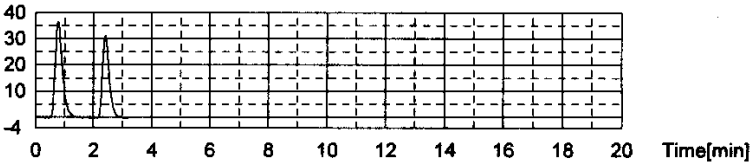
Acid Add. 0.000%
Mean Area 10.82



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

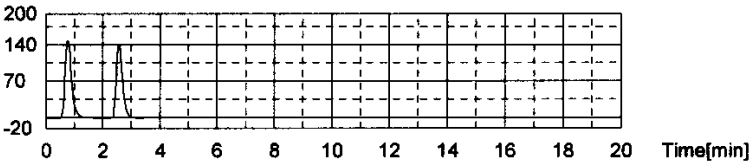
Acid Add. 0.000%
Mean Area 57.92



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

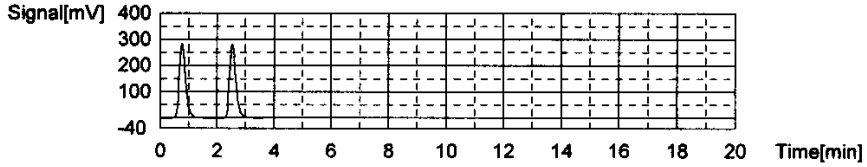
Acid Add. 0.000%
Mean Area 227.4



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

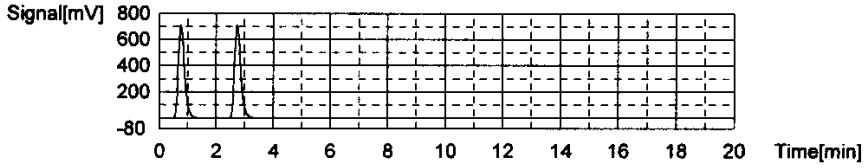
Acid Add. 0.000%
Mean Area 440.2



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

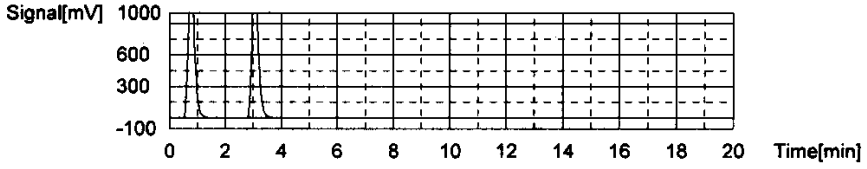
Acid Add. 0.000%
Mean Area 1092



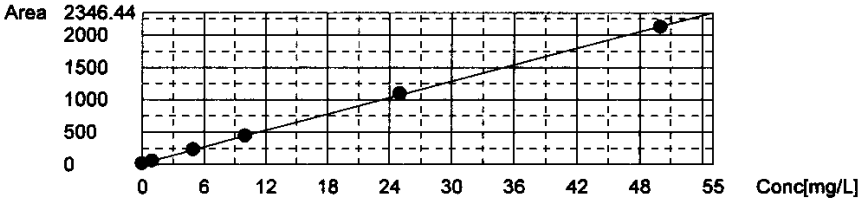
Conc: 50.00mg/L

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

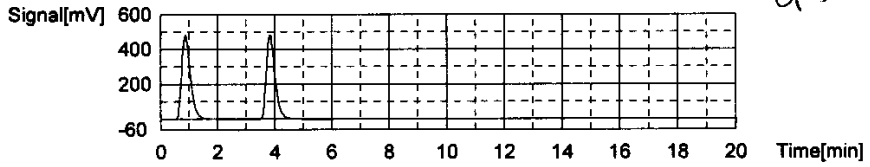
1. Det

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

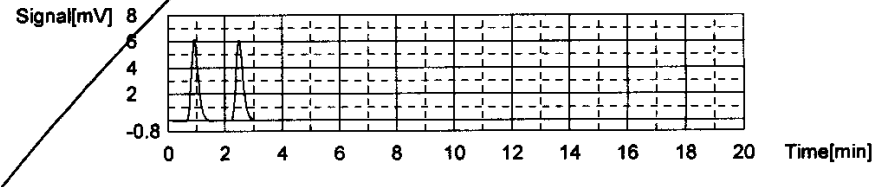
Sample Name: TICCURVE
Sample ID: Untitled
Cal. Curve: TICCURVE-02-10-2017.2017_02_10_14_45_10.cal
Status Completed

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

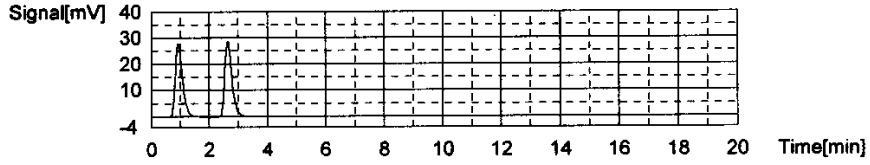
Acid Add. 3.000%
Mean Area 10.51



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

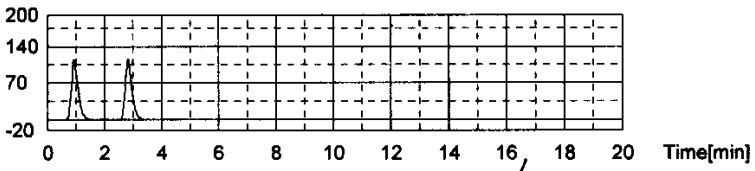


Conc: 5.000mg/L

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

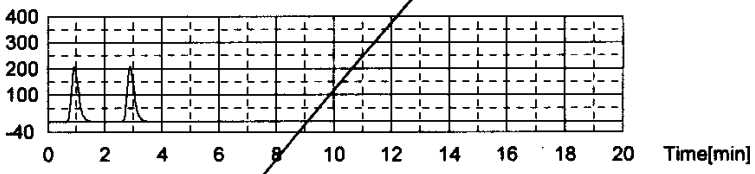
Acid Add. 3.000%
Mean Area 189.6



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

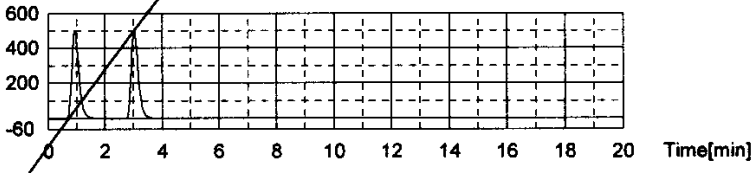
Acid Add. 3.000%
Mean Area 361.4



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

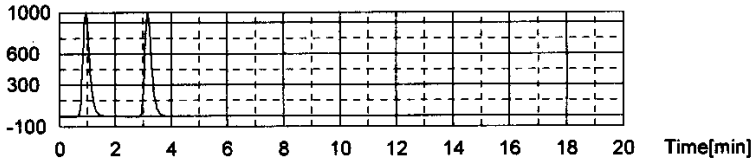
Acid Add. 3.000%
Mean Area 858.1



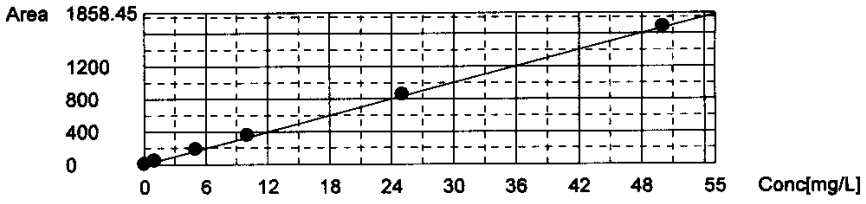
Conc: 50.00mg/L

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

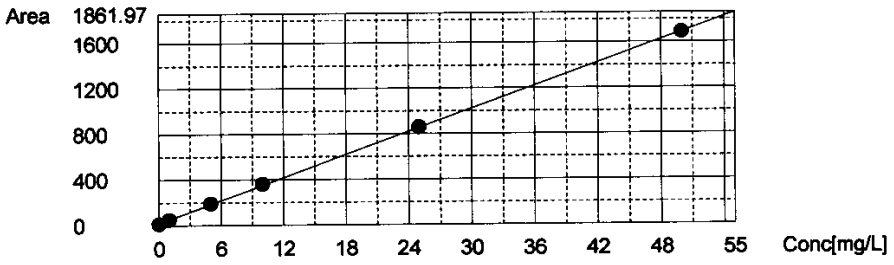
Acid Add.	3.000%
Mean Area	858.1
SD Area	1.697
CV Area	0.20%
Vial	4

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

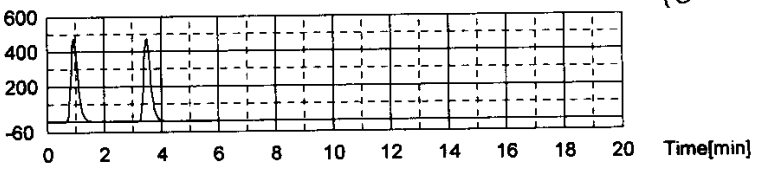
1. Det

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

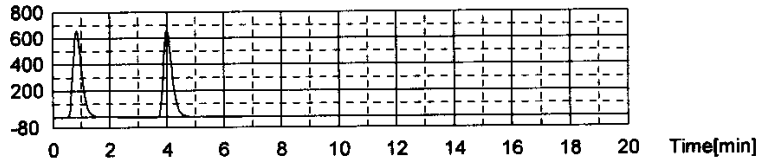
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:0.000mg/L

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

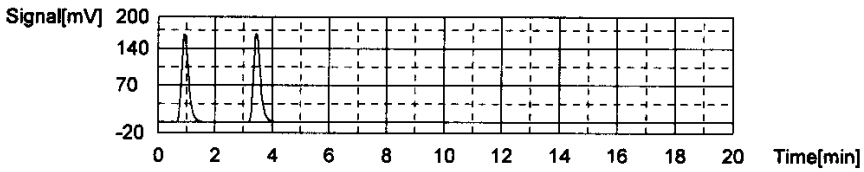
Type	Anal.	Dil.	Result
Unknown	IC	1.000	IC:8.571mg/L

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

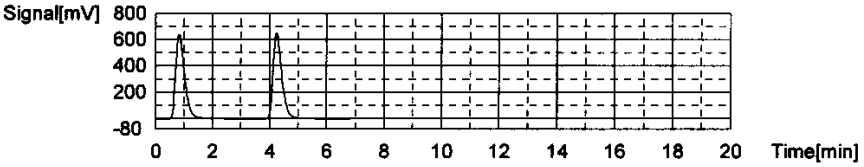
Type	Anal.	Dil.	Result
Unknown	TC	1.000	TC:32.10mg/L

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: WG615834
(615927)

5/30/17 **Total Organic Carbon**

MAKE DAILY

CCV (TOC): ~~Std 80787~~ Std 79381 (5/200)(1000) = 25mg/L

LCS (TOC): Std 80787 (5/200)(1000) = 25mg/L

CCV (TIC): 80416 (5/200)(1000) = 25mg/L

MS (TOC): 80787 0.4(1000)/40 = 10

Calibration Curve Date: 2-10-17

Reagent: 40069 39266

☒ SM5310-C : Matrix 2 WG 615927
☒ EPA 415.1/9060A(mod): Matrix 1 WG 615834 SOP: K 1541 Rev. 19
☐ 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	Position	Sample ID	Dilution	Position	Sample ID	Dilution
1	TIC		26	CCV		51	CCB	
2	TOC/TIC		27	CCB		52	1392-05	
3	CCV		28	msd 1398-03		53	07	
4	BLK		29	10		54	09	
5	LCS		30	13		55	11	
6	LCS Dup		31	1398-01 Dup		56	13	
7	1371-01	1/5	32	1380-01	1/3	57	15	
8	1380 01		33	-03	1/3	58	17	
9	03		34	-05	1/3	59	19	
10	05		35	-07	1/3	60	21	
11	07		36	-11	1/3	61	24	
12	09		37	15	1/3	62	CCV	
13	11		38	CCV		63	CCB	
14	CCV		39	CCB		64	1392-26	
15	CCB		40	Dup 1380-17	1/3	65	1394-01	
16	1380-13		41	MS 19	1/3	66	03	
17	15		42	MSD 21	1/3	67	05	
18	Dup 17	1/2	43	23	1/3	68	07	
19	MS 19	1/2	44	25	1/3	~~69~~ 1	09	
20	MSD 21	1/2	45	BLK		~~70~~ 2	11	
21	23		46	LCS		~~71~~ 3	1394-11 Dup	
22	25		47	LCS		~~72~~ 4	11 MS	
23	27		48	1392-01		~~73~~ 5	CCV	
24	Dup 1398-01		49	03		~~74~~ 6	CCB	
25	MS 02		50	CCV		75		

Analyst: April Greene Date/Time: 5/30/17@0730

DCN#126111

	Analysis	Sample Name	Result	Status	Date / Time	Vial
1	TOC	TIC	TOC:2.084mg/L TC:28.71mg/L IC:26.63mg/L	Complete	5/30/2017 7:37:06 AM	1
2	TOC	TOC/TIC	TOC:27.26mg/L TC:35.96mg/L IC:8.699mg/L	Complete	5/30/2017 7:50:13 AM	2
3	TOC	CCV	!!Error!! TOC:23.72mg/L TC:23.44mg/L IC:-0.2761mg/L	Complete	5/30/2017 8:02:31 AM	3
4	TOC	WG615834-01 BLK	!!Error!! TOC:0.1213mg/L TC:-0.1452mg/L IC:-0.2665mg/	Complete	5/30/2017 8:11:35 AM	0
5	TOC	WG615834-02 LCS	!!Error!! TOC:26.41mg/L TC:26.21mg/L IC:-0.2071mg/L	Complete	5/30/2017 8:23:51 AM	5
6	TOC	WG615834-03 LCSDU	!!Error!! TOC:26.32mg/L TC:25.99mg/L IC:-0.3238mg/L	Complete	5/30/2017 8:36:06 AM	6
7	TOC	L17051371-01 (5)	TOC:10.95mg/L TC:23.91mg/L IC:12.96mg/L	Complete	5/30/2017 9:37:43 AM	7
8	TOC		!!Error!! TOC:-16.52mg/L TC:69.42mg/L IC:85.93mg/L	Complete	5/30/2017 9:52:37 AM	8
9	TOC		!!Error!! TOC:-17.12mg/L TC:74.40mg/L IC:91.52mg/L	Complete	5/30/2017 10:08:19 AM	9
10	TOC		!!Error!! TOC:-21.58mg/L TC:77.19mg/L IC:98.78mg/L	Complete	5/30/2017 10:24:52 AM	10
11	TOC		!!Error!! TOC:-21.10mg/L TC:76.48mg/L IC:97.58mg/L	Complete	5/30/2017 10:40:51 AM	11
12	TOC	L17051380-09	TOC:9.597mg/L TC:49.00mg/L IC:39.41mg/L	Complete	5/30/2017 10:55:28 AM	12
13	TOC		!!Error!! TOC:-14.50mg/L TC:67.55mg/L IC:82.05mg/L	Complete	5/30/2017 11:10:58 AM	13
14	TOC	CCV	TOC:23.64mg/L TC:23.75mg/L IC:0.1116mg/L	Complete	5/30/2017 11:23:38 AM	14
15	TOC	CCB	!!Error!! TOC:0.07478mg/L TC:-0.1329mg/L IC:-0.2077m	Complete	5/30/2017 11:32:41 AM	0
16	TOC	L17051380-13	!!Error!! TOC:0.5007mg/L TC:0.3148mg/L IC:-0.1859mg/	Complete	5/30/2017 11:44:09 AM	16
17	TOC		!!Error!! TOC:-5.151mg/L TC:57.13mg/L IC:62.28mg/L	Complete	5/30/2017 11:59:09 AM	17
18	TOC		!!Error!! TOC:-0.1168mg/L TC:52.43mg/L IC:52.55mg/L	Complete	5/30/2017 12:13:31 PM	18
19	TOC		TOC:8.077mg/L TC:49.78mg/L IC:41.71mg/L	Complete	5/30/2017 12:27:57 PM	19
20	TOC		TOC:9.551mg/L TC:41.94mg/L IC:32.39mg/L	Complete	5/30/2017 12:41:59 PM	20
21	TOC		!!Error!! TOC:-18.96mg/L TC:72.80mg/L IC:91.76mg/L	Complete	5/30/2017 12:57:51 PM	21
22	TOC		!!Error!! TOC:-17.79mg/L TC:72.09mg/L IC:89.88mg/L	Complete	5/30/2017 1:14:52 PM	22
23	TOC	L17051380-27	TOC:0.3361mg/L TC:0.6352mg/L IC:0.2991mg/L	Complete	5/30/2017 1:26:46 PM	23
24	TOC	L17051398-01	TOC:0.8960mg/L TC:17.25mg/L IC:16.35mg/L	Complete	5/30/2017 1:39:38 PM	24
25	TOC	L17051398-02 MS	TOC:12.42mg/L TC:22.52mg/L IC:10.10mg/L	Complete	5/30/2017 1:52:27 PM	25
26	TOC	CCV	!!Error!! TOC:23.54mg/L TC:23.32mg/L IC:-0.2146mg/L	Complete	5/30/2017 2:04:46 PM	26
27	TOC	CCB	!!Error!! TOC:0.1054mg/L TC:-0.1530mg/L IC:-0.2584mg/	Complete	5/30/2017 2:13:44 PM	0
28	TOC	L17051398-03 MSD	TOC:12.29mg/L TC:21.68mg/L IC:9.386mg/L	Complete	5/30/2017 2:26:41 PM	28
29	TOC	L17051398-10	TOC:0.7035mg/L TC:7.330mg/L IC:6.626mg/L	Complete	5/30/2017 2:38:57 PM	29
30	TOC	L17051398-13	TOC:0.8255mg/L TC:9.244mg/L IC:8.418mg/L	Complete	5/30/2017 2:51:06 PM	30
31	TOC	WG615834-05 DUP	TOC:1.327mg/L TC:11.14mg/L IC:9.816mg/L	Complete	5/30/2017 3:17:28 PM	31
32	TOC	L17051380-01 (3)	TOC:2.701mg/L TC:30.95mg/L IC:28.25mg/L	Complete	5/30/2017 3:31:02 PM	32
33	TOC	L17051380-03 (3)	TOC:3.552mg/L TC:36.84mg/L IC:33.29mg/L	Complete	5/30/2017 3:44:44 PM	33
34	TOC	L17051380-05 (3)	TOC:5.354mg/L TC:42.34mg/L IC:36.99mg/L	Complete	5/30/2017 3:58:51 PM	34
35	TOC	L17051380-07 (3)	TOC:3.057mg/L TC:42.11mg/L IC:39.05mg/L	Complete	5/30/2017 4:13:05 PM	35
36	TOC	L17051380-11 (3)	TOC:1.518mg/L TC:24.01mg/L IC:22.49mg/L	Complete	5/30/2017 4:26:31 PM	36
37	TOC	L17051380-15 (3)	TOC:1.776mg/L TC:18.10mg/L IC:16.32mg/L	Complete	5/30/2017 4:39:26 PM	37
38	TOC	CCV	!!Error!! TOC:23.29mg/L TC:23.11mg/L IC:-0.1853mg/L	Complete	5/30/2017 4:51:47 PM	38
39	TOC	CCB	!!Error!! TOC:0.1193mg/L TC:-0.1643mg/L IC:-0.2835mg/	Complete	5/30/2017 5:00:48 PM	0
40	TOC	L17051380-17 (3)	TOC:3.016mg/L TC:32.09mg/L IC:29.07mg/L	Complete	5/30/2017 5:13:45 PM	40
41	TOC	L17051380-19 (3)	TOC:6.142mg/L TC:27.36mg/L IC:21.22mg/L	Complete	5/30/2017 5:27:20 PM	41
42	TOC	L17051380-21 (3)	TOC:5.595mg/L TC:24.79mg/L IC:19.19mg/L	Complete	5/30/2017 5:40:39 PM	42
43	TOC	L17051380-23 (3)	TOC:3.039mg/L TC:31.90mg/L IC:28.86mg/L	Complete	5/30/2017 5:54:00 PM	43
44	TOC	L17051380-25 (3)	TOC:1.410mg/L TC:27.76mg/L IC:26.35mg/L	Complete	5/30/2017 6:07:24 PM	44
45	TOC	WG615927-01 BLK	!!Error!! TOC:0.1672mg/L TC:-0.06947mg/L IC:-0.2367m	Complete	5/30/2017 6:26:09 PM	45
46	TOC	WG615927-02 LCS	!!Error!! TOC:25.99mg/L TC:25.71mg/L IC:-0.2807mg/L	Complete	5/30/2017 6:47:26 PM	46
47	TOC	WG615927-03 LCSDU	!!Error!! TOC:26.01mg/L TC:25.72mg/L IC:-0.2899mg/L	Complete	5/30/2017 7:08:28 PM	47
48	TOC	L17051392-01	TOC:4.690mg/L TC:30.20mg/L IC:25.51mg/L	Complete	5/30/2017 7:33:01 PM	48
49	TOC	L17051392-03	TOC:2.971mg/L TC:17.37mg/L IC:14.40mg/L	Complete	5/30/2017 7:55:30 PM	49
50	TOC	CCV	!!Error!! TOC:23.01mg/L TC:22.81mg/L IC:-0.2071mg/L	Complete	5/30/2017 8:07:49 PM	50
51	TOC	CCB	!!Error!! TOC:0.1159mg/L TC:-0.1591mg/L IC:-0.2750mg/	Complete	5/30/2017 8:16:47 PM	0
52	TOC	L17051392-05	TOC:2.976mg/L TC:23.68mg/L IC:20.70mg/L	Complete	5/30/2017 8:39:41 PM	52
53	TOC	L17051392-07	TOC:3.657mg/L TC:36.78mg/L IC:33.12mg/L	Complete	5/30/2017 9:03:52 PM	53
54	TOC	L17051392-09	TOC:3.693mg/L TC:19.11mg/L IC:15.41mg/L	Complete	5/30/2017 9:26:44 PM	54
55	TOC	L17051392-11	TOC:2.906mg/L TC:16.48mg/L IC:13.57mg/L	Complete	5/30/2017 9:49:58 PM	55
56	TOC	L17051392-13	TOC:2.286mg/L TC:10.09mg/L IC:7.806mg/L	Complete	5/30/2017 10:11:32 PM	56
57	TOC	L17051392-15	TOC:2.494mg/L TC:13.47mg/L IC:10.98mg/L	Complete	5/30/2017 10:33:39 PM	57
58	TOC	L17051392-17	TOC:2.638mg/L TC:16.49mg/L IC:13.85mg/L	Complete	5/30/2017 10:56:11 PM	58
59	TOC	L17051392-19	TOC:1.984mg/L TC:10.64mg/L IC:8.657mg/L	Complete	5/30/2017 11:17:48 PM	59
60	TOC	L17051392-21	TOC:1.606mg/L TC:6.469mg/L IC:4.863mg/L	Complete	5/30/2017 11:38:50 PM	60
61	TOC	L17051392-24	TOC:1.464mg/L TC:2.979mg/L IC:1.515mg/L	Complete	5/30/2017 11:59:17 PM	61
62	TOC	CCV	!!Error!! TOC:23.19mg/L TC:22.91mg/L IC:-0.2839mg/L	Complete	5/31/2017 12:11:37 AM	62
63	TOC	CCB	!!Error!! TOC:0.1211mg/L TC:-0.1561mg/L IC:-0.2771mg/	Complete	5/31/2017 12:20:39 AM	0
64	TOC	L17051392-26	TOC:1.604mg/L TC:3.932mg/L IC:2.328mg/L	Complete	5/31/2017 12:41:17 AM	64
65	TOC	L17051394-01	TOC:1.600mg/L TC:2.081mg/L IC:0.4811mg/L	Complete	5/31/2017 1:01:41 AM	65
66	TOC	L17051394-03	TOC:1.540mg/L TC:1.941mg/L IC:0.4008mg/L	Complete	5/31/2017 1:22:09 AM	66
67	TOC	L17051394-05	TOC:1.108mg/L TC:1.589mg/L IC:0.4811mg/L	Complete	5/31/2017 1:42:15 AM	67

	Analysis	Sample Name	Result	Status	Date / Time	Vial
68	TOC	L17051394-07	TOC:1.309mg/L TC:1.988mg/L IC:0.6788mg/L	Complete	5/31/2017 2:02:30 AM	68
69	TOC	L17051394-09	TOC:1.247mg/L TC:4.161mg/L IC:2.914mg/L	Complete	5/31/2017 2:23:01 AM	1
70	TOC	L17051394-11	TOC:1.066mg/L TC:2.369mg/L IC:1.304mg/L	Complete	5/31/2017 2:43:14 AM	2
71	TOC	WG615927-05 DUP	TOC:1.062mg/L TC:2.640mg/L IC:1.578mg/L	Complete	5/31/2017 3:03:30 AM	3
72	TOC	WG615927-06 MS	!!Error!! TOC:11.36mg/L TC:11.09mg/L IC:-0.2664mg/L	Complete	5/31/2017 3:23:45 AM	4
73	TOC	CCV	!!Error!! TOC:23.11mg/L TC:22.83mg/L IC:-0.2808mg/L	Complete	5/31/2017 3:36:02 AM	5
74	TOC	CCB	!!Error!! TOC:0.1181mg/L TC:-0.1601mg/L IC:-0.2782mg/	Complete	5/31/2017 3:44:57 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	

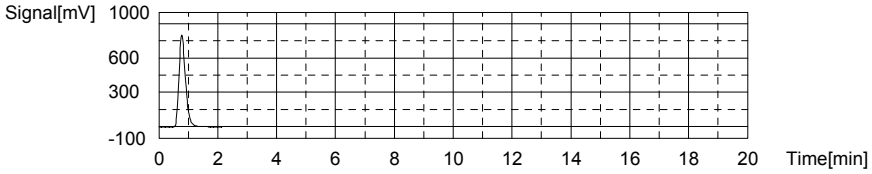
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.084mg/L TC:28.71mg/L IC:26.63mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1232	28.71mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 7:31:31 AM

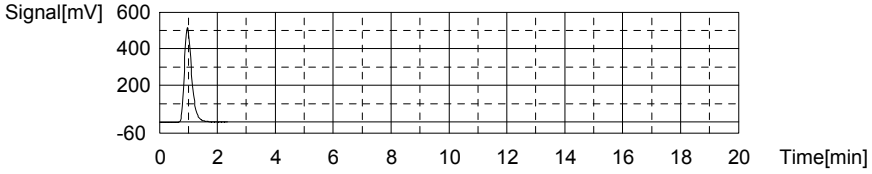
Mean Area 1232
Mean Conc. 28.71mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	910.0	26.63mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 7:37:06 AM

Mean Area 910.0
Mean Conc. 26.63mg/L



Sample

Sample Name:	TOC/TIC
Sample ID:	<Untitled>
Origin:	TOC-02-10-2017.met
Status	Completed
Chk. Result	

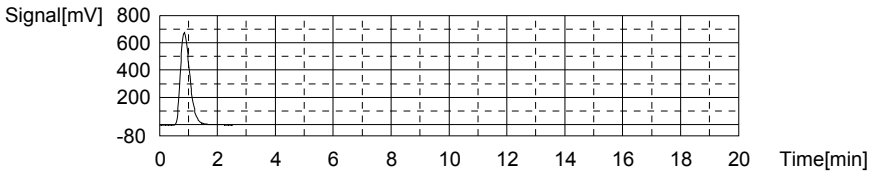
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:27.26mg/L TC:35.96mg/L IC:8.699mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1539	35.96mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 7:45:05 AM

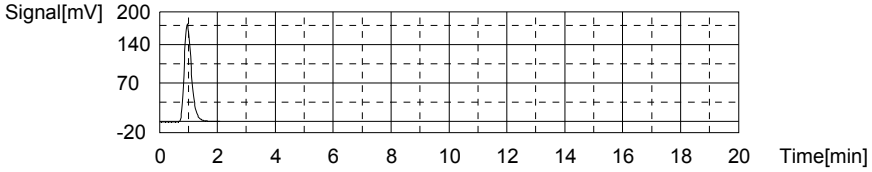
Mean Area 1539
Mean Conc. 35.96mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	309.7	8.699mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 7:50:13 AM

Mean Area 309.7
Mean Conc. 8.699mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

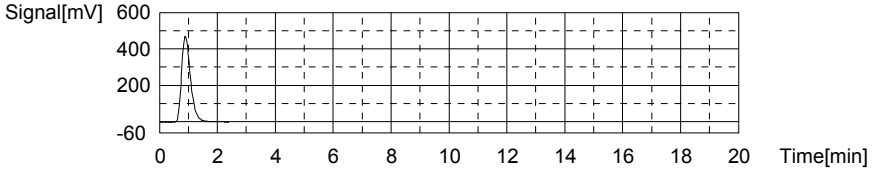
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.72mg/L TC:23.44mg/L IC:-0.2761mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1009	23.44mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 7:58:04 AM

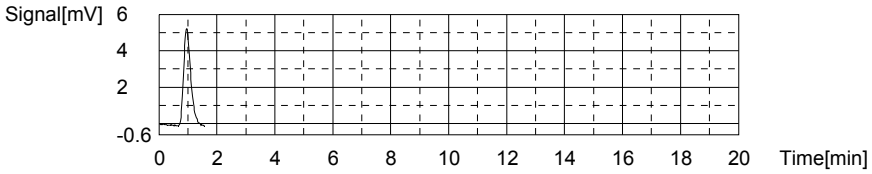
Mean Area 1009
Mean Conc. 23.44mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.169	-0.2761mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 8:02:31 AM

Mean Area 9.169
Mean Conc. -0.2761mg/L



Sample

Sample Name: WG615834-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

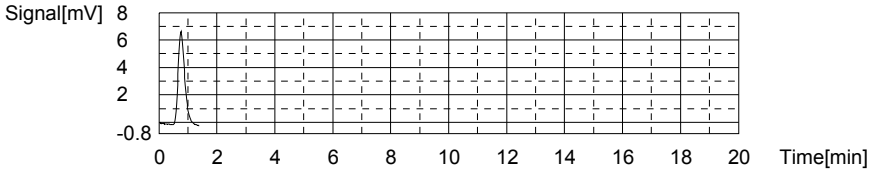
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1213mg/L TC:-0.1452mg/L IC:-0.2665mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.72	-0.1452mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 8:07:34 AM

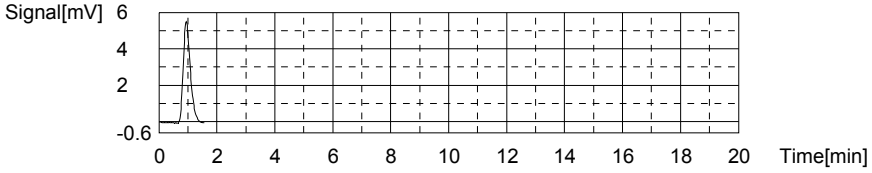
Mean Area 10.72
Mean Conc. -0.1452mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.491	-0.2665mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 8:11:35 AM

Mean Area 9.491
Mean Conc. -0.2665mg/L



Sample

Sample Name: WG615834-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

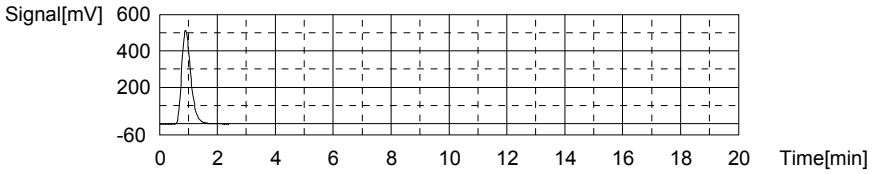
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.41mg/L TC:26.21mg/L IC:-0.2071mg/L

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	5/30/2017 8:19:26 AM

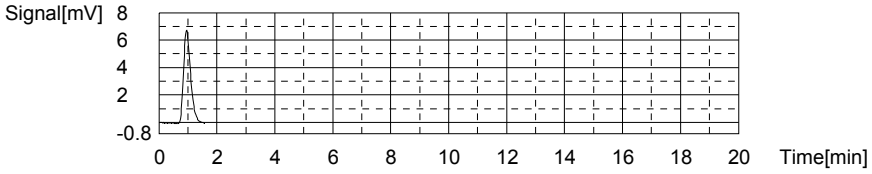
Mean Area 1126
Mean Conc. 26.21mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.48	-0.2071mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 8:23:51 AM

Mean Area 11.48
Mean Conc. -0.2071mg/L



Sample

Sample Name: WG615834-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

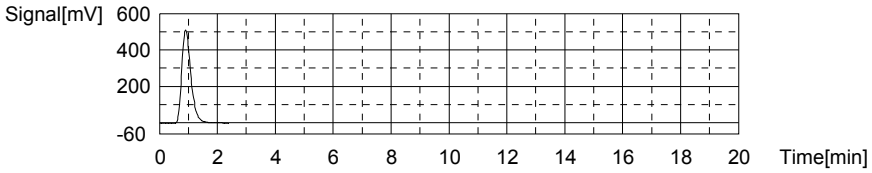
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.32mg/L TC:25.99mg/L IC:-0.3238mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1117	25.99mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/30/2017 8:31:40 AM

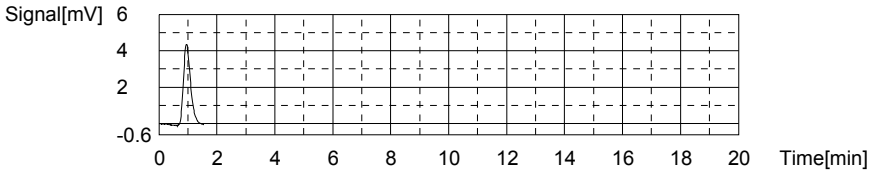
Mean Area 1117
Mean Conc. 25.99mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	7.571	-0.3238mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 8:36:06 AM

Mean Area 7.571
Mean Conc. -0.3238mg/L



Sample

Sample Name: L17051371-01 (5)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

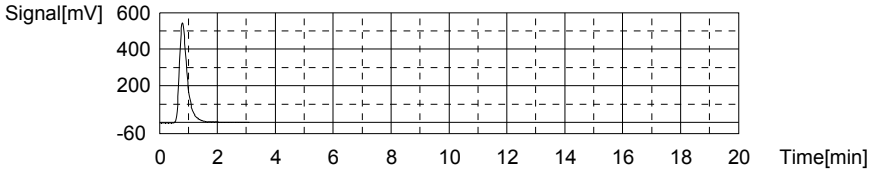
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:10.95mg/L TC:23.91mg/L IC:12.96mg/L

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_55	5/30/2017 9:32:23 AM

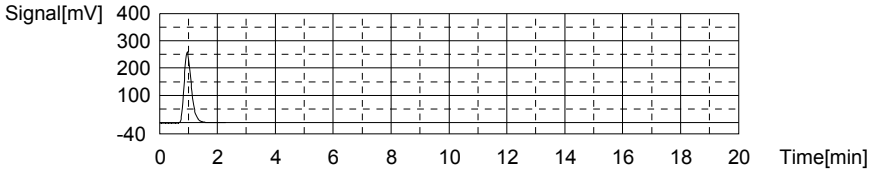
Mean Area 1029
Mean Conc. 23.91mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	452.4	12.96mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 9:37:43 AM

Mean Area 452.4
Mean Conc. 12.96mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

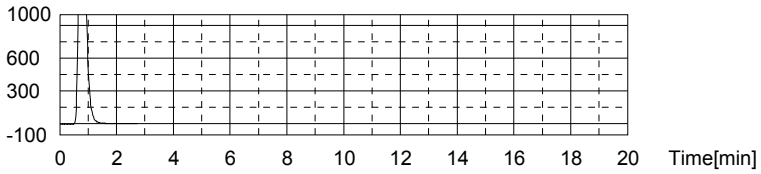
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-16.52mg/L TC:69.42mg/L IC:85.93mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2955	69.42mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 9:45:53 AM

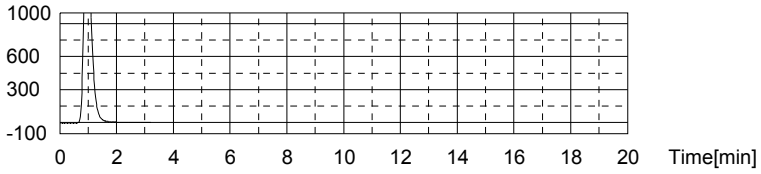
Mean Area 2955
Mean Conc. 69.42mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2896	85.93mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 9:52:37 AM

Mean Area 2896
Mean Conc. 85.93mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

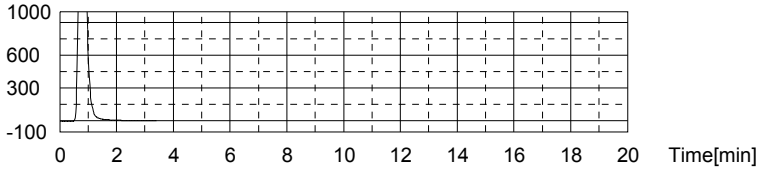
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-17.12mg/L TC:74.40mg/L IC:91.52mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3166	74.40mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:01:28 AM

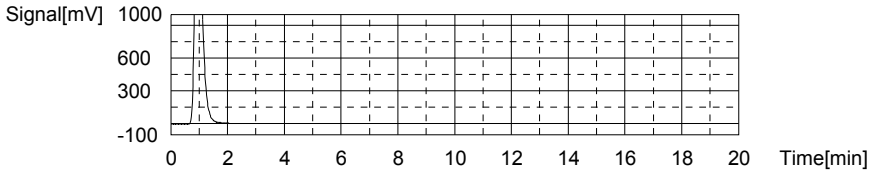
Mean Area 3166
Mean Conc. 74.40mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3083	91.52mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 10:08:19 AM

Mean Area 3083
Mean Conc. 91.52mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

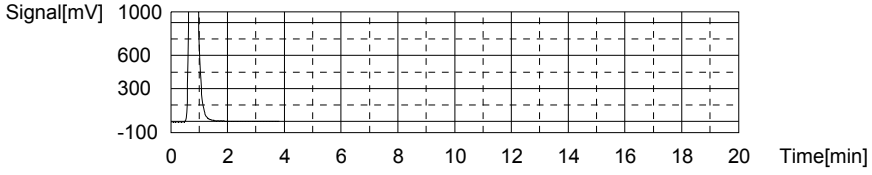
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-21.58mg/L TC:77.19mg/L IC:98.78mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3284	77.19mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:17:35 AM

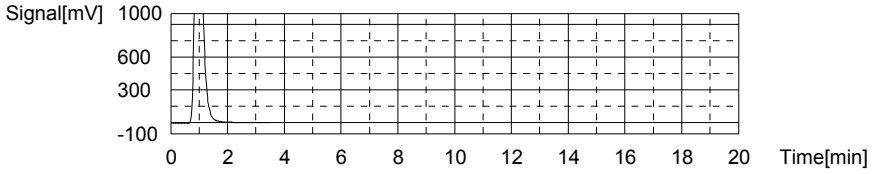
Mean Area 3284
Mean Conc. 77.19mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3326	98.78mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 10:24:52 AM

Mean Area 3326
Mean Conc. 98.78mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

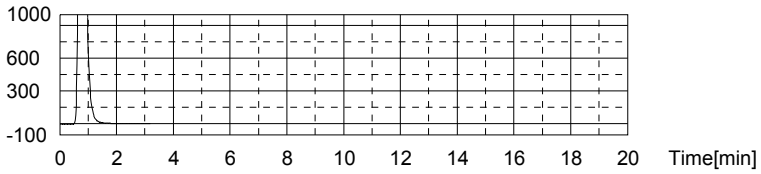
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-21.10mg/L TC:76.48mg/L IC:97.58mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3254	76.48mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:33:30 AM

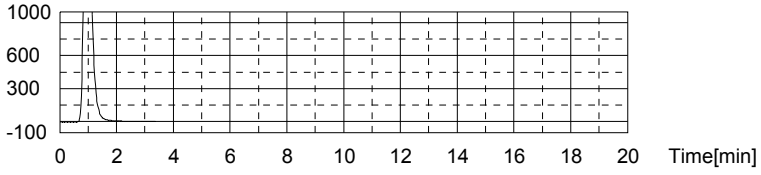
Mean Area 3254
Mean Conc. 76.48mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3286	97.58mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 10:40:51 AM

Mean Area 3286
Mean Conc. 97.58mg/L



Sample

Sample Name: L17051380-09
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

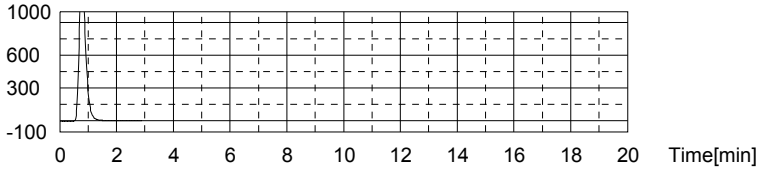
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:9.597mg/L TC:49.00mg/L IC:39.41mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2091	49.00mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:49:11 AM

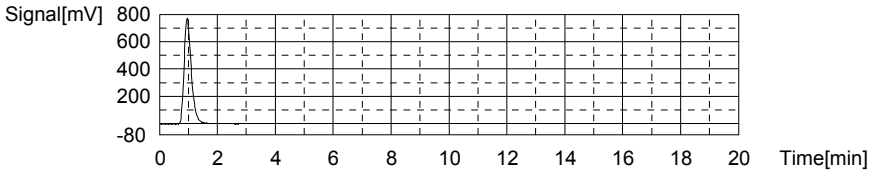
Mean Area 2091
Mean Conc. 49.00mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1338	39.41mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 10:55:28 AM

Mean Area 1338
Mean Conc. 39.41mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

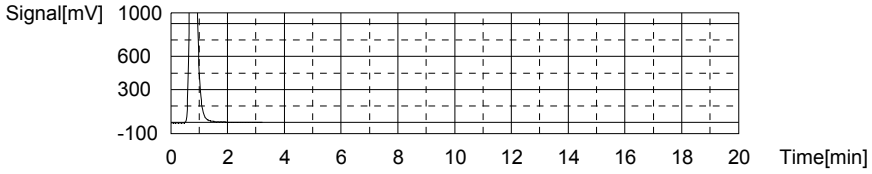
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-14.50mg/L TC:67.55mg/L IC:82.05mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2876	67.55mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 11:04:08 AM

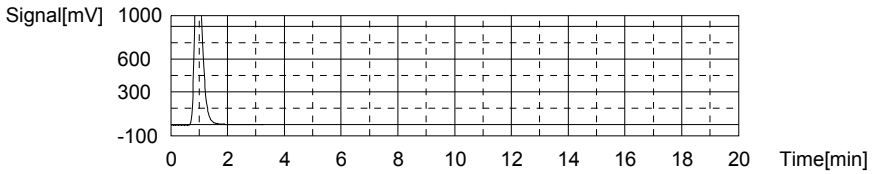
Mean Area 2876
Mean Conc. 67.55mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2766	82.05mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 11:10:58 AM

Mean Area 2766
Mean Conc. 82.05mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

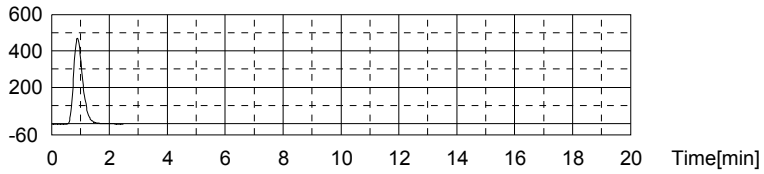
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:23.64mg/L TC:23.75mg/L IC:0.1116mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1022	23.75mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/30/2017 11:18:53 AM

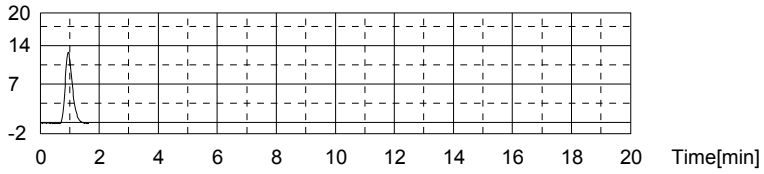
Mean Area 1022
Mean Conc. 23.75mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	22.15	0.1116mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 11:23:38 AM

Mean Area 22.15
Mean Conc. 0.1116mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

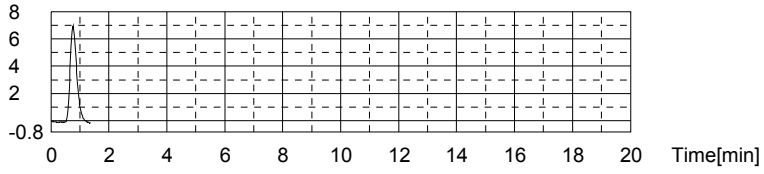
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.07478mg/L TC:-0.1329mg/L IC:-0.2077mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.24	-0.1329mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/30/2017 11:28:39 AM

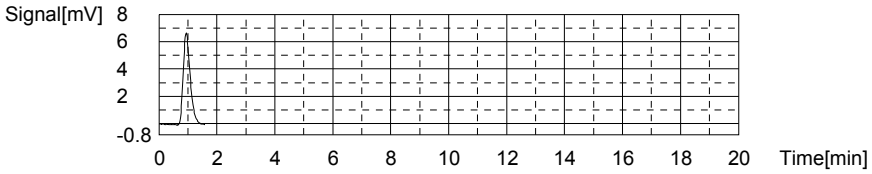
Mean Area 11.24
Mean Conc. -0.1329mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.46	-0.2077mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 11:32:41 AM

Mean Area 11.46
Mean Conc. -0.2077mg/L



Sample

Sample Name: L17051380-13
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

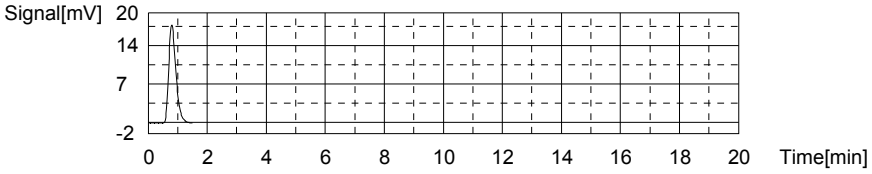
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.5007mg/L TC:0.3148mg/L IC:-0.1859mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	30.19	0.3148mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 11:39:38 AM

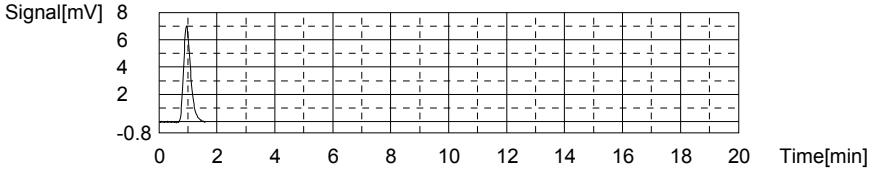
Mean Area 30.19
Mean Conc. 0.3148mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.19	-0.1859mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 11:44:09 AM

Mean Area 12.19
Mean Conc. -0.1859mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

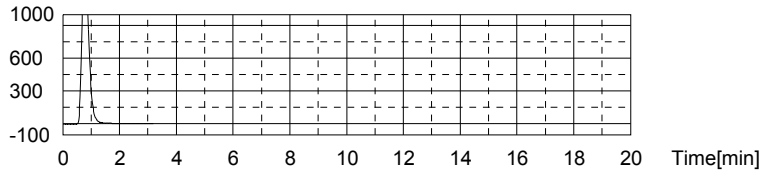
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-5.151mg/L TC:57.13mg/L IC:62.28mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2435	57.13mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 11:52:47 AM

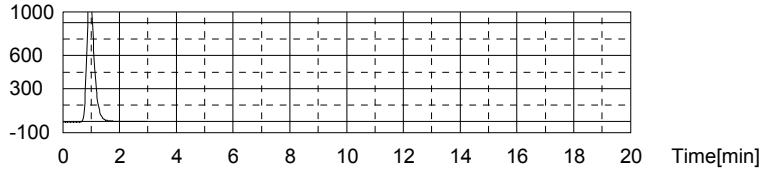
Mean Area 2435
Mean Conc. 57.13mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2104	62.28mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 11:59:09 AM

Mean Area 2104
Mean Conc. 62.28mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

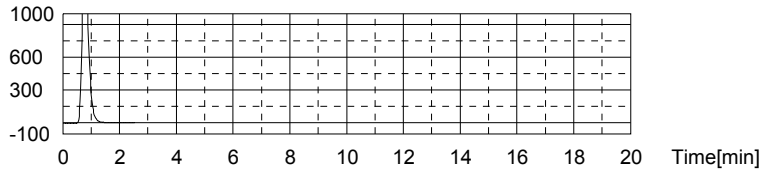
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-0.1168mg/L TC:52.43mg/L IC:52.55mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2236	52.43mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 12:07:07 PM

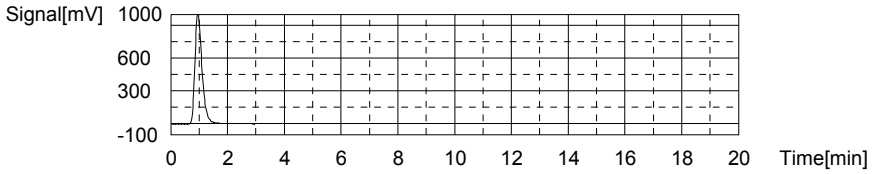
Mean Area 2236
Mean Conc. 52.43mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1778	52.55mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 12:13:31 PM

Mean Area 1778
Mean Conc. 52.55mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

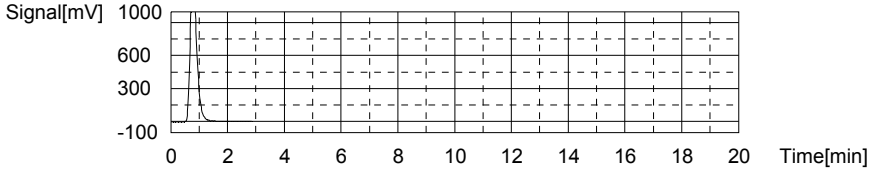
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:8.077mg/L TC:49.78mg/L IC:41.71mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2124	49.78mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 12:21:49 PM

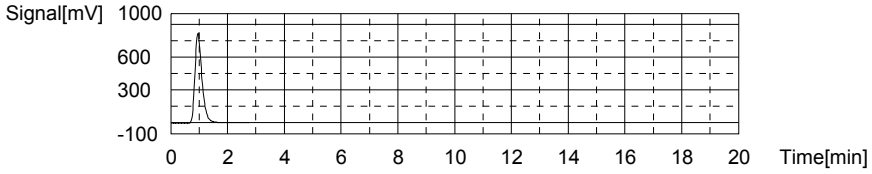
Mean Area 2124
Mean Conc. 49.78mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1415	41.71mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 12:27:57 PM

Mean Area 1415
Mean Conc. 41.71mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

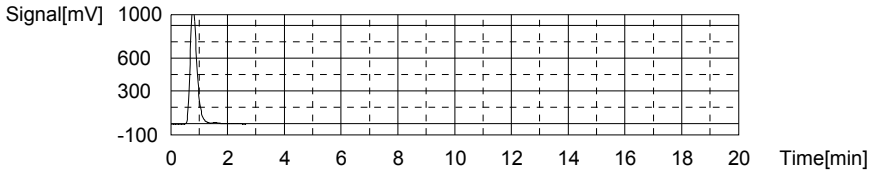
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:9.551mg/L TC:41.94mg/L IC:32.39mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1792	41.94mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 12:36:03 PM

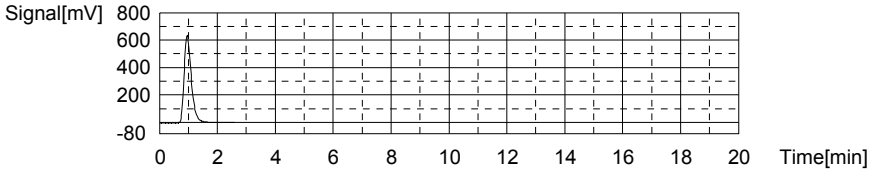
Mean Area 1792
Mean Conc. 41.94mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1103	32.39mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 12:41:59 PM

Mean Area 1103
Mean Conc. 32.39mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

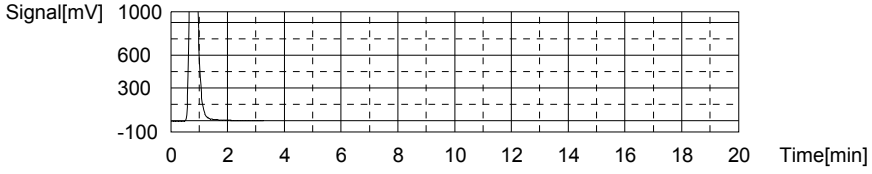
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-18.96mg/L TC:72.80mg/L IC:91.76mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3098	72.80mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 12:50:42 PM

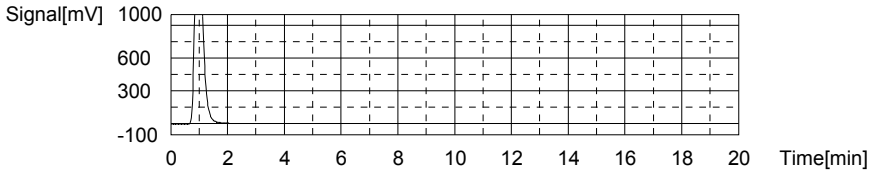
Mean Area 3098
Mean Conc. 72.80mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3091	91.76mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 12:57:51 PM

Mean Area 3091
Mean Conc. 91.76mg/L



Sample

Sample Name:
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

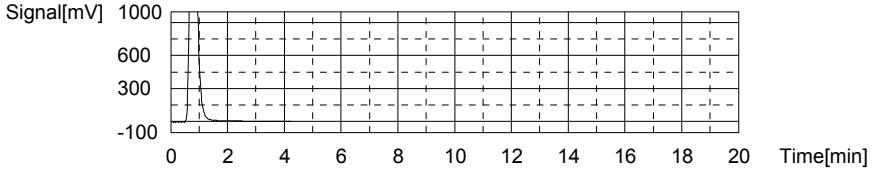
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:-17.79mg/L TC:72.09mg/L IC:89.88mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3068	72.09mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 1:07:32 PM

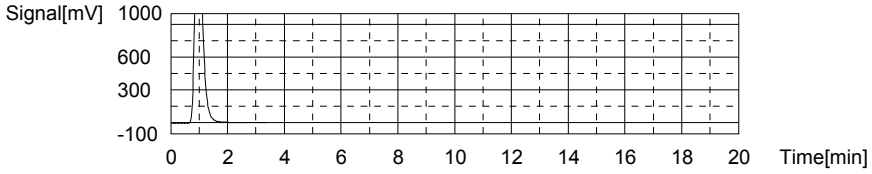
Mean Area 3068
Mean Conc. 72.09mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	3028	89.88mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 1:14:52 PM

Mean Area 3028
Mean Conc. 89.88mg/L



Sample

Sample Name: L17051380-27
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

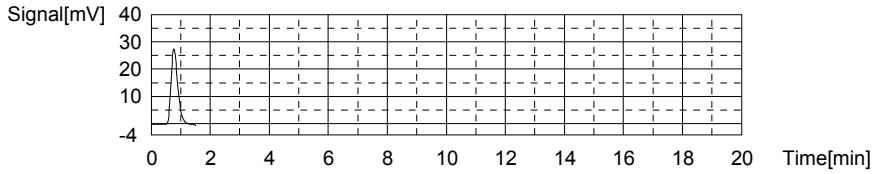
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.3361mg/L TC:0.6352mg/L IC:0.2991mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	43.75	0.6352mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 1:21:49 PM

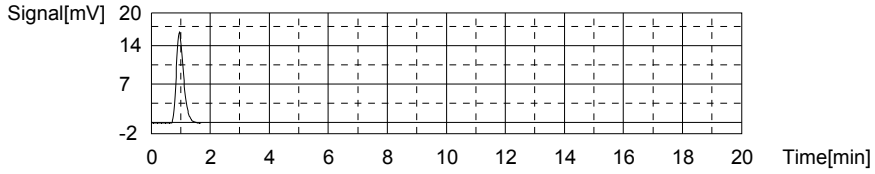
Mean Area 43.75
Mean Conc. 0.6352mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	28.43	0.2991mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 1:26:46 PM

Mean Area 28.43
Mean Conc. 0.2991mg/L



Sample

Sample Name: L17051398-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

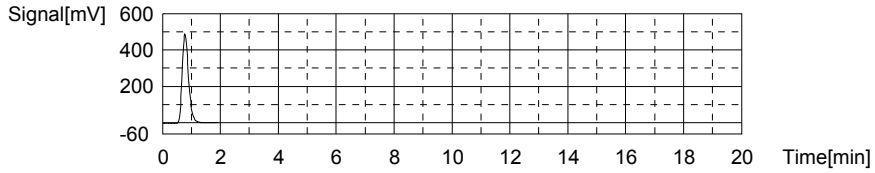
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.8960mg/L TC:17.25mg/L IC:16.35mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	746.8	17.25mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 1:34:09 PM

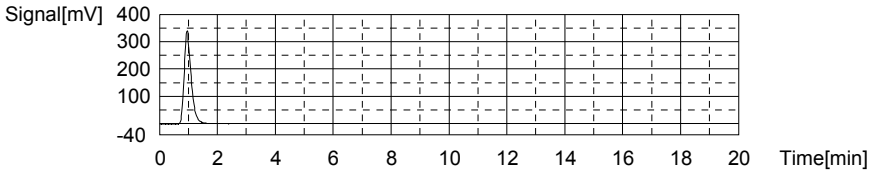
Mean Area 746.8
Mean Conc. 17.25mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	565.9	16.35mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 1:39:38 PM

Mean Area 565.9
Mean Conc. 16.35mg/L



Sample

Sample Name: L17051398-02 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

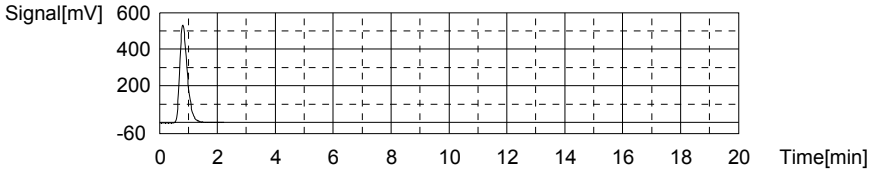
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:12.42mg/L TC:22.52mg/L IC:10.10mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	970.0	22.52mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 1:47:17 PM

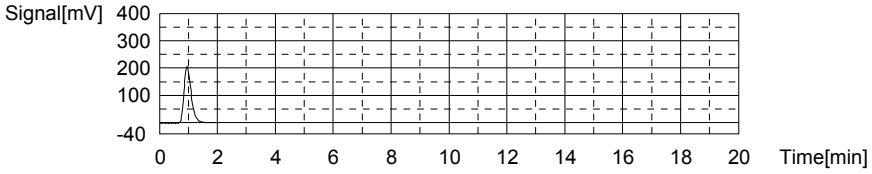
Mean Area 970.0
Mean Conc. 22.52mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	356.5	10.10mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 1:52:27 PM

Mean Area 356.5
Mean Conc. 10.10mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

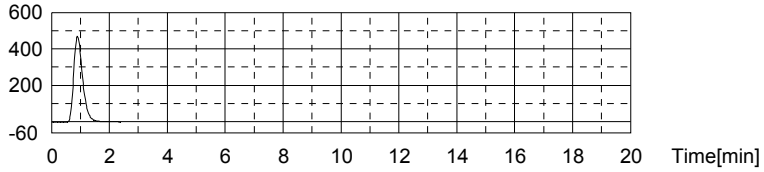
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.54mg/L TC:23.32mg/L IC:-0.2146mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1004	23.32mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/30/2017 2:00:16 PM

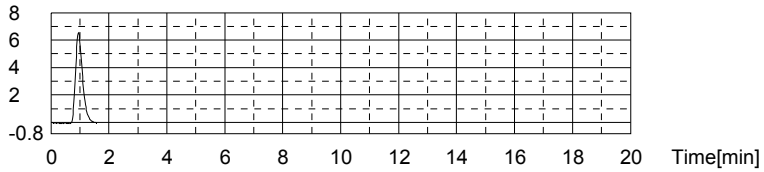
Mean Area 1004
Mean Conc. 23.32mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.23	-0.2146mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 2:04:46 PM

Mean Area 11.23
Mean Conc. -0.2146mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

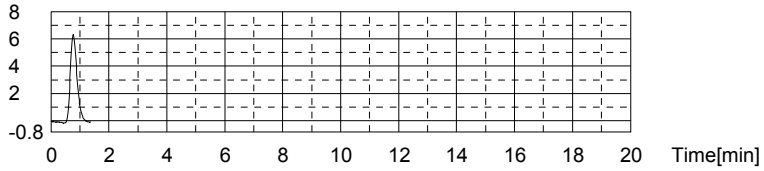
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1054mg/L TC:-0.1530mg/L IC:-0.2584mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.39	-0.1530mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/30/2017 2:09:47 PM

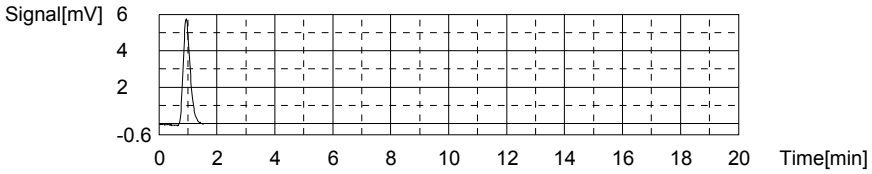
Mean Area 10.39
Mean Conc. -0.1530mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.762	-0.2584mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 2:13:44 PM

Mean Area 9.762
Mean Conc. -0.2584mg/L



Sample

Sample Name: L17051398-03 MSD
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

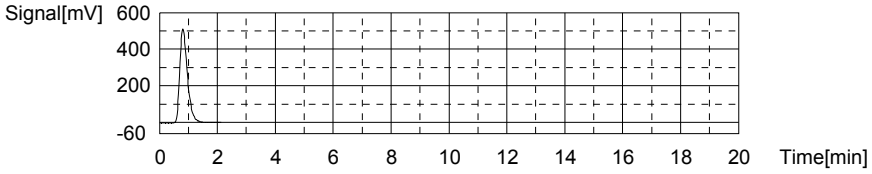
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:12.29mg/L TC:21.68mg/L IC:9.386mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	934.4	21.68mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 2:21:27 PM

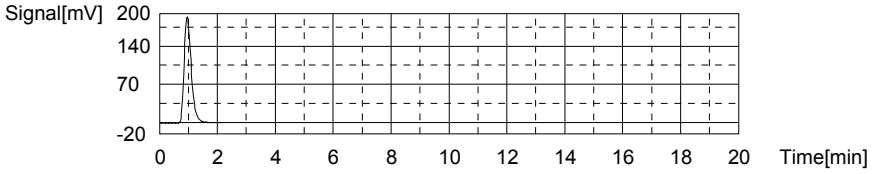
Mean Area 934.4
Mean Conc. 21.68mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	332.7	9.386mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 2:26:41 PM

Mean Area 332.7
Mean Conc. 9.386mg/L



Sample

Sample Name: L17051398-10
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

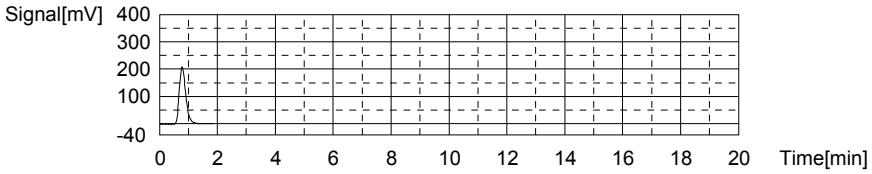
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.7035mg/L TC:7.330mg/L IC:6.626mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	327.1	7.330mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 2:33:59 PM

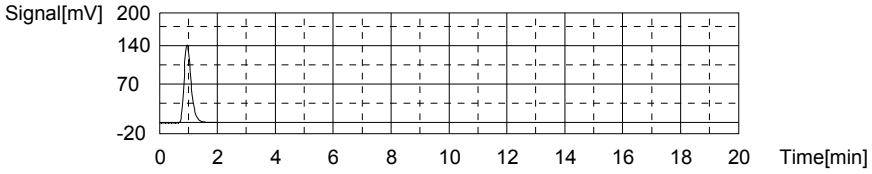
Mean Area 327.1
Mean Conc. 7.330mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	240.3	6.626mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 2:38:57 PM

Mean Area 240.3
Mean Conc. 6.626mg/L



Sample

Sample Name: L17051398-13
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

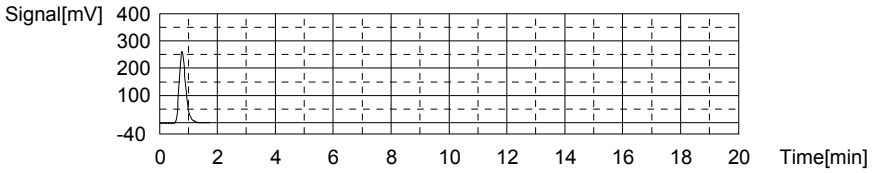
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:0.8255mg/L TC:9.244mg/L IC:8.418mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	408.1	9.244mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 2:46:09 PM

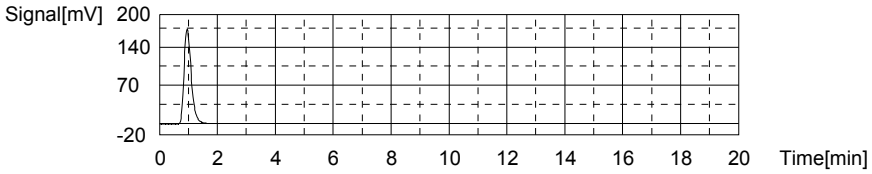
Mean Area 408.1
Mean Conc. 9.244mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	300.3	8.418mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 2:51:06 PM

Mean Area 300.3
Mean Conc. 8.418mg/L



Sample

Sample Name: WG615834-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

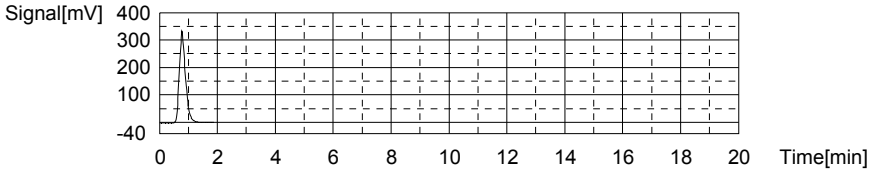
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.327mg/L TC:11.14mg/L IC:9.816mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	488.5	11.14mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 3:12:22 PM

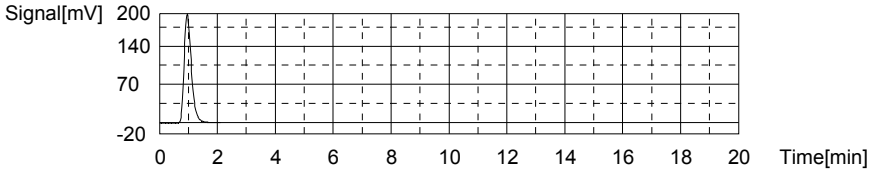
Mean Area 488.5
Mean Conc. 11.14mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	347.1	9.816mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 3:17:28 PM

Mean Area 347.1
Mean Conc. 9.816mg/L



Sample

Sample Name: L17051380-01 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

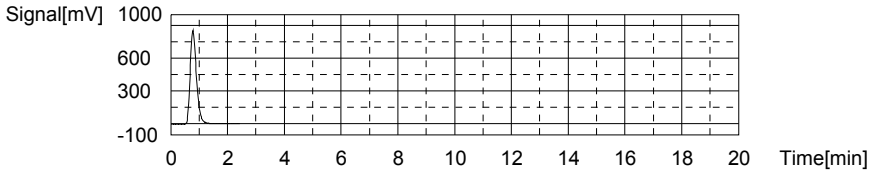
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.701mg/L TC:30.95mg/L IC:28.25mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1327	30.95mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 3:25:21 PM

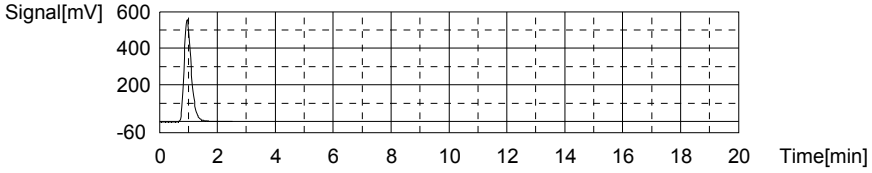
Mean Area 1327
Mean Conc. 30.95mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	964.5	28.25mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 3:31:02 PM

Mean Area 964.5
Mean Conc. 28.25mg/L



Sample

Sample Name: L17051380-03 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

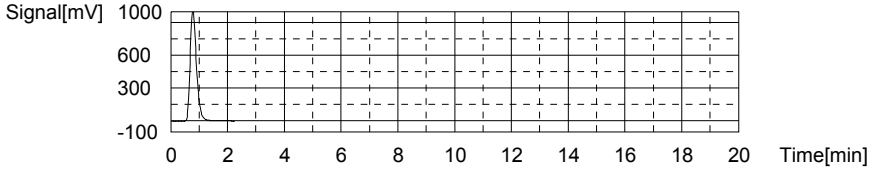
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.552mg/L TC:36.84mg/L IC:33.29mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1576	36.84mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 3:38:45 PM

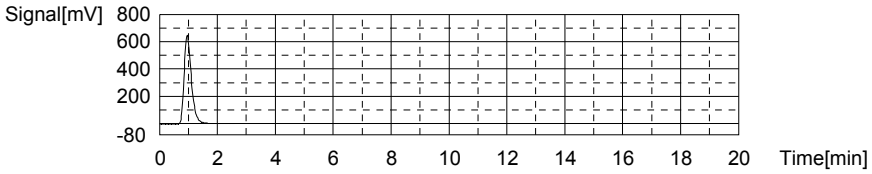
Mean Area 1576
Mean Conc. 36.84mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1133	33.29mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 3:44:44 PM

Mean Area 1133
Mean Conc. 33.29mg/L



Sample

Sample Name: L17051380-05 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

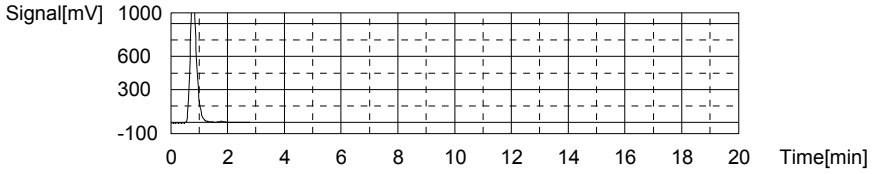
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.354mg/L TC:42.34mg/L IC:36.99mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1809	42.34mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 3:52:59 PM

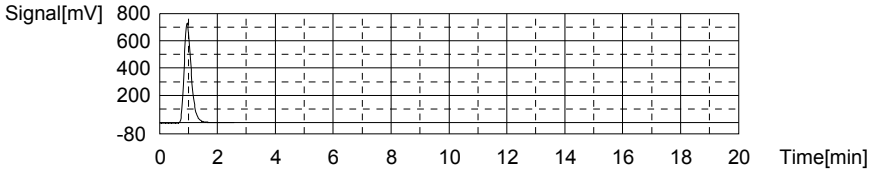
Mean Area 1809
Mean Conc. 42.34mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1257	36.99mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 3:58:51 PM

Mean Area 1257
Mean Conc. 36.99mg/L



Sample

Sample Name: L17051380-07 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

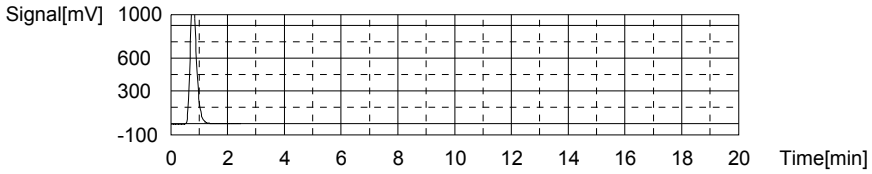
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.057mg/L TC:42.11mg/L IC:39.05mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1799	42.11mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 4:06:47 PM

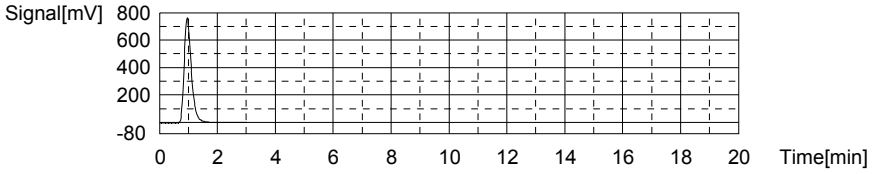
Mean Area 1799
Mean Conc. 42.11mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1326	39.05mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 4:13:05 PM

Mean Area 1326
Mean Conc. 39.05mg/L



Sample

Sample Name: L17051380-11 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

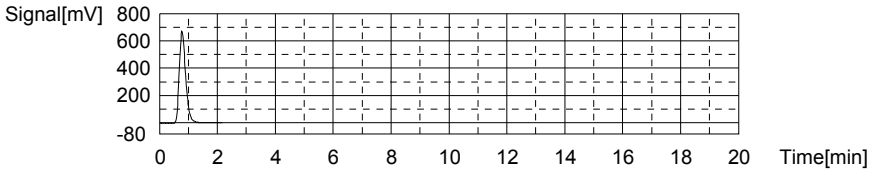
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.518mg/L TC:24.01mg/L IC:22.49mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1033	24.01mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 4:20:41 PM

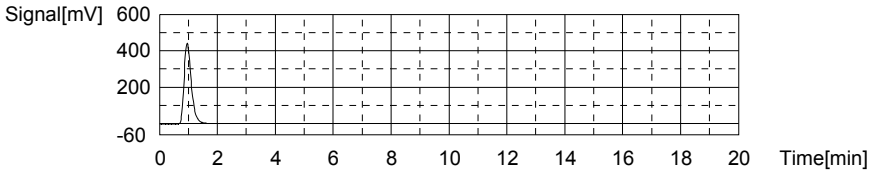
Mean Area 1033
Mean Conc. 24.01mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	771.5	22.49mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 4:26:31 PM

Mean Area 771.5
Mean Conc. 22.49mg/L



Sample

Sample Name: L17051380-15 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

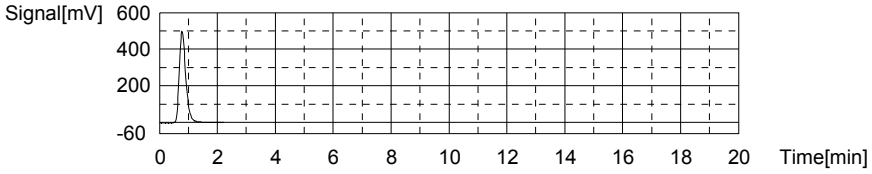
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.776mg/L TC:18.10mg/L IC:16.32mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	782.9	18.10mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 4:34:12 PM

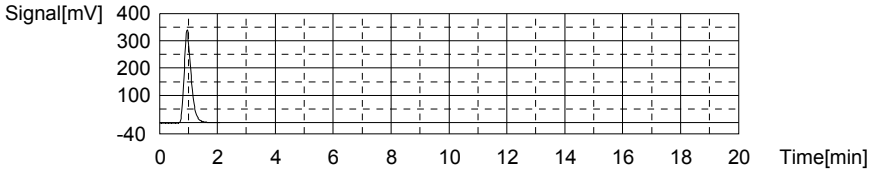
Mean Area 782.9
Mean Conc. 18.10mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	565.0	16.32mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 4:39:26 PM

Mean Area 565.0
Mean Conc. 16.32mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

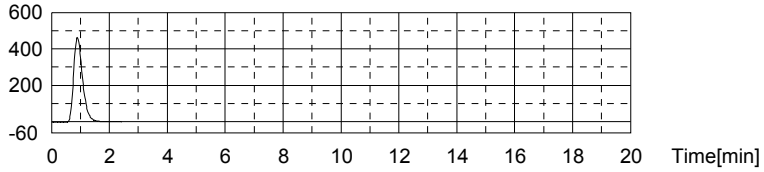
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.29mg/L TC:23.11mg/L IC:-0.1853mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	994.8	23.11mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 4:47:19 PM

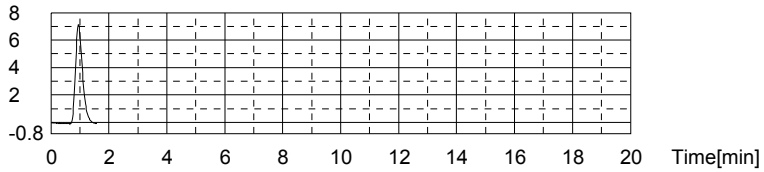
Mean Area 994.8
Mean Conc. 23.11mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	12.21	-0.1853mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 4:51:47 PM

Mean Area 12.21
Mean Conc. -0.1853mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

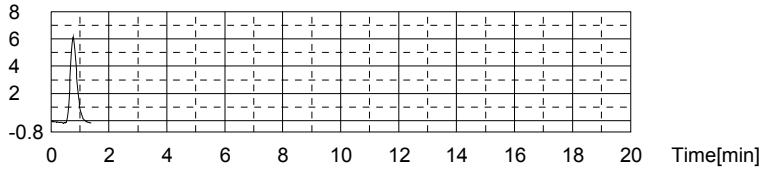
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1193mg/L TC:-0.1643mg/L IC:-0.2835mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.913	-0.1643mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 4:56:49 PM

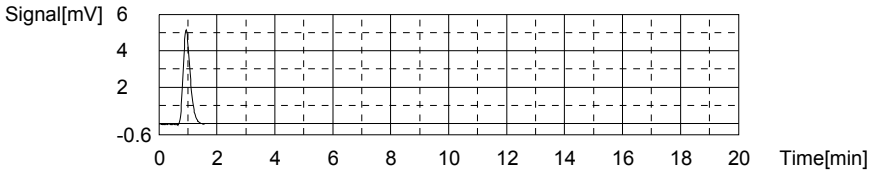
Mean Area 9.913
Mean Conc. -0.1643mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.921	-0.2835mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 5:00:48 PM

Mean Area 8.921
Mean Conc. -0.2835mg/L



Sample

Sample Name: L17051380-17 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

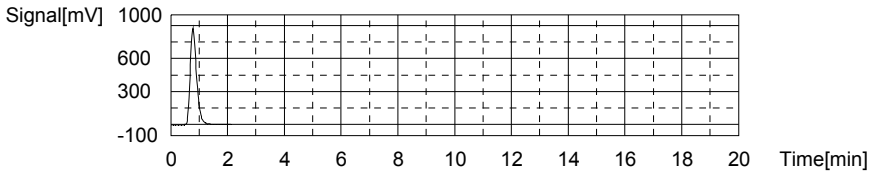
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.016mg/L TC:32.09mg/L IC:29.07mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1375	32.09mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 5:08:24 PM

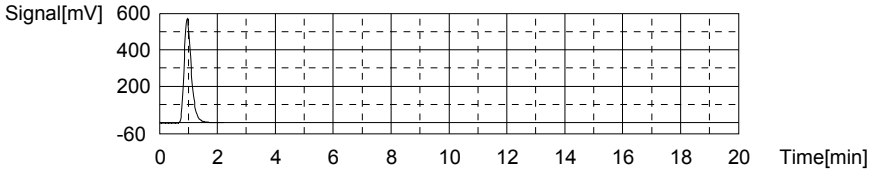
Mean Area 1375
Mean Conc. 32.09mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	991.9	29.07mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 5:13:45 PM

Mean Area 991.9
Mean Conc. 29.07mg/L



Sample

Sample Name: L17051380-19 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

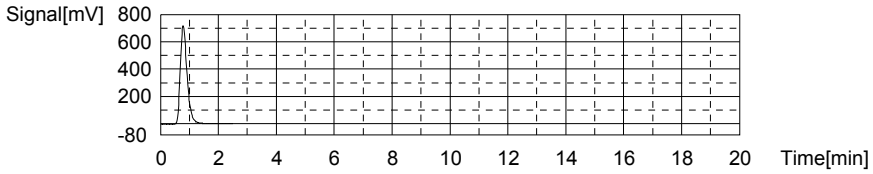
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:6.142mg/L TC:27.36mg/L IC:21.22mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1175	27.36mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 5:21:43 PM

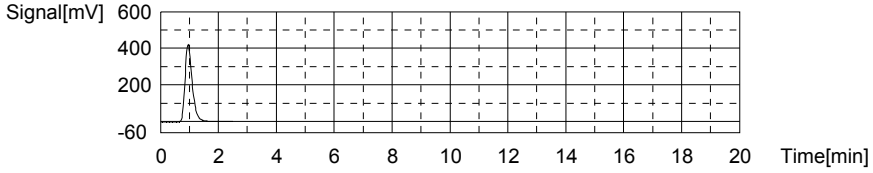
Mean Area 1175
Mean Conc. 27.36mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	729.0	21.22mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 5:27:20 PM

Mean Area 729.0
Mean Conc. 21.22mg/L



Sample

Sample Name: L17051380-21 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

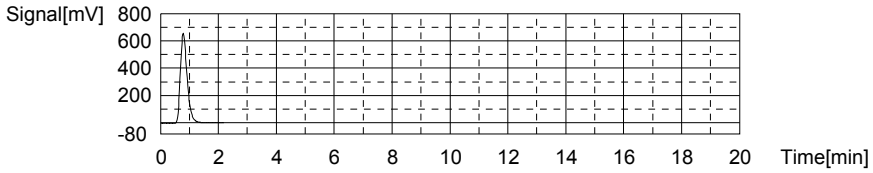
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:5.595mg/L TC:24.79mg/L IC:19.19mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1066	24.79mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 5:35:00 PM

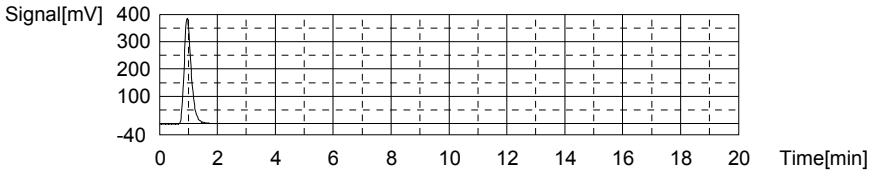
Mean Area 1066
Mean Conc. 24.79mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	661.1	19.19mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 5:40:39 PM

Mean Area 661.1
Mean Conc. 19.19mg/L



Sample

Sample Name: L17051380-23 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

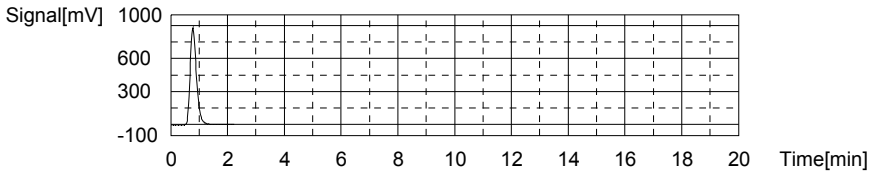
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.039mg/L TC:31.90mg/L IC:28.86mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1367	31.90mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 5:48:21 PM

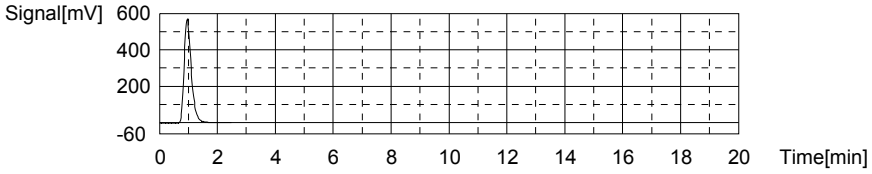
Mean Area 1367
Mean Conc. 31.90mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	984.8	28.86mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 5:54:00 PM

Mean Area 984.8
Mean Conc. 28.86mg/L



Sample

Sample Name: L17051380-25 (3)
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

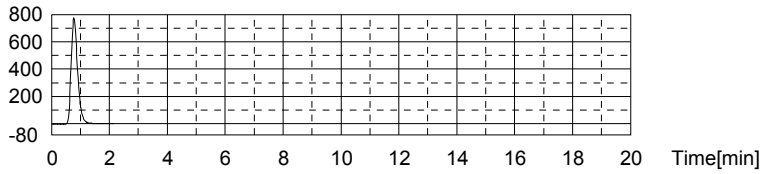
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.410mg/L TC:27.76mg/L IC:26.35mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1192	27.76mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 6:01:37 PM

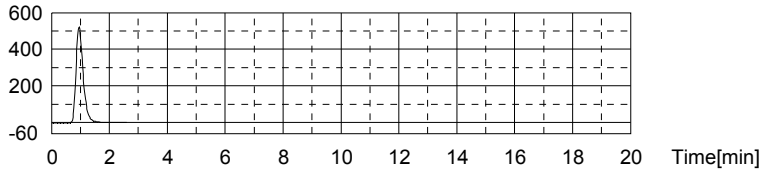
Mean Area 1192
Mean Conc. 27.76mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	900.9	26.35mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 6:07:24 PM

Mean Area 900.9
Mean Conc. 26.35mg/L



Sample

Sample Name: WG615927-01 BLK
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

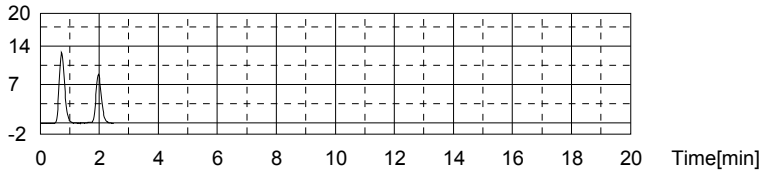
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1672mg/L TC:-0.06947mg/L IC:-0.2367mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	16.63	-0.00556mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 6:14:07 PM
2	11.22	-0.1334mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 6:17:38 PM

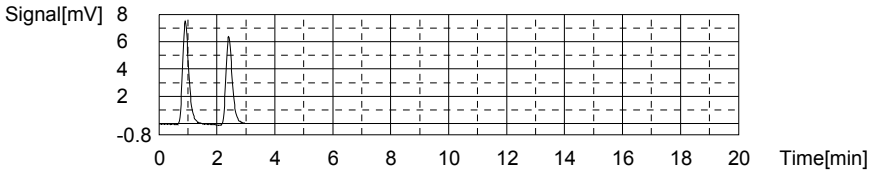
Mean Area 13.93
Mean Conc. -0.06947mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.24	-0.2143mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 6:22:04 PM
2	9.740	-0.2591mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 6:26:09 PM

Mean Area 10.49
Mean Conc. -0.2367mg/L



Sample

Sample Name: WG615927-02 LCS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

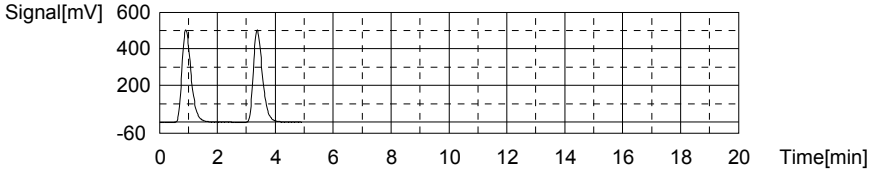
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:25.99mg/L TC:25.71mg/L IC:-0.2807mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1108	25.78mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 6:34:05 PM
2	1102	25.64mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 6:38:48 PM

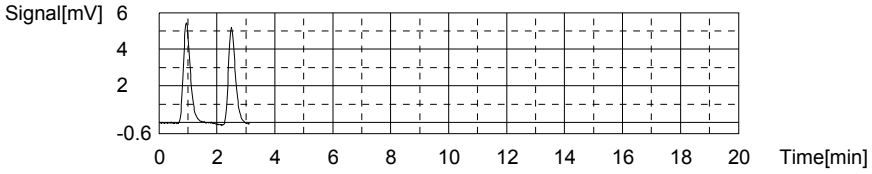
Mean Area 1105
Mean Conc. 25.71mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.105	-0.2780mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 6:43:15 PM
2	8.922	-0.2835mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 6:47:26 PM

Mean Area 9.014
Mean Conc. -0.2807mg/L



Sample

Sample Name: WG615927-03 LCSDUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

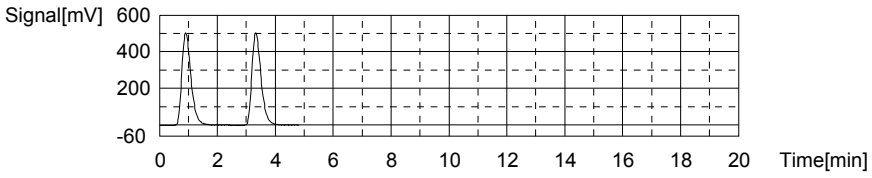
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:26.01mg/L TC:25.72mg/L IC:-0.2899mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1107	25.76mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 6:55:20 PM
2	1104	25.69mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 7:00:00 PM

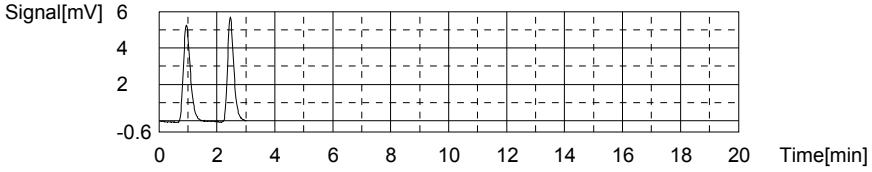
Mean Area 1106
Mean Conc. 25.72mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.921	-0.2835mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 7:04:22 PM
2	8.494	-0.2963mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 7:08:28 PM

Mean Area 8.707
Mean Conc. -0.2899mg/L



Sample

Sample Name: L17051392-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

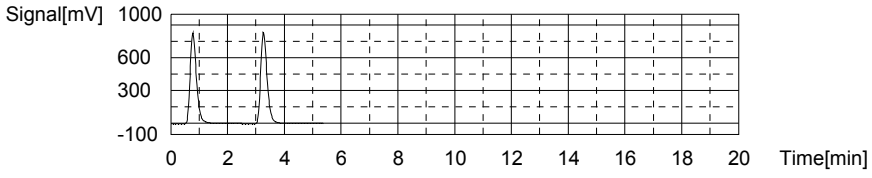
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:4.690mg/L TC:30.20mg/L IC:25.51mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1288	30.03mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 7:16:27 PM
2	1302	30.36mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 7:21:49 PM

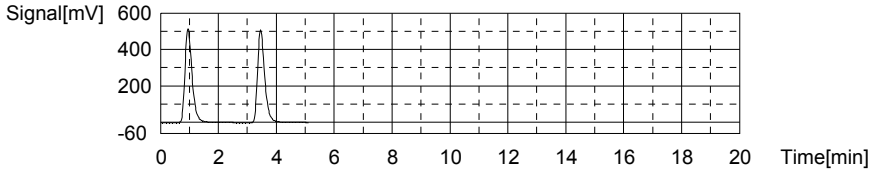
Mean Area 1295
Mean Conc. 30.20mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	878.1	25.67mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 7:27:28 PM
2	867.0	25.34mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 7:33:01 PM

Mean Area 872.5
Mean Conc. 25.51mg/L



Sample

Sample Name: L17051392-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

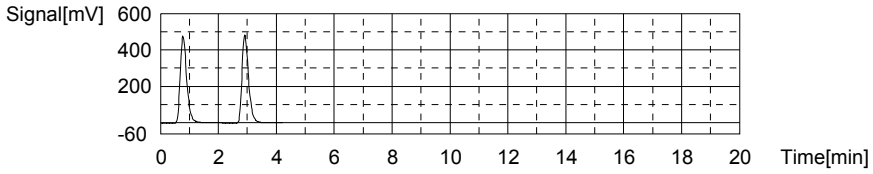
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.971mg/L TC:17.37mg/L IC:14.40mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	744.5	17.19mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 7:40:38 PM
2	759.8	17.55mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 7:45:00 PM

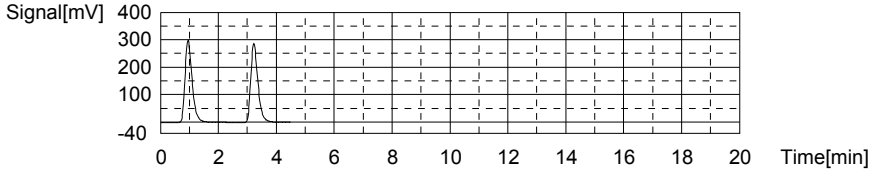
Mean Area 752.2
Mean Conc. 17.37mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	510.1	14.68mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 7:50:23 PM
2	491.2	14.12mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 7:55:30 PM

Mean Area 500.7
Mean Conc. 14.40mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

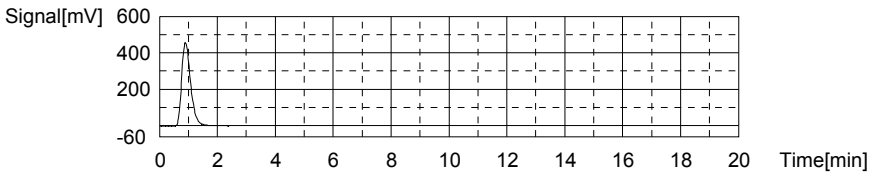
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.01mg/L TC:22.81mg/L IC:-0.2071mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	982.2	22.81mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 8:03:23 PM

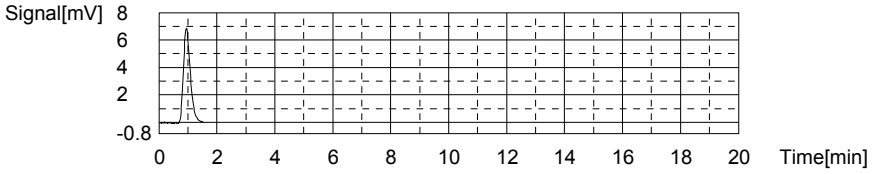
Mean Area 982.2
Mean Conc. 22.81mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.48	-0.2071mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 8:07:49 PM

Mean Area 11.48
Mean Conc. -0.2071mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

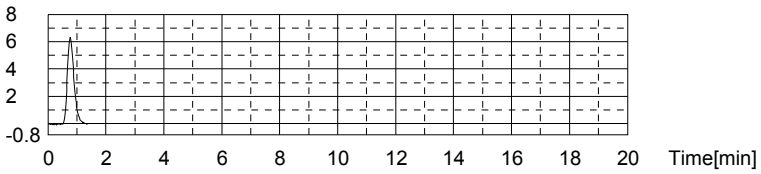
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1159mg/L TC:-0.1591mg/L IC:-0.2750mg/L

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_55	5/30/2017 8:12:50 PM

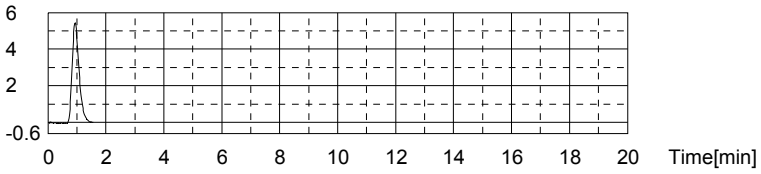
Mean Area 10.13
Mean Conc. -0.1591mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.205	-0.2750mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 8:16:47 PM

Mean Area 9.205
Mean Conc. -0.2750mg/L



Sample

Sample Name: L17051392-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

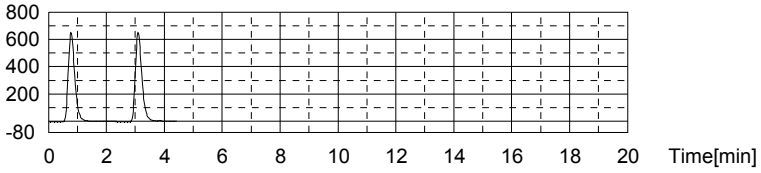
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.976mg/L TC:23.68mg/L IC:20.70mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1014	23.56mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 8:24:36 PM
2	1024	23.80mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 8:28:59 PM

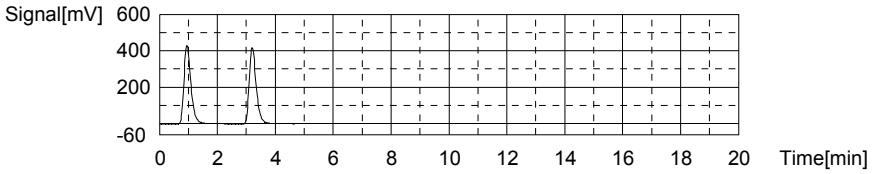
Mean Area 1019
Mean Conc. 23.68mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	719.1	20.92mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 8:34:21 PM
2	704.1	20.48mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 8:39:41 PM

Mean Area 711.6
Mean Conc. 20.70mg/L



Sample

Sample Name: L17051392-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

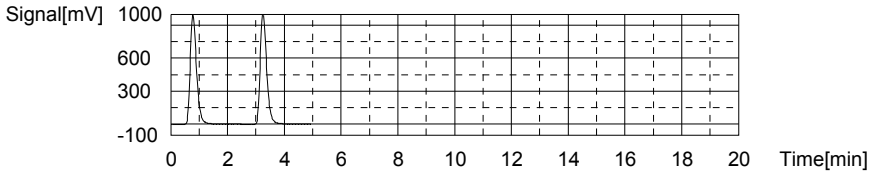
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.657mg/L TC:36.78mg/L IC:33.12mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1555	36.34mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 8:47:38 PM
2	1592	37.22mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 8:52:28 PM

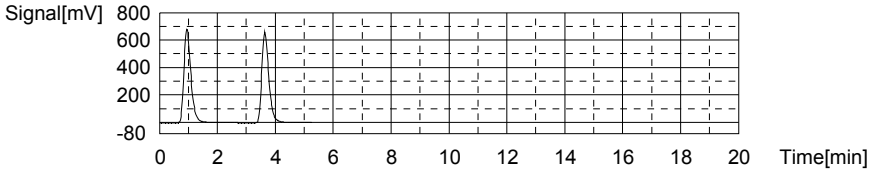
Mean Area 1574
Mean Conc. 36.78mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1143	33.58mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 8:58:20 PM
2	1112	32.66mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 9:03:52 PM

Mean Area 1128
Mean Conc. 33.12mg/L



Sample

Sample Name: L17051392-09
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

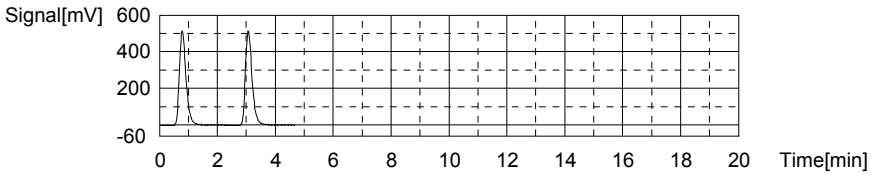
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:3.693mg/L TC:19.11mg/L IC:15.41mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	823.9	19.07mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 9:11:38 PM
2	827.2	19.15mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 9:16:18 PM

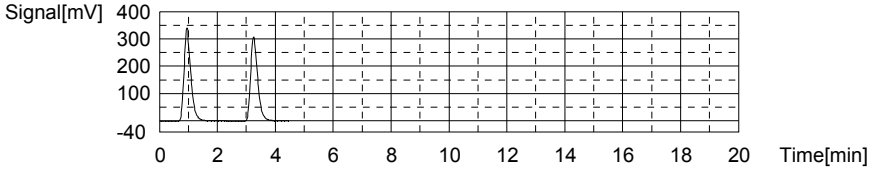
Mean Area 825.6
Mean Conc. 19.11mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	548.3	15.82mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 9:21:47 PM
2	520.8	15.00mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 9:26:44 PM

Mean Area 534.6
Mean Conc. 15.41mg/L



Sample

Sample Name: L17051392-11
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

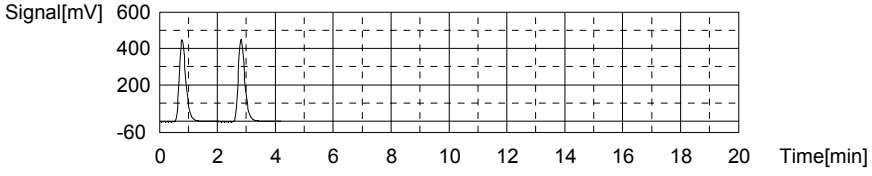
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.906mg/L TC:16.48mg/L IC:13.57mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	707.4	16.31mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 9:34:15 PM
2	721.4	16.65mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 9:39:35 PM

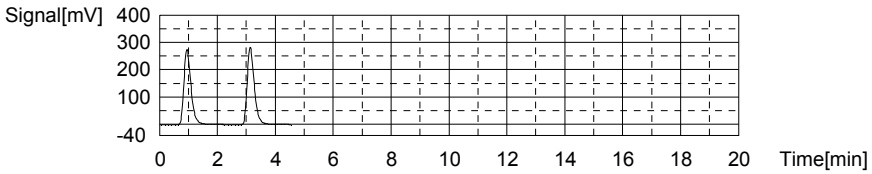
Mean Area 714.4
Mean Conc. 16.48mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	466.6	13.38mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 9:44:48 PM
2	479.3	13.76mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 9:49:58 PM

Mean Area 473.0
Mean Conc. 13.57mg/L



Sample

Sample Name: L17051392-13
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

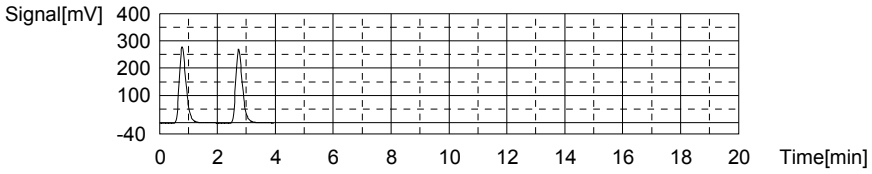
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.286mg/L TC:10.09mg/L IC:7.806mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	451.5	10.27mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 9:57:24 PM
2	436.5	9.915mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:01:40 PM

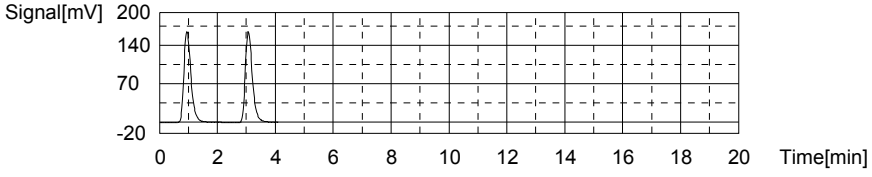
Mean Area 444.0
Mean Conc. 10.09mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	280.2	7.818mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 10:06:45 PM
2	279.4	7.794mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 10:11:32 PM

Mean Area 279.8
Mean Conc. 7.806mg/L



Sample

Sample Name: L17051392-15
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

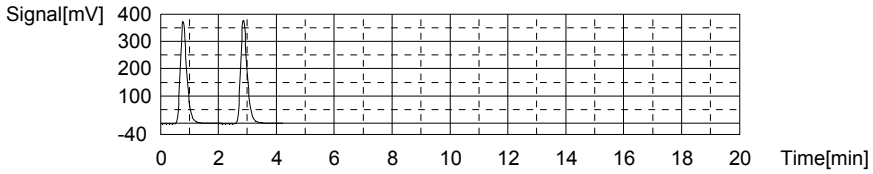
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.494mg/L TC:13.47mg/L IC:10.98mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	579.2	13.29mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:19:06 PM
2	594.9	13.66mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:23:31 PM

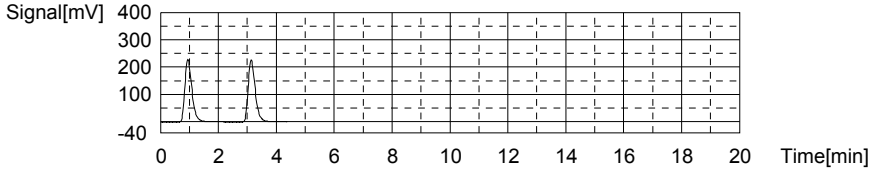
Mean Area 587.0
Mean Conc. 13.47mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	387.6	11.03mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 10:28:45 PM
2	384.4	10.93mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 10:33:39 PM

Mean Area 386.0
Mean Conc. 10.98mg/L



Sample

Sample Name: L17051392-17
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

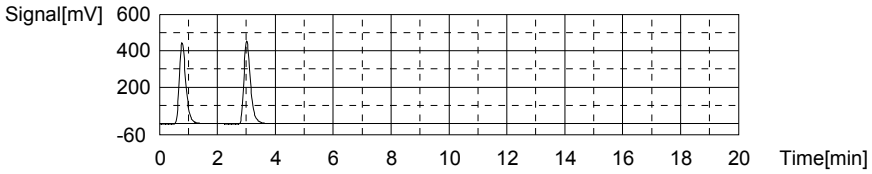
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:2.638mg/L TC:16.49mg/L IC:13.85mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	704.7	16.25mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:41:22 PM
2	724.8	16.73mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 10:45:49 PM

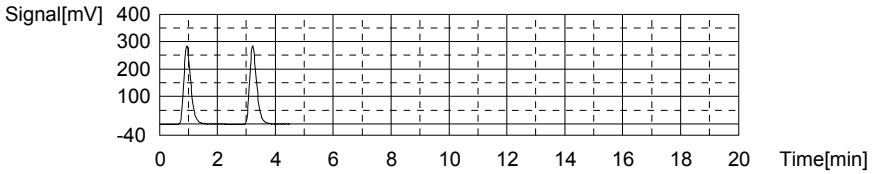
Mean Area 714.8
Mean Conc. 16.49mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	482.7	13.87mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 10:51:07 PM
2	481.7	13.84mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 10:56:11 PM

Mean Area 482.2
Mean Conc. 13.85mg/L



Sample

Sample Name: L17051392-19
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

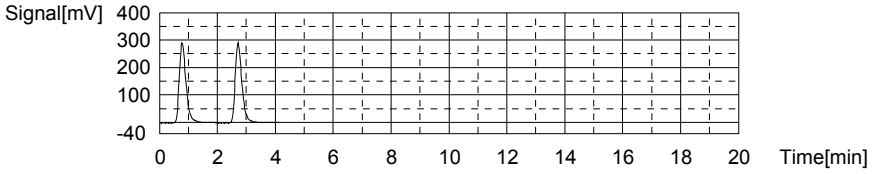
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.984mg/L TC:10.64mg/L IC:8.657mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	465.4	10.60mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/30/2017 11:03:36 PM
2	469.1	10.68mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/30/2017 11:08:05 PM

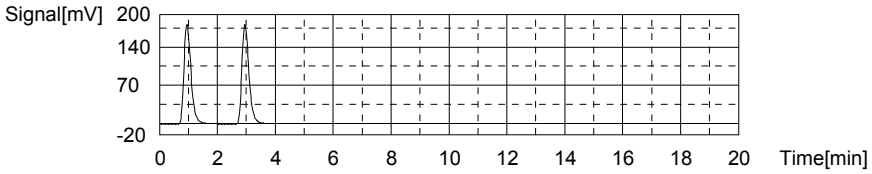
Mean Area 467.3
Mean Conc. 10.64mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	306.7	8.609mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 11:13:04 PM
2	309.9	8.705mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/30/2017 11:17:48 PM

Mean Area 308.3
Mean Conc. 8.657mg/L



Sample

Sample Name: L17051392-21
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

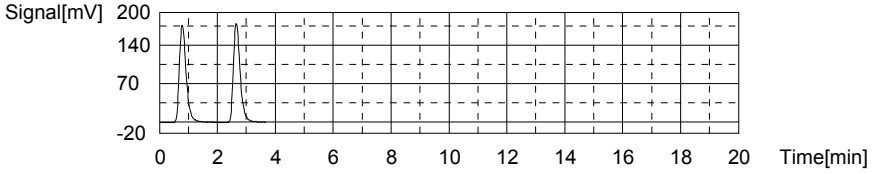
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.606mg/L TC:6.469mg/L IC:4.863mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	288.1	6.408mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 11:25:09 PM
2	293.2	6.529mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 11:29:15 PM

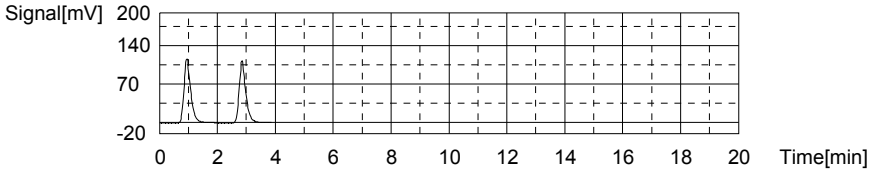
Mean Area 290.6
Mean Conc. 6.469mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	185.1	4.978mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 11:34:07 PM
2	177.4	4.748mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 11:38:50 PM

Mean Area 181.3
Mean Conc. 4.863mg/L



Sample

Sample Name: L17051392-24
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

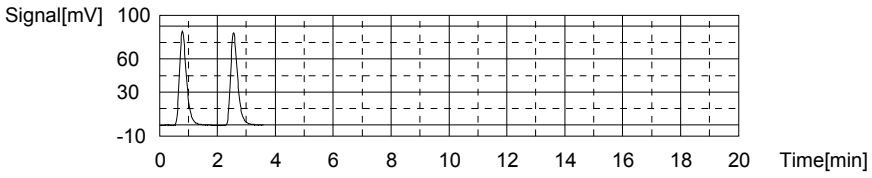
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.464mg/L TC:2.979mg/L IC:1.515mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	143.2	2.985mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 11:46:05 PM
2	142.7	2.973mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/30/2017 11:50:11 PM

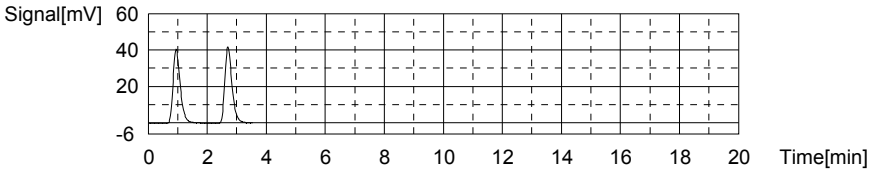
Mean Area 143.0
Mean Conc. 2.979mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	68.01	1.481mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 11:54:50 PM
2	70.29	1.549mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/30/2017 11:59:17 PM

Mean Area 69.15
Mean Conc. 1.515mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

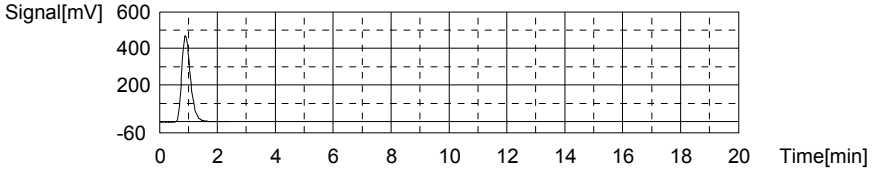
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.19mg/L TC:22.91mg/L IC:-0.2839mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	986.5	22.91mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 12:07:13 AM

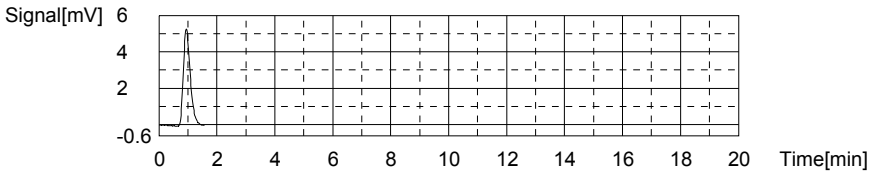
Mean Area 986.5
Mean Conc. 22.91mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.907	-0.2839mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 12:11:37 AM

Mean Area 8.907
Mean Conc. -0.2839mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

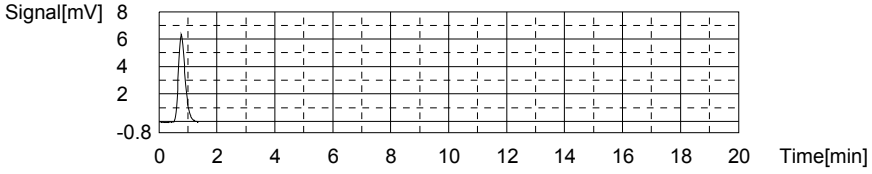
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1211mg/L TC:-0.1561mg/L IC:-0.2771mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.26	-0.1561mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 12:16:37 AM

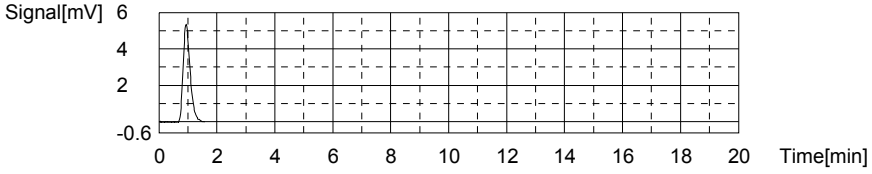
Mean Area 10.26
Mean Conc. -0.1561mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.134	-0.2771mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 12:20:39 AM

Mean Area 9.134
Mean Conc. -0.2771mg/L



Sample

Sample Name: L17051392-26
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

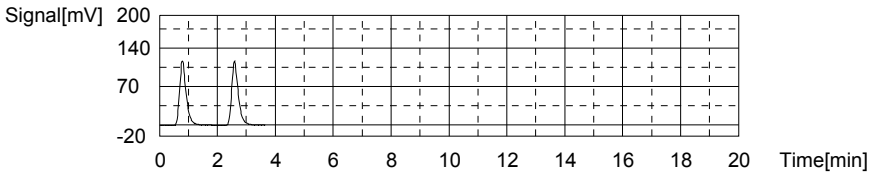
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.604mg/L TC:3.932mg/L IC:2.328mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	182.8	3.920mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 12:27:58 AM
2	183.8	3.944mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 12:32:06 AM

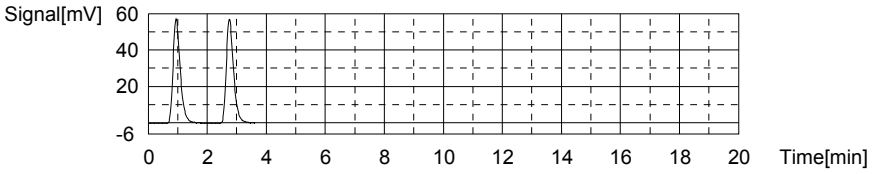
Mean Area 183.3
Mean Conc. 3.932mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	96.27	2.325mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 12:36:48 AM
2	96.46	2.331mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 12:41:17 AM

Mean Area 96.37
Mean Conc. 2.328mg/L



Sample

Sample Name: L17051394-01
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

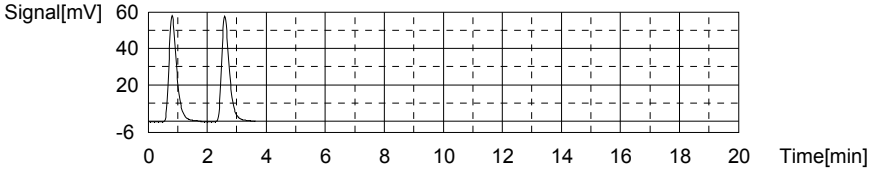
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.600mg/L TC:2.081mg/L IC:0.4811mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	105.0	2.082mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 12:48:35 AM
2	104.9	2.080mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 12:52:43 AM

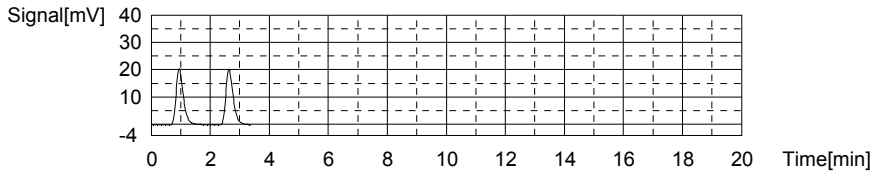
Mean Area 105.0
Mean Conc. 2.081mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	34.59	0.4831mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 12:57:21 AM
2	34.46	0.4792mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 1:01:41 AM

Mean Area 34.53
Mean Conc. 0.4811mg/L



Sample

Sample Name: L17051394-03
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

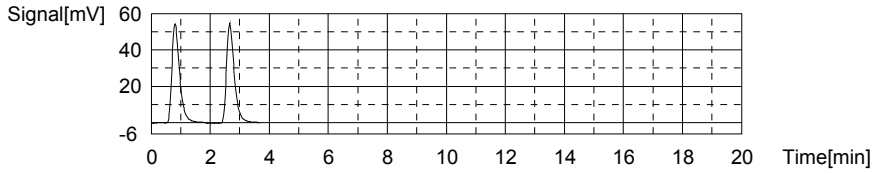
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.540mg/L TC:1.941mg/L IC:0.4008mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	98.52	1.929mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 1:09:02 AM
2	99.51	1.953mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 1:13:09 AM

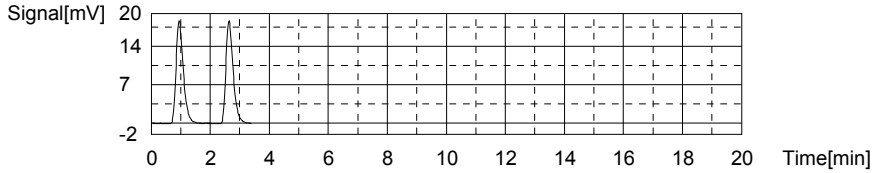
Mean Area 99.02
Mean Conc. 1.941mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	31.84	0.4009mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 1:17:46 AM
2	31.83	0.4006mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 1:22:09 AM

Mean Area 31.84
Mean Conc. 0.4008mg/L



Sample

Sample Name: L17051394-05
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

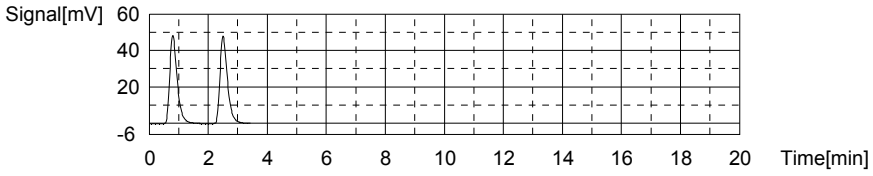
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.108mg/L TC:1.589mg/L IC:0.4811mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	84.08	1.588mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 1:29:21 AM
2	84.18	1.590mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 1:33:21 AM

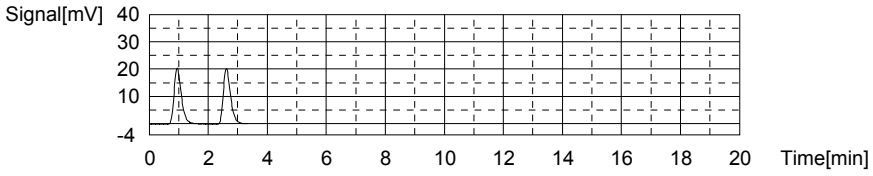
Mean Area 84.13
Mean Conc. 1.589mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	34.69	0.4860mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 1:37:55 AM
2	34.36	0.4762mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 1:42:15 AM

Mean Area 34.53
Mean Conc. 0.4811mg/L



Sample

Sample Name: L17051394-07
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

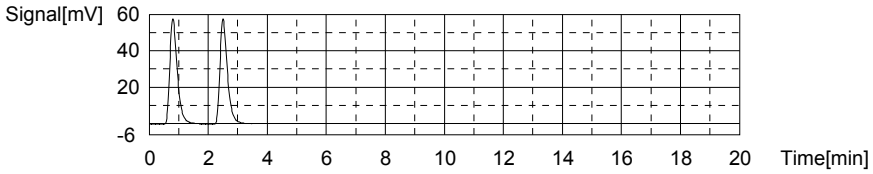
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.309mg/L TC:1.988mg/L IC:0.6788mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	101.0	1.988mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 1:49:27 AM
2	101.0	1.988mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 1:53:31 AM

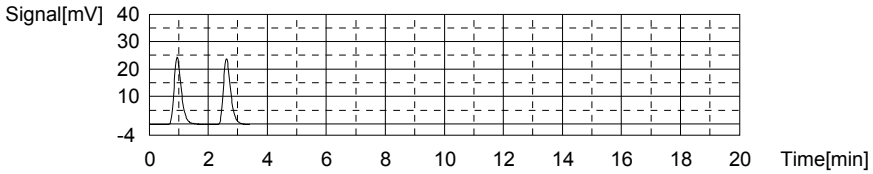
Mean Area 101.0
Mean Conc. 1.988mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	41.23	0.6813mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 1:58:03 AM
2	41.06	0.6763mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 2:02:30 AM

Mean Area 41.15
Mean Conc. 0.6788mg/L



Sample

Sample Name: L17051394-09
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

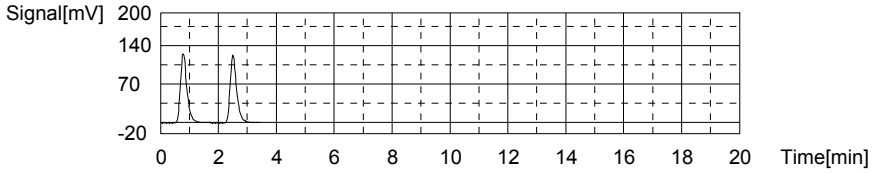
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.247mg/L TC:4.161mg/L IC:2.914mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	194.9	4.206mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/31/2017 2:09:42 AM
2	191.1	4.117mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_5	5/31/2017 2:13:42 AM

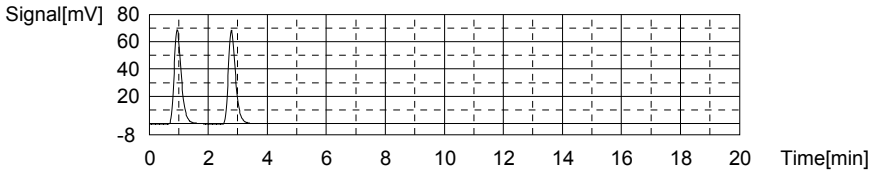
Mean Area 193.0
Mean Conc. 4.161mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	115.9	2.911mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 2:18:28 AM
2	116.1	2.917mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 2:23:01 AM

Mean Area 116.0
Mean Conc. 2.914mg/L



Sample

Sample Name: L17051394-11
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

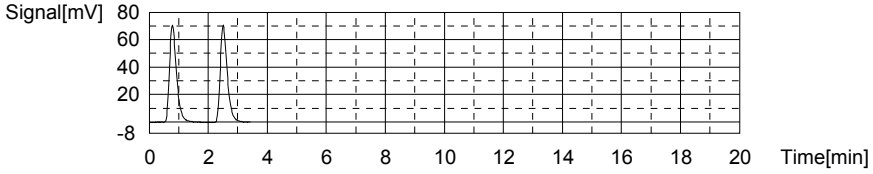
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.066mg/L TC:2.369mg/L IC:1.304mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	117.2	2.371mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 2:30:12 AM
2	117.1	2.368mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 2:34:11 AM

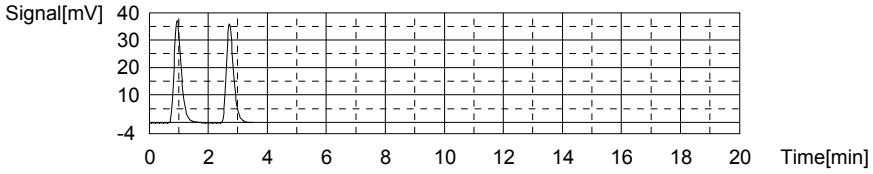
Mean Area 117.2
Mean Conc. 2.369mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	63.27	1.340mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 2:38:51 AM
2	60.87	1.268mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 2:43:14 AM

Mean Area 62.07
Mean Conc. 1.304mg/L



Sample

Sample Name: WG615927-05 DUP
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

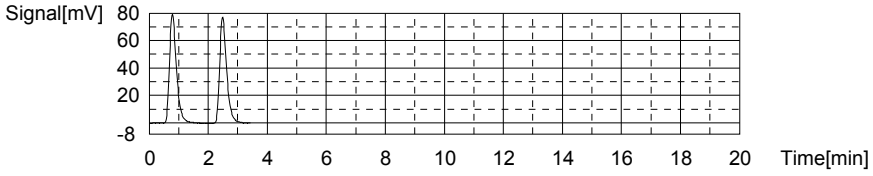
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	TOC:1.062mg/L TC:2.640mg/L IC:1.578mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	130.0	2.673mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 2:50:23 AM
2	127.2	2.607mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 2:54:23 AM

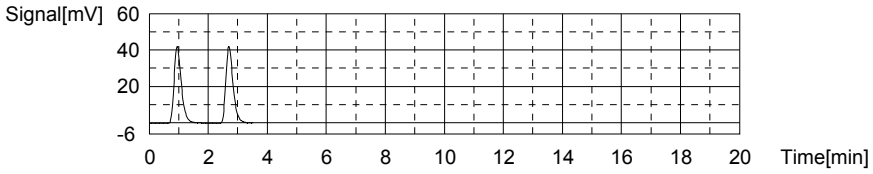
Mean Area 128.6
Mean Conc. 2.640mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	71.48	1.585mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 2:59:02 AM
2	71.01	1.571mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 3:03:30 AM

Mean Area 71.25
Mean Conc. 1.578mg/L



Sample

Sample Name: WG615927-06 MS
Sample ID: <Untitled>
Origin: TOC-02-10-2017A.met
Status Completed
Chk. Result

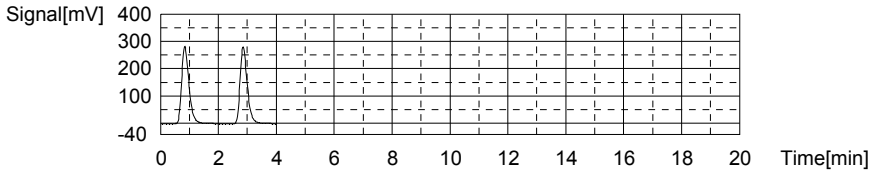
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:11.36mg/L TC:11.09mg/L IC:-0.2664mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	489.6	11.17mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 3:10:58 AM
2	482.9	11.01mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 3:15:15 AM

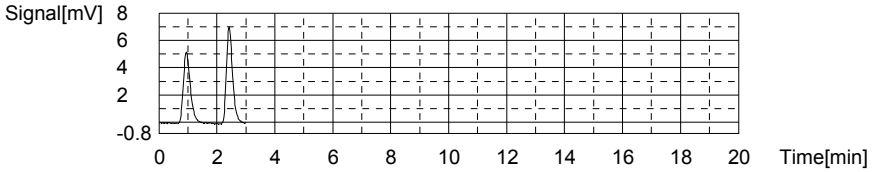
Mean Area 486.3
Mean Conc. 11.09mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	8.645	-0.2918mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 3:19:38 AM
2	10.34	-0.2411mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 3:23:45 AM

Mean Area 9.492
Mean Conc. -0.2664mg/L



Sample

Sample Name: CCV
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

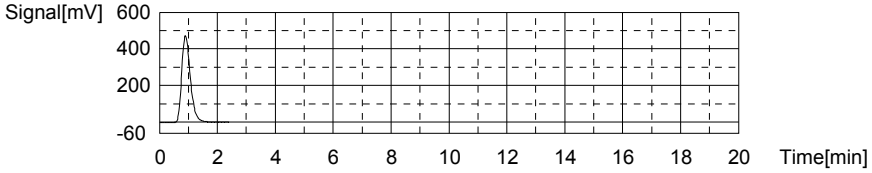
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:23.11mg/L TC:22.83mg/L IC:-0.2808mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	983.0	22.83mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 3:31:36 AM

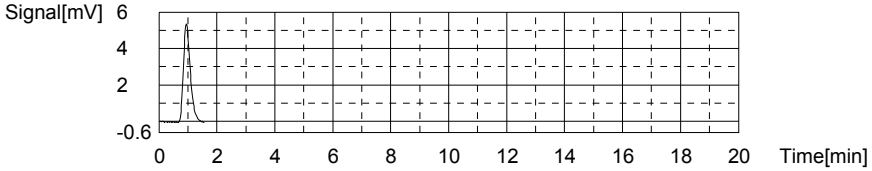
Mean Area 983.0
Mean Conc. 22.83mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.013	-0.2808mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_1	5/31/2017 3:36:02 AM

Mean Area 9.013
Mean Conc. -0.2808mg/L



Sample

Sample Name: CCB
Sample ID: <Untitled>
Origin: TOC-02-10-2017.met
Status Completed
Chk. Result

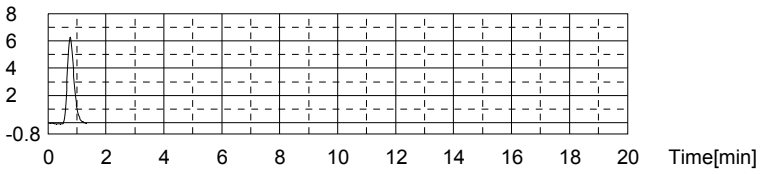
Type	Anal.	Dil.	Result
Unknown	TOC	1.000	!!Error!! TOC:0.1181mg/L TC:-0.1601mg/L IC:-0.2782mg/L

1. Det

Anal.: TC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	10.09	-0.1601mg/L	500uL	1		TCCURVE-02-10-2017.2017_02_10_09_32_55	5/31/2017 3:41:00 AM

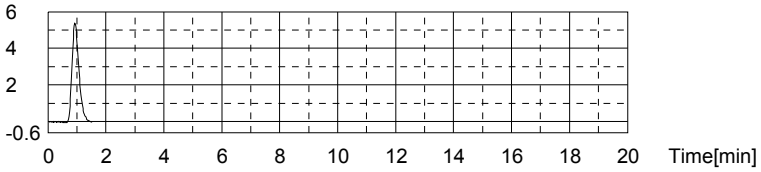
Mean Area 10.09
Mean Conc. -0.1601mg/L



Anal.: IC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	9.100	-0.2782mg/L	500uL	1		TICCURVE-02-10-2017.2017_02_10_14_45_15	5/31/2017 3:44:57 AM

Mean Area 9.100
Mean Conc. -0.2782mg/L



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
May 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
May 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
May 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	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650-6443-Grab	Water	05/24/17 / 15:00		2	X		X	H2SO4	
LH18/24-SP650-6443-Grab	Water	05/24/17 / 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	05/24/17	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: 05/25/2017 09:38
By: BRENDA GREGORY 221000101298

Brenda Gregory

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17051371
Account: 2551
Project: 2551.096
Samples: 1
Due Date: 05-JUN-2017

Samplenum	Container ID	Products
L17051371-01	913018	PO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-MAY-2017 13:13	CLS		
2	ANALYZ	W1	WET	25-MAY-2017 14:00	TB	CLS	
3	STORE	WET	A1	30-MAY-2017 14:51	TMM	CLS	

Samplenum	Container ID	Products
L17051371-01	913019	TOC

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-MAY-2017 13:13	CLS		<2
2	ANALYZ	W1	WET	30-MAY-2017 09:07	ADG	CLS	

Samplenum	Container ID	Products
L17051371-01	913020	NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	WET	25-MAY-2017 13:13	CLS		<2
2	STORE	WET	A1	30-MAY-2017 14:51	TMM	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: L17051389

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 June 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 #: L17051389
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?
0014619	I	4.0		J4616881640	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 #: L17051389
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-SP140-7442-GRAB	L17051389-01	05/24/2017 15:00	05/25/2017 09:42
TRIP BLANK	L17051389-02	05/24/2017 00:01	05/25/2017 09:42

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-06-01 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
Mary Schilling		Anaylst III	2017-06-01 19:41:20

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-06-01 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:**	L17051389
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-06-01 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			1
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:**	L17051389
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-06-01 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					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-06-01 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 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:**	L17051389
Project Name:		**Method:**	8260
Prep Batch Number(s):		**Reviewer Name:**	Mary Schilling
LRC Date:	2017-06-01 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

1. In the LCS analyzed 5/25/17 on HPMS11, WG615570-02, the following analytes exceeded the limit for percent difference, biased high: o-xylene and toluene. All analyte recoveries were acceptable in the LCSDUP. Sample 01 did take hits of both high LCS outliers. The sample was not reanalyzed straight for the LCS outliers due to high levels of other target analytes.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG616526, WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-08 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	2017-06-08 18:20:14

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG616526, WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-08 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			2
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			1
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:**	L17051389
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG616526, WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-08 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:**	L17051389
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG616526, WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-08 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:**	L17051389
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG616526, WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-08 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:**	L17051389
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG616526, WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-08 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

1. Sample 01 yielded a recovery for the surrogate that was above the acceptance limit, and had a hit. Sample 01 was re-extracted out of hold, and yielded similar surrogate results, suggesting sample matrix interference.
2. Sample 01 was re-extracted out of hold.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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	2017-05-30 19:36:48

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051389
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051389
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051389
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051389
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051389
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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		2017-06-05 19:52:10

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051389
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051389
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051389
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051389
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051389
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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		2017-06-05 19:49:01

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051389
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051389
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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				ER#1
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:**	L17051389
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051389
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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 - The low level continuing calibration verification analyzed on 01-Jun-2017 at 14:29 yielded noncompliant recoveries for chromium and vanadium. Client sample 01 and batch QA/QC were reanalyzed on a later calibration which was compliant for analytes of concern.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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	2017-05-26 20:06:56

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051389
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051389
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051389
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051389
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051389
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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	2017-05-31 18:11:39

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051389
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051389
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051389
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051389
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051389
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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	2017-05-31 18:19:56

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051389
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051389
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051389
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051389
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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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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:**	L17051389
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG615570	**Analyst:**	ADC	**Run Date:**	05/26/2017 01:27
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	11M18653
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	3.19		1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	3.72		1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	16.3		0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	121		2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	86.7		1.00	0.500	0.250
Acetone	67-64-1	5.00	U	10.0	5.00	2.50
Benzene	71-43-2	3.60		0.500	0.250	0.125
Carbon tetrachloride	56-23-5	6.40		1.00	0.500	0.250
Chloroform	67-66-3	20.7		0.500	0.250	0.125
Ethylbenzene	100-41-4	3.18		1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.26	J	2.00	1.00	0.500
o-Xylene	95-47-6	1.01		1.00	0.500	0.250
Styrene	100-42-5	1.38		0.500	0.250	0.125
Tetrachloroethene	127-18-4	78.3		1.00	0.500	0.250
Toluene	108-88-3	4.06		1.00	0.500	0.250
Vinyl chloride	75-01-4	154		1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	111	70	120	
4-Bromofluorobenzene	114	75	120	
Dibromofluoromethane	108	85	115	
Toluene-d8	110	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
J	Estimated value ; the analyte concentration was greater than the highest standard
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG615792	**Analyst:**	JDS	**Run Date:**	05/26/2017 19:12
Collect Date:	05/24/2017 15:00	**Dilution:**	100	**File ID:**	11M18675
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Methylene chloride	75-09-2	8020		100	50.0	25.0
Trichloroethene	79-01-6	11400		100	50.0	25.0

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	107	70	120	
4-Bromofluorobenzene	111	75	120	
Dibromofluoromethane	100	85	115	
Toluene-d8	109	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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3520C	**Prep Date:**	06/05/2017 15:06
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG616972	**Analyst:**	LJH	**Run Date:**	06/07/2017 18:55
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	15M21296
Sample Tag:	REDL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	21.6	J,H1	10.0	5.00	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	1970	20	129	*

J,H1	The reported result is an estimated value. Sample was analyzed past holding time.

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3520C	**Prep Date:**	05/30/2017 16:02
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG616244	**Analyst:**	LJH	**Run Date:**	06/02/2017 14:45
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	15M21271
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	17.7	J	10.0	5.00	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	1810	20	129	*

J	The reported result is an estimated value.

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	6850	**Prep Date:**	05/26/2017 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG615781	**Analyst:**	JWR	**Run Date:**	05/26/2017 16:48
Collect Date:	05/24/2017 15:00	**Dilution:**	10000	**File ID:**	1LM.LM39706
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	12000		4000	2000	1000

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 09:42
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	06/01/2017 11:29
Workgroup #:	WG616048	**Analyst:**	KKB	**Run Date:**	06/01/2017 16:52
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	T4.060117.165241
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Aluminum, Total	7429-90-5	0.200	U	0.200	0.200	0.100
Iron, Total	7439-89-6	0.0570	J	0.100	0.100	0.0500
Selenium, Total	7782-49-2	0.0200	U	0.0200	0.0200	0.0100

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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 07:36
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	06/01/2017 16:12
Workgroup #:	WG615899	**Analyst:**	JYH	**Run Date:**	06/01/2017 16:58
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	NI.060117.165851
Sample Tag:	02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Total	7440-47-3	0.00260	J	0.00400	0.00200	0.00100
Vanadium, Total	7440-62-2	0.00100	U	0.00200	0.00100	0.000500

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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 07:36
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	06/01/2017 12:20
Workgroup #:	WG615899	**Analyst:**	JYH	**Run Date:**	06/01/2017 14:04
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	NI.060117.140407
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Antimony, Total	7440-36-0	0.00100	U	0.00200	0.00100	0.000500
Arsenic, Total	7440-38-2	0.000780	J	0.00200	0.00100	0.000500
Barium, Total	7440-39-3	0.197		0.00600	0.00300	0.00150
Cadmium, Total	7440-43-9	0.000600	U	0.00120	0.000600	0.000300
Cobalt, Total	7440-48-4	0.00100	U	0.00200	0.00100	0.000500
Lead, Total	7439-92-1	0.00100	U	0.00200	0.00100	0.000500
Manganese, Total	7439-96-5	0.0790		0.00400	0.00200	0.00100
Nickel, Total	7440-02-0	0.00400	U	0.00800	0.00400	0.00200
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500
Thallium, Total	7440-28-0	0.000200	U	0.000400	0.000200	0.000100
Zinc, Total	7440-66-6	0.0250	U	0.0500	0.0250	0.0125

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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	9056	**Prep Date:**	05/25/2017 16:04
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG615591	**Analyst:**	CAS	**Run Date:**	05/26/2017 01:22
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	I2_052517-32
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	121		10.0	5.00	2.50

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

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	9056	**Prep Date:**	05/25/2017 16:04
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG615591	**Analyst:**	CAS	**Run Date:**	05/26/2017 01:41
Collect Date:	05/24/2017 15:00	**Dilution:**	50	**File ID:**	I2_052517-33
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	460		20.0	10.0	5.00

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

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	METHOD	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	410.4 MOD	**Cal Date:**	02/27/2017 11:47
Workgroup #:	WG615777	**Analyst:**	TMM	**Run Date:**	05/26/2017 08:30
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	00.1705260830-12
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chemical Oxygen Demand	COD	122		40.0	20.0	10.0

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HORIZON
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	1664A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	1664A	**Cal Date:**	
Workgroup #:	WG615965	**Analyst:**	AWE	**Run Date:**	05/31/2017 08:46
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	ON.1705310846-08
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
n-Hexane Extractable Material (HEM)	OILGREASE	2.80	U	5.60	2.80	1.40

U	Analyte was not detected. The concentration is below the reported LOD.

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Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-02	**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:**	05/16/2017 17:16
Workgroup #:	WG615570	**Analyst:**	ADC	**Run Date:**	05/26/2017 00:58
Collect Date:	05/24/2017 00:01	**Dilution:**	1	**File ID:**	11M18652
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	5.25	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	111	70	120	
4-Bromofluorobenzene	113	75	120	
Dibromofluoromethane	103	85	115	
Toluene-d8	108	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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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Lab Report #: L17051389
Lab Project #: 2551.096
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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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG615570	**Analyst:**	ADC	**Run Date:**	05/26/2017 01:27
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	11M18653
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	3.19		1.00	0.500	0.250
1,1,2-Trichloroethane	79-00-5	3.72		1.00	0.500	0.250
1,1-Dichloroethane	75-34-3	16.3		0.500	0.250	0.125
1,1-Dichloroethene	75-35-4	121		2.00	1.00	0.500
1,2-Dichloroethane	107-06-2	86.7		1.00	0.500	0.250
Acetone	67-64-1	5.00	U	10.0	5.00	2.50
Benzene	71-43-2	3.60		0.500	0.250	0.125
Carbon tetrachloride	56-23-5	6.40		1.00	0.500	0.250
Chloroform	67-66-3	20.7		0.500	0.250	0.125
Ethylbenzene	100-41-4	3.18		1.00	0.500	0.250
m,p-Xylene	179601-23-1	1.26	J	2.00	1.00	0.500
o-Xylene	95-47-6	1.01		1.00	0.500	0.250
Styrene	100-42-5	1.38		0.500	0.250	0.125
Tetrachloroethene	127-18-4	78.3		1.00	0.500	0.250
Toluene	108-88-3	4.06		1.00	0.500	0.250
Vinyl chloride	75-01-4	154		1.00	0.500	0.250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	111	70	120	
4-Bromofluorobenzene	114	75	120	
Dibromofluoromethane	108	85	115	
Toluene-d8	110	85	120	

J	Estimated value ; the analyte concentration was less than the LOQ.
J	Estimated value ; the analyte concentration was greater than the highest standard
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG615792	**Analyst:**	JDS	**Run Date:**	05/26/2017 19:12
Collect Date:	05/24/2017 15:00	**Dilution:**	100	**File ID:**	11M18675
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Methylene chloride	75-09-2	8020		100	50.0	25.0
Trichloroethene	79-01-6	11400		100	50.0	25.0

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	107	70	120	
4-Bromofluorobenzene	111	75	120	
Dibromofluoromethane	100	85	115	
Toluene-d8	109	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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-02	**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:**	05/16/2017 17:16
Workgroup #:	WG615570	**Analyst:**	ADC	**Run Date:**	05/26/2017 00:58
Collect Date:	05/24/2017 00:01	**Dilution:**	1	**File ID:**	11M18652
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	5.25	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	111	70	120	
4-Bromofluorobenzene	113	75	120	
Dibromofluoromethane	103	85	115	
Toluene-d8	108	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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
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Lab Report #: L17051389
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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

Analyst(s): BNB
Date: 5-24-17
Filter Lot #: 9803210

Agitator Speed 30 ± 2 rpm ☑

Balance ID: BAL020
pH Probe ID: T5
Temp probe ID: ☒ 1025 ☐ 1023

Analyst / Date		Analyst / Date	
BNB 5-24-17		BNB 5-25-17	
Time On	Temp On °C	Time Off	Temp Off °C
1520	22.9	754	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	05-1285-02	✓	10	10	1311	F1-231	S	100		✓	25.00	500
P	05-1283-02	✓	〃	〃	〃	〃	〃	〃		✓	25.01	500
Q												
R												
S												
NA	FB1K-1	NA	NA	NA	1311	F1-231	NA	NA	NA	NA	40	40

BNB 5-25-17

BNB 5-25-17

BNB 5-25-17

*Matrix Code = (S-solid) (SS-sand, soil or sludge) (P-paint) (O-organic) (W-water or waste)

Comments: NA

Peer Review By: [signature]

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 050317
Analyst1: ADC Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 24,0
Method: 624 SOP: MSV10 Rev: 15
Method: 5035/ 5030B/ 5030C SOP: PAT01, OVAP PAT01 Rev: 18,1
Maintenance Log ID:

Internal Standard: STD81442 Surrogate Standard: STD81441
CCV: STD81698/STD81708 LCS: STD81656/STD81640 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG612363 WG612759

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M17986	WG612363-01 50ng BFB STD 8260	NA	1	1	STD81491	05/03/17 10:28
11M17987	RINSE	NA	1	1		05/03/17 10:52
11M17988	WG612363-02 .3ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 11:21
11M17989	WG612363-03 .4ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 11:50
11M17990	WG612363-04 1ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 12:19
11M17991	WG612363-05 2ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 12:48
11M17992	WG612363-06 5ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 13:17
11M17993	WG612363-07 20ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 13:46
11M17994	WG612363-08 50ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 14:15
11M17995	WG612363-09 100ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 14:44
11M17996	WG612363-10 200ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 15:13
11M17997	WG612363-11 300ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 15:42
11M17998	RINSE	NA	1	1		05/03/17 16:11
11M17999	WG612363-12 50ug/L ICV 8260	NA	1	1	STD81656	05/03/17 16:40
11M18000	WG612363-12 20ug/L ICV 8260	NA	1	1	STD81656	05/03/17 17:47
11M18001	WG612759-01 BFB 50ng A9FOO	NA	1	1	STD81491	05/03/17 19:14
11M18002	WG612759-02 5ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 19:42
11M18003	WG612759-03 20ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 20:10
11M18004	WG612759-04 50ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 20:39
11M18005	WG612759-05 100ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 21:08
11M18006	WG612759-06 200ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 21:36
11M18007	WG612759-07 300ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 22:05
11M18008	WG612759-08 400ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 22:34
11M18009	WG612759-09 500ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 23:02
11M18010	RINSE	NA	1	1		05/03/17 23:31
11M18011	WG612759-10 100ug/L STD A9FOO	NA	1	1	STD81640	05/04/17 00:00

Comments

Seq.	Rerun	Dil.	Reason	Analytes
14	X			
File ID: 11M17999				
WG612363-12 ICV had multiple failures. RR at 20ppb.				

Approved: May 09, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 051617
Analyst1: ADC 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:

Internal Standard: STD81876 Surrogate Standard: STD81877
CCV: STD81698 LCS: STD81861 MS/MSD: STD81861

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG614378 (ICAL)

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18429	WG614378-01 BFB 50ng 8260	NA	1	1	STD81491	05/16/17 12:01
11M18430	RINSE	NA	1	1		05/16/17 12:25
11M18431	WG614378-02 0.3ug/L CCV 8260	NA	1	1	STD81880	05/16/17 12:54
11M18432	WG614378-03 0.4ug/L CCV 8260	NA	1	1	STD81880	05/16/17 13:23
11M18433	WG614378-04 1.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 13:52
11M18434	WG614378-05 2.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 14:21
11M18435	WG614378-06 5.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 14:50
11M18436	WG614378-07 20.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 15:20
11M18437	WG614378-08 50.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 15:49
11M18438	WG614378-09 100.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 16:18
11M18439	WG614378-10 200.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 16:47
11M18440	WG614378-11 300.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 17:16
11M18441	RINSE	NA	1	1	STD81880	05/16/17 17:45
11M18442	WG614378-12 20.0ug/L ALT 8260	NA	1	1	STD81881	05/16/17 18:14

Approved: May 22, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052517
Analyst1: ADC Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG615570

Comments: L17051374s and 1376s have % high LCS outliers; LCSDUP is acceptable. Samples are non-detect.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18631	WG615569-01 50ng BFB STD 8260	NA	1	1	STD81972	05/25/17 14:46
11M18632	WG615569-02 50ug/L CCV 8260	NA	1	1	STD81983	05/25/17 15:15
11M18633	WGXXXXXX-01 100ug/L CCV 826-A9	NA	1	1	STD81708	05/25/17 15:44
11M18634	WG615570-01 BLANK 8260	NA	1	1		05/25/17 16:14
11M18635	WG615570-02 20ug/L LCS 8260	NA	1	1	STD82009	05/25/17 16:43
11M18636	WG615570-03 20ug/L LCSDUP 8260	NA	1	1	STD82009	05/25/17 17:12
11M18637	L17051282-02 A1 10X AF 826-TC	NA	17	10		05/25/17 17:41
11M18638	L17051283-02 10X AF 826-TC	NA	17	10		05/25/17 18:10
11M18639	L17051285-02 10X AF 826-TC	NA	17	10		05/25/17 18:39
11M18640	L17051277-02 500X AF 826-TC	NA	17	500		05/25/17 19:08
11M18641	L17051374-01 A 826-SPE	<2	1	1		05/25/17 19:37
11M18642	L17051374-02 A 826-SPE	<2	1	1		05/25/17 20:07
11M18643	L17051374-03 A 826-SPE	<2	1	1		05/25/17 20:36
11M18644	L17051374-04 A 826-SPE	<2	1	1		05/25/17 21:05
11M18645	L17051374-05 A 826-SPE	<2	1	1		05/25/17 21:34
11M18646	L17051374-06 A 826-SPE	<2	1	1		05/25/17 22:03
11M18647	L17051374-07 A 826-SPE	<2	1	1		05/25/17 22:32
11M18648	L17051374-08 A 826-SPE	<2	1	1		05/25/17 23:01
11M18649	L17051374-09 A 826-SPE	<2	1	1		05/25/17 23:31
11M18650	L17051376-01 A 826-SPE	<2	1	1		05/26/17 00:00
11M18651	L17051391-02 A TB 826-SPE	<2	1	1		05/26/17 00:29
11M18652	L17051389-02 A TB 826-SPE	<2	1	1		05/26/17 00:58
11M18653	L17051389-01 A 826-SPE	<2	1	1		05/26/17 01:27
11M18654	L17051391-01 A 826-SPE	<2	1	1		05/26/17 01:56
11M18655	RINSE	NA	1	1		05/26/17 02:25
11M18656	WG615570-04 BLANK2 624	NA	2	1		05/26/17 02:54
11M18657	L17051329-01 B A1 624-SPE	6	2	1		05/26/17 03:23
11M18658	L17051379-01 A 624-SPE1	8	2	1		05/26/17 03:53
11M18659	CCV	NA	1	1		05/26/17 04:22
11M18660	RINSE	NA	1	1		05/26/17 04:52
11M18661	RINSE	NA	1	1		05/26/17 05:21
11M18662	WG615410-01 FBLK 826-TC	NA	17	10		05/26/17 05:51
11M18663	CLEANUP RINSE	NA	1	1		05/26/17 12:26
11M18664	CLEANUP RINSE	NA	1	1		05/26/17 12:55

Approved: May 30, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052517
Analyst1: ADC Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG615570

Comments: L17051374s and 1376s have % high LCS outliers; LCSDUP is acceptable. Samples are non-detect.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18665	CLEANUP RINSE	NA	1	1		05/26/17 13:24

Comments

Seq.	Rerun	Dil.	Reason	Analytes
7				
File ID: 11M18637				
	L17051282-02 two high surrogates; F flag hit. Reporting both runs.			
10				
File ID: 11M18640				
	L17051277-02 500X AF 826-TC needs reanalyzed. LCS is high for PCE.			
14			Surrogate standard failure	
File ID: 11M18644				
	L17051374-04			
18			Surrogate standard failure	
File ID: 11M18648				
	L17051374-08			
20			Surrogate standard failure	
File ID: 11M18650				
	L17051376-01			
21			Surrogate standard failure	
File ID: 11M18651				
	L17051391-02 DNR one high surrogate; F flag hit. Needs reanalyzed.			
22				
File ID: 11M18652				
	L17051389-02 oxylene and toluene high in LCS; sample ND for these analytes.			
23	X	100	Over Calibration Range	
File ID: 11M18653				
	L17051389-01 oxylene and toluene high in LCS; sample has hits. Unable to reanalye for these analytes due to other large hits.			
24	X	20	Over Calibration Range	
File ID: 11M18654				
	L17051391-01 TCE and ch2cl2 carryover. Needs reanalyzed at a 2X dilution.			
26			Carry-over contamination	TCE
File ID: 11M18656				
	WG615570-04			
27	X	1	Carry-over contamination	TCE
File ID: 11M18657				

Approved: May 30, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument:	HPMS11	Dataset:	052517		
Analyst1:	ADC	Analyst2:	NA		
Method:	8260	SOP:	MSV01, OVAP MSV01	Rev:	25,0
Method:	624	SOP:	MSV10	Rev:	10
Method:	5035, 5030B, 5030C	SOP:	PAT01, OVAP PAT01	Rev:	19,0
Maintenance Log ID:					

Internal Standard: STD82876 Surrogate Standard: STD82877

CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG615570

Comments: L17051374s and 1376s have % high LCS outliers; LCSDUP is acceptable. Samples are non-detect.

Comments

Seq.	Rerun	Dil.	Reason	Analytes
			L17051329-01 Reporting PCE only.	
28	X		Carry-over contamination	
File ID: 11M18658				
			L17051379-01 DNR	

Approved: May 30, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052617
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: Column 2 ID: RTX502.2
Workgroups: WG615792

Comments: For the 1440s LCS has 5 high outliers; LCSDUP is acceptable. 1440-06,-09, and 14 have hits of p-isopropyltoluene(high inLCS). 14 has a hit of 1,4-DCB (high in LCS). Samples all needed further dilutions for other analytes; unable to reanalyze. Also, insufficient sample volume to reanalyze without headspace.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18666	WG615791-01 50ng BFB STD 8260	NA	1	1	STD81972	05/26/17 14:49
11M18667	WG615791-02 50ug/L CCV 8260	NA	1	1	STD81983	05/26/17 15:13
11M18668	WG615791-02 50ug/L CCV 8260	NA	1	1	STD81983	05/26/17 15:48
11M18669	WGXXXXXX-01 100ug/L CCV 826-A9	NA	1	1	STD81708	05/26/17 16:17
11M18670	WG615792-01 BLANK 8260	NA	1	1		05/26/17 16:46
11M18671	L17050744-04 A 826-REF-BLK	<2	1	1		05/26/17 17:15
11M18672	L17050744-05 A 826-REF-BLK	<2	1	1		05/26/17 17:44
11M18673	WG615792-02 20ug/L LCS 8260	NA	1	1	STD82009	05/26/17 18:14
11M18674	WG615792-03 20ug/L LCSDUP 8260	NA	1	1	STD82009	05/26/17 18:43
11M18675	L17051389-01 B D1 100X 826-SPE	<2	1	100		05/26/17 19:12
11M18676	L17051391-01 B D1 20X 826-SPE	<2	1	20		05/26/17 19:41
11M18677	L17051440-01 A TB 826-SPE	<2	1	1		05/26/17 20:10
11M18678	L17051440-02 A 826-SPE	<2	1	1		05/26/17 20:38
11M18679	L17051440-03 A 826-SPE	<2	1	1		05/26/17 21:07
11M18680	L17051440-04 A 826-SPE	<2	1	1		05/26/17 21:36
11M18681	L17051440-07 A 826-SPE	<2	1	1		05/26/17 22:05
11M18682	L17051440-08 A 826-SPE	<2	1	1		05/26/17 22:34
11M18683	L17051440-13 A 826-SPE	<2	1	1		05/26/17 23:03
11M18684	L17051440-05 A 50X 826-SPE	<2	1	50		05/26/17 23:32
11M18685	L17051440-06 A 10X 826-SPE	<2	1	10		05/27/17 00:02
11M18686	L17051440-11 A 10X 826-SPE	<2	1	10		05/27/17 00:31
11M18687	L17051440-09 A 826-SPE	<2	1	1		05/27/17 01:00
11M18688	L17051440-10 A 826-SPE	<2	1	1		05/27/17 01:29
11M18689	L17051440-12 A 826-SPE	<2	1	1		05/27/17 01:58
11M18690	L17051440-14 A 826-SPE	<2	1	1		05/27/17 02:27
11M18691	RINSE	NA	2	1		05/27/17 02:56
11M18692	RINSE	NA	2	1		05/27/17 03:25
11M18693	RINSE	NA	2	1		05/27/17 03:55
11M18694	WG615792-04 BLANK2 624	NA	2	1		05/27/17 04:24
11M18695	L17051379-01 B A1 624-SPE1	7	2	1		05/27/17 04:54
11M18696	CCV	NA	1	1		05/27/17 05:24
11M18697	RINSE	NA	1	1		05/27/17 05:53

Approved: June 01, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052617
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: Column 2 ID: RTX502.2
Workgroups: WG615792

Comments: For the 1440s LCS has 5 high outliers; LCSDUP is acceptable. 1440-06,-09, and 14 have hits of p-isopropyltoluene(high inLCS). 14 has a hit of 1,4-DCB (high in LCS). Samples all needed further dilutions for other analytes; unable to reanalyze. Also, insufficient sample volume to reanalyze without headspace.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18698	RINSE	NA	1	1		05/27/17 06:22

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
File ID: 11M18667				
	WG615791-02 50ug/L CCV rerun CCV, multiple analytes were low.			
6			Surrogate standard failure	
File ID: 11M18671				
	L17050744-04 mult. surr. failed high. F flag hits for acetone less than 1/2 RL. Needs reanalyzed.			
7			Surrogate standard failure	
File ID: 11M18672				
	L17050744-05 mult. surr. failed high. F flag hits for acetone less than 1/2 RL.			
11	X	2		
File ID: 11M18676				
	L17051391-01 acetone results from this and previous run do not match. RR for conf.			
13			Surrogate standard failure	
File ID: 11M18678				
	L17051440-02 mult. surr. failed high. sample ND for all target cmpds.			
16	X		Surrogate standard failure	
File ID: 11M18681				
	L17051440-07 mult. surr. failed high. sample took target hits above 1/2 RL. RR for conf.			
20	X	100	Over Calibration Range	
File ID: 11M18685				
	L17051440-06			
22	X	20	Over Calibration Range	
File ID: 11M18687				
	L17051440-09			
23	X		Carry-over contamination	
File ID: 11M18688				
	L17051440-10 mult. surr. failed high. C/O. DNR.			
24	X	1	Carry-over contamination	
File ID: 11M18689				
	L17051440-12 mult. surr. failed high. C/O. DNR			
25	X	25	Over Calibration Range	

Approved: June 01, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052617
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: Column 2 ID: RTX502.2
Workgroups: WG615792

Comments: For the 1440s LCS has 5 high outliers; LCSDUP is acceptable. 1440-06,-09, and 14 have hits of p-isopropyltoluene(high inLCS). 14 has a hit of 1,4-DCB (high in LCS). Samples all needed further dilutions for other analytes; unable to reanalyze. Also, insufficient sample volume to reanalyze without headspace.

Comments

Seq.	Rerun	Dil.	Reason	Analytes
File ID: 11M18690				
	L17051440-14 A 826-SPE			
29			Surrogate standard failure	benzene, xylenes
File ID: 11M18694				
	WG615792-04			
30			Carry-over contamination	
File ID: 11M18695				
	L17051379-01 benzene C/O present. was RR for trichloroethene C/O. report trichloroethene result from this run and all other results from previous run.			

Approved: June 01, 2017

Page: 3

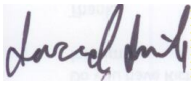
Microbac Laboratories Inc.

Data Checklist

Date: 03-MAY-2017
Analyst: ADC
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 81984
Analytical Workgroups: WG612363 WG612759

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	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	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:
08-MAY-2017



Secondary Reviewer:
09-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-09-2017 08:44:21

Microbac Laboratories Inc.

Data Checklist

Date: 16-MAY-2017
Analyst: ADC
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82278
Analytical Workgroups: WG614378

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	ADC
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	ADC
Secondary Reviewer	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:
19-MAY-2017

Secondary Reviewer:
22-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-22-2017 09:02:59

Microbac Laboratories Inc.

Data Checklist

Date: 25-MAY-2017
Analyst: JDS
Analyst: ADC
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82441
Analytical Workgroups: WG615570

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	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	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:
29-MAY-2017

Secondary Reviewer:
30-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-30-2017 16:38:08

Microbac Laboratories Inc.

Data Checklist

Date: 26-MAY-2017
Analyst: JDS
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82472
Analytical Workgroups: WG615792

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	X
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	X
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:
31-MAY-2017

Secondary Reviewer:
01-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-01-2017 08:57:25

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B **AAB#:** WG615570

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/26/2017	1.4	14		05/26/17	1.4	14	
TRIP BLANK	02	05/24/17					05/26/2017	2	14		05/26/17	2	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5313664
Report generated 06/01/2017 15:41

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B AAB#: WG615792

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/26/2017	2.2	14		05/26/17	2.2	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5313664
Report generated 06/01/2017 15:41

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17051389
Instrument Id: HPMS11
Workgroup (AAB#): WG615570

Method: 8260
CAL ID: HPMS11-16-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17051389-01	1.00	01	111	108	114	110
L17051389-02	1.00	01	111	103	113	108
WG615570-01	1.00	01	109	98.8	117	109
WG615570-02	1.00	01	108	104	108	109
WG615570-03	1.00	01	106	102	106	108
WG615570-04	1.00	01	112	106	115	111

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: 5313672
Report generated: 06/01/2017 15:41

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17051389
Instrument Id: HPMS11
Workgroup (AAB#): WG615792

Method: 8260
CAL ID: HPMS11-16-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17051389-01	100	DL01	107	100	111	109
WG615792-01	1.00	01	110	104	115	110
WG615792-02	1.00	01	109	104	114	110
WG615792-03	1.00	01	108	104	113	110
WG615792-04	1.00	01	104	99.3	112	111

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: 5313672
Report generated: 06/01/2017 15:41

METHOD BLANK SUMMARY

Login Number: L17051389
Blank File ID: 11M18634
Prep Date: 05/25/17 16:14
Analyzed Date: 05/25/17 16:14
Analyst: ADC

Work Group: WG615570
Blank Sample ID: WG615570-01
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	WG615570-02	11M18635	05/25/17 16:43	01
LCS2	WG615570-03	11M18636	05/25/17 17:12	01
TRIP BLANK	L17051389-02	11M18652	05/26/17 00:58	01
LH18/24-SP140-7442-GRAB	L17051389-01	11M18653	05/26/17 01:27	01

Report Name: BLANK_SUMMARY
PDF File ID: 5313665
Report generated 06/01/2017 15:41

METHOD BLANK SUMMARY

Login Number: L17051389
Blank File ID: 11M18656
Prep Date: 05/26/17 02:54
Analyzed Date: 05/26/17 02:54
Analyst: ADC

Work Group: WG615570
Blank Sample ID: WG615570-04
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	WG615570-02	11M18635	05/25/17 16:43	01
LCS2	WG615570-03	11M18636	05/25/17 17:12	01
TRIP BLANK	L17051389-02	11M18652	05/26/17 00:58	01
LH18/24-SP140-7442-GRAB	L17051389-01	11M18653	05/26/17 01:27	01

Report Name: BLANK_SUMMARY
PDF File ID: 5313665
Report generated 06/01/2017 15:41

METHOD BLANK SUMMARY

Login Number:	L17051389	**Work Group:**	WG615792
Blank File ID:	11M18670	**Blank Sample ID:**	WG615792-01
Prep Date:	05/26/17 16:46	**Instrument ID:**	HPMS11
Analyzed Date:	05/26/17 16:46	**Method:**	8260B
Analyst:	JDS		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615792-02	11M18673	05/26/17 18:14	01
LCS2	WG615792-03	11M18674	05/26/17 18:43	01
LH18/24-SP140-7442-GRAB	L17051389-01	11M18675	05/26/17 19:12	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5313665
Report generated 06/01/2017 15:41

METHOD BLANK SUMMARY

Login Number:	L17051389	Work Group:	WG615792
Blank File ID:	11M18694	Blank Sample ID:	WG615792-04
Prep Date:	05/27/17 04:24	Instrument ID:	HPMS11
Analyzed Date:	05/27/17 04:24	Method:	8260B
Analyst:	JDS		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615792-02	11M18673	05/26/17 18:14	01
LCS2	WG615792-03	11M18674	05/26/17 18:43	01
LH18/24-SP140-7442-GRAB	L17051389-01	11M18675	05/26/17 19:12	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5313665
Report generated 06/01/2017 15:41

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 05/25/17 16:14 Sample ID: WG615570-01
Instrument ID: HPMS11 Run Date: 05/25/17 16:14 Prep Method: 5030B/5030C/503
File ID: 11M18634 Analyst: ADC Method: 8260B
Workgroup (AAB#): WG615570 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS11-16-MAY-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	109	70 - 120	PASS
4-Bromofluorobenzene	117	75 - 120	PASS
Dibromofluoromethane	98.8	85 - 115	PASS
Toluene-d8	109	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: 5313666
01-JUN-2017 15:41

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 05/26/17 16:46 Sample ID: WG615792-01
Instrument ID: HPMS11 Run Date: 05/26/17 16:46 Prep Method: 5030B/5030C/503
File ID: 11M18670 Analyst: JDS Method: 8260B
Workgroup (AAB#): WG615792 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS11-16-MAY-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Methylene chloride	0.250	1.00	0.250	1	U
Trichloroethene	0.250	1.00	0.250	1	U

Surrogates	% Recovery	Surrogate Limits			Qualifier
1,2-Dichloroethane-d4	110	70	-	120	PASS
4-Bromofluorobenzene	115	75	-	120	PASS
Dibromofluoromethane	104	85	-	115	PASS
Toluene-d8	110	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: 5313666
01-JUN-2017 15:41

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 Analyst: JDS Prep Method: 5030B/5030C/503
Instrument ID: HPMS11 Matrix: Water Method: 8260B
Workgroup (AAB#): WG615792 Units: ug/L
QC Key: DOD4 Lot #: STD82009

Sample ID: WG615792-02 LCS File ID: 11M18673 Run Date: 05/26/2017 18:14
Sample ID: WG615792-03 LCS2 File ID: 11M18674 Run Date: 05/26/2017 18:43

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Methylene chloride	20.0	20.6	103	20.0	19.8	99.2	3.76	55 - 140	30	
Trichloroethene	20.0	22.5	113	20.0	21.9	110	2.62	70 - 125	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,2-Dichloroethane-d4	109	108	70 - 120	PASS
Dibromofluoromethane	104	104	85 - 115	PASS
4-Bromofluorobenzene	114	113	75 - 120	PASS
Toluene-d8	110	110	85 - 120	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5313667
Report generated: 06/01/2017 15:41

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 Analyst: ADC Prep Method: 5030B/5030C/503
Instrument ID: HPMS11 Matrix: Water Method: 8260B
Workgroup (AAB#): WG615570 Units: ug/L
QC Key: DOD4 Lot #: STD82009

Sample ID: WG615570-02 LCS File ID: 11M18635 Run Date: 05/25/2017 16:43
Sample ID: WG615570-03 LCS2 File ID: 11M18636 Run Date: 05/25/2017 17:12

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	23.8	119	20.0	22.2	111	6.76	65 - 130	30	
1,1,2-Trichloroethane	20.0	23.7	118	20.0	23.5	117	1.01	75 - 125	30	
1,1-Dichloroethane	20.0	23.2	116	20.0	21.9	109	5.97	70 - 135	30	
1,1-Dichloroethene	20.0	23.8	119	20.0	22.1	110	7.55	70 - 130	30	
1,2-Dichloroethane	20.0	23.7	119	20.0	22.9	114	3.82	70 - 130	30	
Acetone	20.0	20.8	104	20.0	21.4	107	2.79	40 - 140	30	
Benzene	20.0	24.0	120	20.0	22.6	113	5.83	80 - 120	30	
Carbon tetrachloride	20.0	24.0	120	20.0	22.9	114	5.00	65 - 140	30	
Chloroform	20.0	21.4	107	20.0	20.3	102	5.18	65 - 135	30	
Ethylbenzene	20.0	24.0	120	20.0	22.9	114	4.73	75 - 125	30	
m,p-Xylene	40.0	50.5	126	40.0	48.0	120	5.07	75 - 130	30	
Methylene chloride	20.0	21.4	107	20.0	20.5	102	4.22	55 - 140	30	
o-Xylene	20.0	25.3	126	20.0	23.8	119	6.12	80 - 120	30	*
Styrene	20.0	25.4	127	20.0	24.4	122	3.81	65 - 135	30	
Tetrachloroethene	20.0	25.1	125	20.0	23.6	118	5.96	45 - 150	30	
Toluene	20.0	25.0	125	20.0	24.0	120	4.35	75 - 120	30	*
Trichloroethene	20.0	23.6	118	20.0	22.8	114	3.72	70 - 125	30	
Vinyl chloride	20.0	24.8	124	20.0	25.6	128	3.19	50 - 145	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,2-Dichloroethane-d4	108	106	70 - 120	PASS
Dibromofluoromethane	104	102	85 - 115	PASS
4-Bromofluorobenzene	108	106	75 - 120	PASS
Toluene-d8	109	108	85 - 120	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5313667
Report generated: 06/01/2017 15:41

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051389
Instrument: HPMS11
Analyst: FJB
Workgroup: WG612759

Tune ID: WG612759-01
Run Date: 05/03/2017
Run Time: 19:14
File ID: 11M18001
Cal ID: HPMS11-03-MAY-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	22.7	10582	PASS
75.0	95.0	30.0	60.0	49.6	23133	PASS
95.0	95.0	100	100	100	46626	PASS
96.0	95.0	5.00	9.00	6.81	3175	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	87.5	40784	PASS
175	174	5.00	9.00	8.19	3340	PASS
176	174	95.0	101	98.0	39952	PASS
177	176	5.00	9.00	6.40	2555	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG612759-02	STD	01	05/03/2017 19:42	
WG612759-03	STD	01	05/03/2017 20:10	
WG612759-04	STD	01	05/03/2017 20:39	
WG612759-05	STD-CCV	01	05/03/2017 21:08	
WG612759-06	STD	01	05/03/2017 21:36	
WG612759-07	STD	01	05/03/2017 22:05	
WG612759-08	STD	01	05/03/2017 22:34	
WG612759-09	STD	01	05/03/2017 23:02	
WG612759-10	SSCV	01	05/04/2017 00:00	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313669
Report generated 06/01/2017 15:41

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051389
Instrument: HPMS11
Analyst: ADC
Workgroup: WG614378

Tune ID: WG614378-01
Run Date: 05/16/2017
Run Time: 12:01
File ID: 11M18429
Cal ID: HPMS11-16-MAY-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	24.1	5305	PASS
75.0	95.0	30.0	60.0	51.3	11296	PASS
95.0	95.0	100	100	100	22034	PASS
96.0	95.0	5.00	9.00	6.88	1516	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	87.2	19224	PASS
175	174	5.00	9.00	7.97	1532	PASS
176	174	95.0	101	97.2	18686	PASS
177	176	5.00	9.00	6.15	1149	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG614378-02	STD	01	05/16/2017 12:54	
WG614378-03	STD	01	05/16/2017 13:23	
WG614378-04	STD	01	05/16/2017 13:52	
WG614378-05	STD	01	05/16/2017 14:21	
WG614378-06	STD	01	05/16/2017 14:50	
WG614378-07	STD	01	05/16/2017 15:20	
WG614378-08	STD-CCV	01	05/16/2017 15:49	
WG614378-09	STD	01	05/16/2017 16:18	
WG614378-10	STD	01	05/16/2017 16:47	
WG614378-11	STD	01	05/16/2017 17:16	
WG614378-12	SSCV	01	05/16/2017 18:14	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313669
Report generated 06/01/2017 15:41

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051389
Instrument: HPMS11
Analyst: ADC
Workgroup: WG615569

Tune ID: WG615569-01
Run Date: 05/25/2017
Run Time: 14:46
File ID: 11M18631
Cal ID: HPMS11-16-MAY-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	26.0	6073	PASS
75.0	95.0	30.0	60.0	52.8	12346	PASS
95.0	95.0	100	100	100	23389	PASS
96.0	95.0	5.00	9.00	6.96	1629	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	78.0	18236	PASS
175	174	5.00	9.00	7.94	1448	PASS
176	174	95.0	101	96.6	17610	PASS
177	176	5.00	9.00	6.50	1145	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG615569-02	CCV	01	05/25/2017 15:15	
WG615570-01	BLANK	01	05/25/2017 16:14	
WG615570-02	LCS	01	05/25/2017 16:43	
WG615570-03	LCS2	01	05/25/2017 17:12	
L17051389-02	TRIP BLANK	01	05/26/2017 00:58	
L17051389-01	LH18/24-SP140-7442-GRAB	01	05/26/2017 01:27	
WG615570-04	BLANK2	01	05/26/2017 02:54	*
WG615410-01	FBLK1	DL01	05/26/2017 05:51	*

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313669
Report generated 06/01/2017 15:41

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051389
Instrument: HPMS11
Analyst: JDS
Workgroup: WG615791

Tune ID: WG615791-01
Run Date: 05/26/2017
Run Time: 14:49
File ID: 11M18666
Cal ID: HPMS11-16-MAY-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	25.0	10921	PASS
75.0	95.0	30.0	60.0	50.2	21888	PASS
95.0	95.0	100	100	100	43621	PASS
96.0	95.0	5.00	9.00	6.79	2961	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	80.9	35301	PASS
175	174	5.00	9.00	7.66	2705	PASS
176	174	95.0	101	97.8	34520	PASS
177	176	5.00	9.00	6.40	2209	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG615791-02	CCV	01	05/26/2017 15:48	
WG615792-01	BLANK	01	05/26/2017 16:46	
WG615792-02	LCS	01	05/26/2017 18:14	
WG615792-03	LCS2	01	05/26/2017 18:43	
L17051389-01	LH18/24-SP140-7442-GRAB	DL01	05/26/2017 19:12	
WG615792-04	BLANK2	01	05/27/2017 04:24	*

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313669
Report generated 06/01/2017 15:41

Calibration Table Report
Method: A9FOOWTR.M
Title: Appendix IX (SOP:OVL MSV01) Water 050317 HPMS11
Last Calibration: Thu May 04 07:07:15 2017
Curve: WG612759
Calibration Files

	Compound	5 11M18002.D	20 11M18003.D	50 11M18004.D	100 11M18005.D	200 11M18006.D	300 11M18007.D	400 11M18008.D	500 11M18009.D	Avg	%RSD	Linear	Quadratic
I	Fluorobenzene	ISTD											
T	Acetonitrile	0.028	0.032	0.033	0.032	0.034	0.033	0.034	0.035	0.033	6.933		
T	3-Chloro-1-propene	0.480	0.493	0.499	0.481	0.462	0.420	0.394	0.364	0.449	11.191		
T	2-Chloro-1,3-butadiene	0.439	0.462	0.480	0.471	0.458	0.418	0.395	0.364	0.436	9.323		
T	Methacrylonitrile	0.149	0.176	0.191	0.188	0.193	0.186	0.185	0.178	0.181	7.820		
T	Isobutyl Alcohol		0.009	0.012	0.011	0.012	0.013	0.014	0.014	0.012	13.767		
T	1-Butanol				0.005	0.006	0.006	0.007	0.007	0.006	11.655		
T	Cyclohexanone			0.008	0.008	0.010	0.010	0.011	0.011	0.010	12.441		
T	2-Nitropropane			0.066	0.071	0.076	0.078	0.081	0.080	0.075	7.608		
T	Ethyl Acetate	0.229	0.253	0.260	0.255	0.254	0.241	0.233	0.221	0.243	5.885		
T	Methyl methacrylate	0.186	0.234	0.248	0.249	0.251	0.240	0.233	0.220	0.233	9.226		
I	Chlorobenzene-d5	ISTD											
I	1,4-Dichlorobenzene-d4	ISTD											

Mon May 08 16:08:06 2017

Calibration Table Report
Method: 8260WT.M
Title: 8260B/624 (SOP: OVL MSV01) Water 051617 HPMS11
Last Calibration: Wed May 17 12:46:08 2017
Curve: WG614378
Calibration Files

Compound	0.3 11M18431.D	0.4 11M18432.D	1 11M18433.D	2 11M18434.D	5 11M18435.D	20 11M18436.D	50 11M18437.D	100 11M18438.D	200 11M18439.D	300 11M18440.D	Avg	%RSD	R^2 Linear	 Quadratic
Fluorobenzene	ISTD													
Dichlorodifluoromethane			0.317	0.353	0.357	0.424	0.407	0.378	0.368		0.372	9.541		
Chloromethane			0.560	0.639	0.584	0.630	0.536	0.486	0.439		0.553	13.227		
Vinyl Chloride		0.498	0.417	0.470	0.439	0.478	0.442	0.375	0.336		0.432	12.564		
1,3-Butadiene				0.343	0.282	0.295	0.228	0.162	0.153	0.130	0.227	36.032		1.002
Bromomethane			0.207	0.210	0.206	0.193	0.198	0.204	0.219		0.205	4.082		
Chloroethane			0.219	0.239	0.241	0.249	0.245	0.237	0.248		0.240	4.259		
Trichlorofluoromethane		0.441	0.417	0.471	0.462	0.480	0.472	0.439	0.448		0.454	4.729		
Diethyl ether			0.273	0.297	0.290	0.286	0.284	0.278		0.284	0.285	2.761		
Isoprene		0.305	0.365	0.389	0.401	0.441	0.443	0.441	0.439		0.403	12.220		
Acrolein			0.029	0.040	0.038	0.039	0.040	0.042		0.042	0.039	11.129		
1,1,2-Trichloro-1,2,2-Trifluoroet			0.195	0.234	0.242	0.249	0.253	0.241	0.255		0.239	8.688		
Acetone				0.089	0.093	0.091	0.092	0.093	0.097	0.090	0.092	2.806		
1,1-Dichloroethene		0.473	0.457	0.486	0.517	0.521	0.518	0.495	0.494		0.495	4.648		
Tert-Butyl Alcohol			0.023	0.027	0.027	0.028	0.031	0.032			0.028	11.816		
Dimethyl Sulfide		0.287	0.297	0.340	0.336	0.357	0.356	0.352	0.351		0.334	8.216		
Iodomethane			0.013	0.079	0.141	0.251	0.276	0.290	0.298		0.192	59.519	0.998	
Methyl acetate				0.215	0.241	0.249	0.254	0.256	0.266		0.247	7.124		
Methylene Chloride			0.335	0.334	0.310	0.314	0.305	0.293	0.302		0.313	5.038		
Carbon Disulfide			0.710	0.770	0.789	0.834	0.806	0.757	0.688		0.765	6.757		
Acrylonitrile			0.094	0.114	0.118	0.119	0.129	0.131		0.126	0.119	10.729		
Methyl Tert Butyl Ether		0.745	0.695	0.766	0.793	0.821	0.803	0.773	0.768		0.771	5.035		
trans-1,2-Dichloroethene		0.246	0.236	0.270	0.276	0.288	0.287	0.276	0.287		0.271	7.185		
n-Hexane				0.407	0.430	0.467	0.476	0.471	0.467		0.453	6.165		
Diisopropyl ether			1.117	1.264	1.233	1.203	1.164	1.017		0.915	1.130	11.071		
Vinyl Acetate				0.479	0.533	0.487	0.517	0.535	0.472	0.424	0.492	8.019		
1,1-Dichloroethane		0.640	0.593	0.611	0.604	0.645	0.631	0.596	0.577		0.612	3.958		
Ethyl-Tert-Butyl ether			0.964	1.097	1.071	1.046	1.027	0.914		0.834	0.993	9.488		
2-Butanone				0.137	0.139	0.143	0.147	0.152	0.157	0.155	0.147	5.313		
Propionitrile			0.034	0.041	0.043	0.044	0.045	0.047		0.050	0.043	11.768		
2,2-Dichloropropane		0.423	0.369	0.405	0.392	0.420	0.417	0.395	0.398		0.402	4.470		
cis-1,2-Dichloroethene		0.316	0.262	0.294	0.319	0.332	0.328	0.315	0.320		0.311	7.292		
Chloroform	0.668	0.681	0.536	0.542	0.526	0.550	0.525	0.494	0.481		0.556	12.730		
1-Bromopropane				0.040	0.054	0.061	0.060	0.058	0.061	0.059	0.056	13.246		
Bromochloromethane		0.129	0.172	0.187	0.196	0.199	0.196	0.192	0.198		0.184	12.931		
Tetrahydrofuran			0.158	0.115	0.106	0.104	0.106	0.106		0.108	0.115	16.890	0.999	
Dibromofluoromethane					0.280	0.262	0.272	0.271	0.260		0.269	3.091		
1,1,1-Trichloroethane		0.415	0.399	0.423	0.462	0.483	0.485	0.463	0.464		0.449	7.243		
Cyclohexane		0.581	0.524	0.578	0.607	0.650	0.644	0.623	0.599	0.540	0.594	7.282		
1,1-Dichloropropene		0.331	0.335	0.357	0.372	0.408	0.407	0.386	0.387		0.373	7.978		
Carbon Tetrachloride		0.304	0.349	0.379	0.396	0.420	0.430	0.409	0.410		0.387	10.874		
Tert-Amyl-Methyl ether			0.714	0.837	0.823	0.816	0.803	0.73		0.677	0.77142	8.15202		
1,2-Dichloroethane-d4					0.363	0.317	0.338	0.335	0.317		0.33379	5.69157		
1,2-Dichloroethane		0.442	0.419	0.47	0.476	0.478	0.468	0.436	0.423		0.45135	5.33453		
Benzene		1.156	1.084	1.179	1.185	1.199	1.141	1.011	0.878		1.104	10.0158		
Trichloroethene		0.226	0.251	0.301	0.301	0.325	0.317	0.301	0.309		0.29146	11.7841		
Methylcyclohexane		0.477	0.383	0.443	0.467	0.507	0.501	0.477	0.464	0.423	0.46019	8.49006		
1,2-Dichloropropane		0.313	0.286	0.342	0.342	0.369	0.363	0.345	0.352		0.33917	8.04796		
1,4-Dioxane				0.002	0.003	0.003	0.003	0.003		0.003	0.00293	13.9596		
Bromodichloromethane		0.343	0.298	0.345	0.37	0.408	0.403	0.393	0.389		0.36867	10.1709		
Dibromomethane		0.12	0.153	0.171	0.163	0.188	0.182	0.176	0.183		0.16712	13.2633		
2-Chloroethyl Vinyl Ether			0.14	0.162	0.18	0.202	0.21	0.215	0.22	0.208	0.19218	14.9182		
4-Methyl-2-Pentanone					0.099	0.116	0.122	0.127	0.138	0.133	0.12257	11.2898		
cis-1,3-Dichloropropene		0.334	0.303	0.37	0.402	0.455	0.472	0.45	0.443		0.40378	15.4416	0.999	
Dimethyl Disulfide				0.147	0.173	0.237	0.271	0.28	0.288	0.269	0.23782	23.5484	0.999	
Chlorobenzene-d5	ISTD													
Toluene-d8					1.507	1.348	1.404	1.335	1.146		1.34813	9.77146		
Toluene		2.389	1.827	1.753	1.819	1.767	1.658	1.41			1.80307	16.3818	0.991	
Ethyl Methacrylate			0.303	0.369	0.419	0.482	0.512	0.503	0.484	0.461	0.44178	16.5839	0.998	
trans-1,3-Dichloropropene			0.496	0.468	0.517	0.577	0.593	0.574	0.53		0.53644	8.70041		
1,1,2-Trichloroethane		0.319	0.306	0.337	0.349	0.367	0.361	0.35	0.342		0.34131	5.95867		
2-Hexanone					0.257	0.302	0.314	0.319	0.323	0.318	0.30532	8.13831		
1,3-Dichloropropane		0.632	0.563	0.598	0.616	0.627	0.611	0.573	0.539		0.59471	5.61804		
Tetrachloroethene		0.237	0.276	0.301	0.34	0.35	0.354	0.336	0.331		0.31574	13.0405		
Dibromochloromethane		0.302	0.303	0.328	0.364	0.422	0.438	0.419	0.416		0.37379	15.2048	0.999	
1,2-Dibromoethane		0.218	0.277	0.297	0.323	0.336	0.338	0.324	0.324		0.30457	13.3219		
1-Chlorohexane		0.435	0.368	0.42	0.471	0.528	0.54	0.528	0.493	0.454	0.47077	12.2378		
Chlorobenzene		1.06	1.029	1.093	1.095	1.14	1.091	0.982	0.852		1.04267	8.68375		
1,1,1,2-Tetrachloroethane		0.333	0.343	0.376	0.375	0.422	0.428	0.418	0.412		0.38822	9.55907		
Ethylbenzene			0.49	0.553	0.573	0.617	0.631	0.597	0.568		0.5756	8.15775		
m-,p-Xylene		0.624	0.61	0.662	0.73	0.738	0.723	0.635	0.52		0.6552	11.3677		
o-Xylene		0.611	0.542	0.601	0.714	0.734	0.742	0.699	0.654		0.66201	10.9201		
Styrene		0.915	0.841	0.944	1.039	1.186	1.213	1.116	0.962		1.02697	13.0703		
Bromoform			0.169	0.221	0.229	0.278	0.299	0.304	0.316		0.25955	20.9192	0.999	
Isopropylbenzene		1.54	1.47	1.654	1.773	1.858	1.79	1.534	1.228		1.60558	12.8593		
1,4-Dichlorobenzene-d4	ISTD													
1,1,2,2-Tetrachloroethane		0.602	0.603	0.738	0.784	0.799	0.755	0.759	0.712		0.71899	10.6759		
p-Bromofluorobenzene					0.94	0.932	0.941	0.959	0.874		0.92914	3.499		
1,2,3-Trichloropropane			0.192	0.203	0.227	0.25	0.237	0.238	0.241		0.22684	9.47455		
trans-1,4-Dichloro-2-Butene			0.145	0.197	0.252	0.276	0.273	0.283	0.283	0.259	0.24598	20.0146	0.998	

n-Propylbenzene		3.443	3.25	3.731	4.084	4.255	3.72	3.078			3.6516	11.7041	
Bromobenzene	0.765	0.798	0.769	0.857	0.913	0.978	0.915	0.884	0.825		0.85586	8.52037	
1,3,5-Trimethylbenzene		2.528	2.343	2.64	2.841	3.025	2.723	2.375	1.866		2.54273	14.0286	
2-Chlorotoluene		2.677	2.489	2.82	2.937	3.017	2.639	2.322	1.813		2.58925	14.9669	
4-Chlorotoluene		1.945	1.885	2.066	2.17	2.308	2.123	1.844	1.421		1.97015	13.7289	
a-Methylstyrene					1.273	1.545	1.523	1.47	1.247	1.119	1.36309	12.7744	
tert-Butylbenzene			0.452	0.537	0.622	0.676	0.646	0.63	0.606		0.59568	12.8233	
1,2,4-Trimethylbenzene			2.375	2.721	2.996	3.128	2.834	2.449			2.75056	10.8088	
sec-Butylbenzene			2.835	3.307	3.628	3.804	3.444	2.938			3.32593	11.4512	
p-Isopropyltoluene			2.257	2.755	2.988	3.212	2.941	2.558			2.7853	12.2258	
1,3-Dichlorobenzene		1.381	1.452	1.581	1.675	1.801	1.669	1.574	1.332		1.5582	10.2657	
1,4-Dichlorobenzene		1.654	1.501	1.619	1.747	1.774	1.655	1.555	1.316		1.60264	9.16319	
n-Butylbenzene			2.011	2.347	2.567	2.939	2.747	2.426			2.50625	12.9532	
1,2-Dichlorobenzene	1.749	1.667	1.454	1.685	1.649	1.757	1.617	1.532	1.299		1.60101	9.3155	
1,2-Dibromo-3-Chloropropane				0.092	0.133	0.151	0.154	0.157	0.168		0.14243	19.0803	0.999
1,2,4-Trichlorobenzene		0.9	0.961	1.064	1.102	1.251	1.175	1.143	1.07		1.08325	10.4409	
Hexachlorobutadiene		0.336	0.503	0.513	0.584	0.642	0.617	0.623	0.616		0.55426	18.444	1
Naphthalene		2.035	1.958	2.204	2.525	2.772	2.535	2.227	1.831		2.26105	14.3669	
1,2,3-Trichlorobenzene	0.922	0.878	0.94	1.027	1.136	1.237	1.159	1.103	1.065		1.05185	11.4386	

Thu May 18 10:46:55 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051389 Run Date: 05/16/2017 Sample ID: WG614378-12
Instrument ID: HPMS11 Run Time: 18:14 Method: 8260B
File ID: 11M18442 Analyst: ADC QC Key: DOD4
ICal Workgroup: WG614378 Cal ID: HPMS11 - 16-MAY-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	18.4	ug/L	0.455	8.00	20	
Chloroform	CCC	20.0	18.3	ug/L	0.508	8.60	20	
Ethylbenzene	CCC	20.0	20.8	ug/L	0.599	4.10	20	
Toluene	CCC	20.0	21.7	ug/L	1.68	8.60	20	
Vinyl Chloride	CCC	20.0	21.6	ug/L	0.467	8.20	20	
1,1,2,2-Tetrachloroethane	SPCC	20.0	19.6	ug/L	0.704	2.10	20	
Chloromethane	SPCC	20.0	22.3	ug/L	0.617	11.5	20	
Bromoform	SPCC	20.0	16.5	ug/L	0.246	17.6	20	
Chlorobenzene	SPCC	20.0	20.9	ug/L	1.09	4.40	20	
1,1-Dichloroethane	SPCC	20.0	19.1	ug/L	0.586	4.30	20	
1,1,1-Trichloroethane		20.0	20.4	ug/L	0.459	2.10	20	
1,1,2-Trichloroethane		20.0	20.4	ug/L	0.348	2.00	20	
1,2-Dichloroethane		20.0	19.6	ug/L	0.443	1.90	20	
Acetone		20.0	19.5	ug/L	0.0897	2.60	20	
Benzene		20.0	20.5	ug/L	1.13	2.30	20	
Carbon Tetrachloride		20.0	20.2	ug/L	0.392	1.20	20	
Methylene Chloride		20.0	18.3	ug/L	0.286	8.60	20	
m-,p-Xylene		40.0	43.6	ug/L	0.715	9.10	20	
o-Xylene		20.0	22.2	ug/L	0.733	10.8	20	
Styrene		20.0	22.5	ug/L	1.16	12.6	20	
Tetrachloroethene		20.0	21.4	ug/L	0.338	6.90	20	
Trichloroethene		20.0	21.9	ug/L	0.319	9.30	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5313668
Report generated 06/01/2017 15:41

Login Number: L17051389 Run Date: 05/25/2017 Sample ID: WG615569-02
Instrument ID: HPMS11 Run Time: 15:15 Method: 8260B
File ID: 11M18632 Analyst: ADC QC Key: DOD4
Workgroup (AAB#): WG615570 Cal ID: HPMS11 - 16-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	53.1	ug/L	0.360	6.22	20	
1,1-Dichloroethene	CCC	50.0	51.0	ug/L	0.505	1.91	20	
Chloroform	CCC	50.0	45.7	ug/L	0.508	8.59	20	
Ethylbenzene	CCC	50.0	52.8	ug/L	0.608	5.54	20	
Toluene	CCC	50.0	51.3	ug/L	1.57	2.65	20	
Vinyl Chloride	CCC	50.0	52.0	ug/L	0.449	3.92	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	48.6	ug/L	0.699	2.79	20	
Bromoform	SPCC	50.0	44.2	ug/L	0.271	11.5	20	
Chlorobenzene	SPCC	50.0	50.8	ug/L	1.06	1.52	20	
Chloromethane	SPCC	50.0	44.1	ug/L	0.488	11.9	20	
1,1-Dichloroethane	SPCC	50.0	50.8	ug/L	0.622	1.66	20	
Xylenes		150	160	ug/L	0.704	6.83	20	
1,1,1-Trichloroethane		50.0	50.9	ug/L	0.458	1.90	20	
1,1,2-Trichloroethane		50.0	48.5	ug/L	0.331	2.90	20	
1,2-Dichloroethane		50.0	49.5	ug/L	0.447	1.01	20	
Acetone		50.0	45.9	ug/L	0.0846	8.17	20	
Benzene		50.0	49.1	ug/L	1.08	1.86	20	
Carbon Tetrachloride		50.0	54.2	ug/L	0.419	8.31	20	
Methylene Chloride		50.0	45.3	ug/L	0.284	9.47	20	
m-,p-Xylene		100	107	ug/L	0.699	6.62	20	
o-Xylene		50.0	53.6	ug/L	0.710	7.25	20	
Styrene		50.0	56.0	ug/L	1.15	12.1	20	
Tetrachloroethene		50.0	54.9	ug/L	0.347	9.81	20	
Trichloroethene		50.0	51.2	ug/L	0.298	2.39	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5313670
Report generated 06/01/2017 15:41

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615791-02
Instrument ID: HPMS11 Run Time: 15:48 Method: 8260B
File ID: 11M18668 Analyst: JDS QC Key: DOD4
Workgroup (AAB#): WG615792 Cal ID: HPMS11 - 16-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	52.4	ug/L	0.355	4.79	20	
1,1-Dichloroethene	CCC	50.0	49.8	ug/L	0.493	0.492	20	
Chloroform	CCC	50.0	45.1	ug/L	0.501	9.87	20	
Ethylbenzene	CCC	50.0	50.3	ug/L	0.579	0.628	20	
Toluene	CCC	50.0	50.1	ug/L	1.53	0.295	20	
Vinyl Chloride	CCC	50.0	49.3	ug/L	0.426	1.42	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	51.9	ug/L	0.746	3.79	20	
Bromoform	SPCC	50.0	42.5	ug/L	0.260	15.0	20	
Chlorobenzene	SPCC	50.0	49.4	ug/L	1.03	1.17	20	
Chloromethane	SPCC	50.0	41.4	ug/L	0.458	17.2	20	
1,1-Dichloroethane	SPCC	50.0	50.4	ug/L	0.617	0.712	20	
Methylene Chloride		50.0	45.4	ug/L	0.284	9.23	20	
Trichloroethene		50.0	49.0	ug/L	0.286	1.94	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5313670
Report generated 06/01/2017 15:41

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

Login Number: L17051389
Instrument ID: HPMS11
Workgroup (AAB#): WG615570

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	183063	318734	440982
Upper Limit	NA	NA	366126	637468	881964
Lower Limit	NA	NA	91532	159367	220491
L17051389-01	1.00	01	128720	250202	359113
L17051389-02	1.00	01	112728	232045	333586
WG615570-01	1.00	01	121127	247540	369716
WG615570-02	1.00	01	147589	269007	385752
WG615570-03	1.00	01	152720	279011	401718

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: 5313671
Report generated 06/01/2017 15:41

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

Login Number: L17051389
Instrument ID: HPMS11
Workgroup (AAB#): WG615792

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	183063	318734	440982
Upper Limit	NA	NA	366126	637468	881964
Lower Limit	NA	NA	91532	159367	220491
L17051389-01	100	DL01	131540	263470	386259
WG615792-01	1.00	01	122385	249061	360009
WG615792-02	1.00	01	137386	263489	374813
WG615792-03	1.00	01	150364	282491	402247

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: 5313671
Report generated 06/01/2017 15:41

Microbac Laboratories Inc.

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

Login Number: L17051389
Instrument ID: HPMS11
Workgroup (AAB#): WG615570

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	16.96	14.14	10.52
Upper Limit	NA	NA	17.46	14.64	11.02
Lower Limit	NA	NA	16.46	13.64	10.02
L17051389-01	1.00	01	16.94	14.12	10.49
L17051389-02	1.00	01	16.94	14.12	10.49
WG615570-01	1.00	01	16.94	14.12	10.49
WG615570-02	1.00	01	16.94	14.12	10.49
WG615570-03	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: 5313673
Report generated: 06/01/2017 15:41

Microbac Laboratories Inc.

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

Login Number: L17051389
Instrument ID: HPMS11
Workgroup (AAB#): WG615792

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	16.96	14.14	10.52
Upper Limit	NA	NA	17.46	14.64	11.02
Lower Limit	NA	NA	16.46	13.64	10.02
L17051389-01	100	DL01	16.94	14.12	10.49
WG615792-01	1.00	01	16.94	14.12	10.49
WG615792-02	1.00	01	16.94	14.12	10.49
WG615792-03	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: 5313673
Report generated: 06/01/2017 15:41

2.2 General Chromatography Data

2.2.1 LC/MS Data (6850)

2.2.1.1 Summary Data

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	6850	**Prep Date:**	05/26/2017 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG615781	**Analyst:**	JWR	**Run Date:**	05/26/2017 16:48
Collect Date:	05/24/2017 15:00	**Dilution:**	10000	**File ID:**	1LM.LM39706
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	12000		4000	2000	1000

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: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)

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

Comments: ICAL WG611288 : Alternate Source STD80234
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39494	WG611288-01 CCB	1	1		04/24/17 13:27
2	1LM.LM39495	WG611288-02 STD (0.1 ug/L)	1	1	STD80232	04/24/17 13:46
3	1LM.LM39496	WG611288-03 STD (0.2 ug/L)	1	1	STD80232	04/24/17 14:05
4	1LM.LM39497	WG611288-04 STD (0.5 ug/L)	1	1	STD80232	04/24/17 14:24
5	1LM.LM39498	WG611288-05 STD (1.0 ug/L)	1	1	STD80232	04/24/17 14:43
6	1LM.LM39499	WG611288-06 STD (2.0 ug/L)	1	1	STD80232	04/24/17 15:02
7	1LM.LM39500	WG611288-07 STD (5.0 ug/L)	1	1	STD80232	04/24/17 15:21
8	1LM.LM39501	WG611288-08 STD (10 ug/L)	1	1	STD80232	04/24/17 15:40
9	1LM.LM39502	WG611288-09 SSCV (1.0 ug/L)	1	1	STD80234	04/24/17 15:59
10	1LM.LM39503	WG611330-01 CCB	1	1		04/24/17 16:18
11	1LM.LM39504	WG611330-02 CCV (1.0ug/L)	1	1	STD80232	04/24/17 16:37
12	1LM.LM39505	WG611327-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 16:56
13	1LM.LM39506	WG611327-01 MCT (0.2ug/L)	1	1	STD80234	04/24/17 17:14
14	1LM.LM39507	WG611327-02 BLANK	1	1		04/24/17 17:34
15	1LM.LM39508	WG611327-03 LCS (0.2ug/L)	1	1	STD80234	04/24/17 17:52
16	1LM.LM39509	L17040713-06 RS	1	1		04/24/17 18:11
17	1LM.LM39510	L17040713-07 MS	1	1	STD80234	04/24/17 18:30
18	1LM.LM39511	L17040713-08 MSD	1	1	STD80234	04/24/17 18:49
19	1LM.LM39512	L17040713-01	1	1		04/24/17 19:08
20	1LM.LM39513	L17040713-02	1	1		04/24/17 19:27
21	1LM.LM39514	L17040713-03	1	1		04/24/17 19:46
22	1LM.LM39515	L17040713-04	1	1		04/24/17 20:05
23	1LM.LM39516	WG611330-03 CCV (1.0ug/L)	1	1	STD80232	04/24/17 20:24
24	1LM.LM39517	WG611327-08 MRL (0.2ug/L)	1	1	STD80232	04/24/17 20:43
25	1LM.LM39518	WG611330-04 CCB	1	1		04/24/17 21:02
26	1LM.LM39519	L17040713-05	1	1		04/24/17 21:21
27	1LM.LM39520	L17040713-09	1	1		04/24/17 21:40
28	1LM.LM39521	L17040713-10	1	1		04/24/17 21:59
29	1LM.LM39522	L17040713-11	1	1		04/24/17 22:17
30	1LM.LM39523	L17040713-12	1	1		04/24/17 22:36
31	1LM.LM39524	L17040713-13	1	1		04/24/17 22:55
32	1LM.LM39525	WG611330-05 CCV (1.0ug/L)	1	1	STD80232	04/24/17 23:14
33	1LM.LM39526	WG611327-09 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:33

Page: 1 Approved: 25-APR-17

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 042417_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 WG611327 (waters) Analytical WG611328 (waters)
Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 STD80234

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM39527	WG611328-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:52
35	1LM.LM39528	WG611330-06 CCB	1	1		04/25/17 00:11
36	1LM.LM39529	WG611328-01 MCT (0.2ug/L)	1	1	STD80234	04/25/17 00:30
37	1LM.LM39530	WG611328-02 BLANK	1	1		04/25/17 00:49
38	1LM.LM39531	WG611328-03 LCS (0.2ug/L)	1	1	STD80234	04/25/17 01:08
39	1LM.LM39532	L17040841-08 RS	1	1		04/25/17 01:27
40	1LM.LM39533	L17040841-09 MS	1	1	STD80234	04/25/17 01:46
41	1LM.LM39534	L17040841-10 MSD	1	1	STD80234	04/25/17 02:05
42	1LM.LM39535	L17040841-01	1	1		04/25/17 02:23
43	1LM.LM39536	L17040841-02	1	1		04/25/17 02:42
44	1LM.LM39537	L17040841-03	1	1		04/25/17 03:01
45	1LM.LM39538	L17040841-04	1	1		04/25/17 03:20
46	1LM.LM39539	WG611330-07 CCV (1.0ug/L)	1	1	STD80232	04/25/17 03:39
47	1LM.LM39540	WG611328-08 MRL (0.2ug/L)	1	1	STD80232	04/25/17 03:58
48	1LM.LM39541	WG611330-08 CCB	1	1		04/25/17 04:17
49	1LM.LM39542	L17040841-05	1	1		04/25/17 04:36
50	1LM.LM39543	L17040841-06	1	1		04/25/17 04:55
51	1LM.LM39544	L17040841-07	1	1		04/25/17 05:14
52	1LM.LM39545	L17040841-11	1	1		04/25/17 05:33
53	1LM.LM39546	L17040841-12	1	1		04/25/17 05:52
54	1LM.LM39547	L17040841-13	1	1		04/25/17 06:11
55	1LM.LM39548	WG611330-09 CCV (1.0ug/L)	1	1	STD80232	04/25/17 06:30
56	1LM.LM39549	WG611328-09 MRL (0.2ug/L)	1	1	STD80232	04/25/17 06:49
57	1LM.LM39550	WG611330-10 CCB	1	1		04/25/17 07:07

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 25-APR-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 052617_JWR.TXT
Analyst1: JWR Analyst2: WTD
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#:
Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA
Workgroups: WG615781 (WTD DOC's)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2014)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39696	WG615784-01 CCB	1	1		05/26/17 13:38
2	1LM.LM39697	WG615784-02 CCV (1.0ug/L)	1	1	STD80232	05/26/17 13:57
3	1LM.LM39698	WG615781-07 MRL (0.2ug/L)	1	1	STD80232	05/26/17 14:16
4	1LM.LM39699	WG615781-01 MCT (0.2ug/L)	1	1	STD80234	05/26/17 14:35
5	1LM.LM39700	WG615781-02 BLANK	1	1		05/26/17 14:54
6	1LM.LM39701	WG615781-03 LCS (0.2ug/L)	1	1	STD80234	05/26/17 15:13
7	1LM.LM39702	L17051385-01	1	1	STD80234	05/26/17 15:32
8	1LM.LM39703	L17051385-02	1	1	STD80234	05/26/17 15:51
9	1LM.LM39704	L17051385-03	1	1	STD80234	05/26/17 16:10
10	1LM.LM39705	L17051385-04	1	1	STD80234	05/26/17 16:29
11	1LM.LM39706	L17051389-01 (10,000x)	1	10000	STD80234	05/26/17 16:48
12	1LM.LM39707	L17051391-01	1	1	STD80234	05/26/17 17:07
13	1LM.LM39708	L17051393-01	1	1	STD80234	05/26/17 17:26
14	1LM.LM39709	WG615784-03 CCV (1.0ug/L)	1	1	STD80232	05/26/17 17:45
15	1LM.LM39710	WG615781-08 MRL (0.2ug/L)	1	1	STD80232	05/26/17 18:03
16	1LM.LM39711	WG615784-04 CCB	1	1		05/26/17 18:22
17	1LM.LM39712	L17051395-01 DOC WTD	1	1	STD80234	05/26/17 18:41
18	1LM.LM39713	L17051395-02 DOC WTD	1	1	STD80234	05/26/17 19:00
19	1LM.LM39714	L17051395-03 DOC WTD	1	1	STD80234	05/26/17 19:19
20	1LM.LM39715	L17051395-04 DOC WTD	1	1	STD80234	05/26/17 19:38
30	1LM.LM39716	L17051393-02 REF	1	1	STD80234	05/26/17 19:57
22	1LM.LM39717	L17051393-02 MS	1	1	STD80234	05/26/17 20:16
23	1LM.LM39718	L17051393-02 MSD	1	1	STD80234	05/26/17 20:35
24	1LM.LM39719	L17051393-03	1	1	STD80234	05/26/17 20:54
25	1LM.LM39720	L17051393-04	1	1	STD80234	05/26/17 21:13
26	1LM.LM39721	L17051393-05	1	1	STD80234	05/26/17 21:32
27	1LM.LM39722	WG615784-05 CCV (1.0ug/L)	1	1	STD80232	05/26/17 21:51
28	1LM.LM39723	WG615781-09 MRL (0.2ug/L)	1	1	STD80232	05/26/17 22:10
29	1LM.LM39724	WG615784-06 CCB	1	1		05/26/17 22:29

Comments

Seq.	Rerun	Dil.	Reason	Analytes
11				

Page: 1 Approved: 30-MAY-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 052617_JWR.TXT

Analyst1: JWR Analyst2: WTD

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#:

Eluent ID#:

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

WG615781 (WTD DOC's)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2014)

CCV STD: STD80232 LCS STD: STD80234 STD80234

Comments

Seq.	Rerun	Dil.	Reason	Analytes
	L17051389-01 was analyzed at a dilution based on historical data.			
22				
	L17051393-02 MS failed marginally high due to target analyte being present in the parent sample, but below the MDL.			
23				
	L17051393-03 MS failed marginally high due to target analyte being present in the parent sample, but below the MDL.			

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Microbac Laboratories Inc.

Data Checklist

Date: 24-APR-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG611288
Runlog ID: 81726
Analytical Workgroups: L17040713, L17040841

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	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:
25-APR-2017
John Richards

Secondary Reviewer:
25-APR-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: APR-25-2017 14:21:32

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 26-MAY-2017
Analyst: JWR
Analyst: WTD
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 82452
Analytical Workgroups: L17051385, L17051389, L17051391, L17051393, L17051395

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)	X
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	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	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-MAY-2017

Secondary Reviewer:
30-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-31-2017 09:03:40

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 AAB#: WG615781

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/26/2017	1.9	28		05/26/17	.2	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5315226
Report generated 05/31/2017 09:08

METHOD BLANK SUMMARY

Login Number: L17051389
Work Group: WG615781
Blank File ID: 1LM.LM39700
Blank Sample ID: WG615781-02
Prep Date: 05/26/17 12:00
Instrument ID: LCMS1
Analyzed Date: 05/26/17 14:54
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG615781-07	1LM.LM39698	05/26/17 14:16	01
MCT	WG615781-01	1LM.LM39699	05/26/17 14:35	01
LCS	WG615781-03	1LM.LM39701	05/26/17 15:13	01
LH18/24-SP140-7442-GRAB	L17051389-01	1LM.LM39706	05/26/17 16:48	DL01
QCMRL	WG615781-08	1LM.LM39710	05/26/17 18:03	01
QCMRL	WG615781-09	1LM.LM39723	05/26/17 22:10	01

Report Name: BLANK_SUMMARY
PDF File ID: 5315227
Report generated 05/31/2017 09:08

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 05/26/17 12:00 Sample ID: WG615781-02
Instrument ID: LCMS1 Run Date: 05/26/17 14:54 Prep Method: 6850
File ID: 1LM.LM39700 Analyst: JWR Method: 6850
Workgroup (AAB#): WG615781 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-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: 5315228
31-MAY-2017 09:08

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 **Run Date:** 05/26/2017 **Sample ID:** WG615781-03
Instrument ID: LCMS1 **Run Time:** 15:13 **Prep Method:** 6850
File ID: 1LM.LM39701 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG615781 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD80234 **Cal ID:** LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.209	105	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5315229
Report generated: 05/31/2017 09:08

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17051389
Analytical Method: 6850
ICAL Workgroup: WG611288

Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.286	4.98	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: 5315231
Report generated 05/31/2017 09:08

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17051389
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-02			WG611288-03			WG611288-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	21000.0000	1.332	0.200	38200.0000	1.222	0.500	104000.000	1.335

INT_CAL - Modified 03/06/2008
PDF File ID: 5315231
Report generated 05/31/2017 09:08

Login Number: L17051389
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-05			WG611288-06			WG611288-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	206000.000	1.288	2.00	412000.000	1.312	5.00	955000.000	1.270

INT_CAL - Modified 03/06/2008
PDF File ID: 5315231
Report generated 05/31/2017 09:08

Login Number: L17051389
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-08		
	CONC	RESP	RF
Perchlorate	10.0	1860000.00	1.244

INT_CAL - Modified 03/06/2008
PDF File ID: 5315231
Report generated 05/31/2017 09:08

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051389 Run Date: 04/24/2017 Sample ID: WG611288-09
Instrument ID: LCMS1 Run Time: 15:59 Method: 6850
File ID: 1LM.LM39502 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG611288 Cal ID: LCMS1 - 24-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.977	ug/L	1.24	2.30	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5315232
Report generated 05/31/2017 09:08

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 | Run Date: 05/26/2017 | Sample ID: WG615784-01
Instrument ID: LCMS1 | Run Time: 13:38 | Method: 6850
File ID: 1LM.LM39696 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG615781 | Cal ID: LCMS1 - 24-APR-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: 5315235
Report generated 05/31/2017 09:09

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615784-04
Instrument ID: LCMS1 Run Time: 18:22 Method: 6850
File ID: 1LM.LM39711 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-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: 5315235
Report generated 05/31/2017 09:09

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615784-06

Instrument ID: LCMS1 Run Time: 22:29 Method: 6850

File ID: 1LM.LM39724 Analyst: JWR Units: ug/L

Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-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: 5315235

Report generated 05/31/2017 09:09

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615784-02
Instrument ID: LCMS1 Run Time: 13:57 Method: 6850
File ID: 1LM.LM39697 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.09	ug/L	1.39	9.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5315234
Report generated 05/31/2017 09:09

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615784-03
Instrument ID: LCMS1 Run Time: 17:45 Method: 6850
File ID: 1LM.LM39709 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.08	ug/L	1.37	8.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5315234
Report generated 05/31/2017 09:09

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615784-05
Instrument ID: LCMS1 Run Time: 21:51 Method: 6850
File ID: 1LM.LM39722 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.09	ug/L	1.38	9.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5315234
Report generated 05/31/2017 09:09

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615781-07
Instrument ID: LCMS1 Run Time: 14:16 Prep Method: 6850
File ID: 1LM.LM39698 Analyst: JWR Method: 6850
Workgroup (AAB#): WG615781 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.210	105	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5315230
Report generated 05/31/2017 09:08

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615781-08
Instrument ID: LCMS1 Run Time: 18:03 Prep Method: 6850
File ID: 1LM.LM39710 Analyst: JWR Method: 6850
Workgroup (AAB#): WG615781 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.215	108	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5315230
Report generated 05/31/2017 09:08

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615781-09
Instrument ID: LCMS1 Run Time: 22:10 Prep Method: 6850
File ID: 1LM.LM39723 Analyst: JWR Method: 6850
Workgroup (AAB#): WG615781 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.221	111	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5315230
Report generated 05/31/2017 09:08

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

Login Number: L17051389
Instrument ID: LCMS1
Workgroup (AAB#): WG615781

ICAL CCV Number: WG611288-05
CAL ID: LCMS1-24-APR-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG611288	NA	NA	777000
Upper Limit	NA	NA	1165500
Lower Limit	NA	NA	388500
L17051389-01	10000	DL01	728000
WG615781-02	1.00	01	688000
WG615781-03	1.00	01	676000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5315236
Report generated 05/31/2017 09:09

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**	6850	**Samplenum:**	L17051389-01
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39706
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 16:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	221000	66600	3.32	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG611288-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39495
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 13:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21000	6820	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG611288-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39496
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 14:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38200	13500	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG611288-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39497
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 14:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	104000	33400	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG611288-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39498
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 14:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	65300	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG611288-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39499
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 15:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	412000	130000	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG611288-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39500
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 15:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	955000	298000	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG611288-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39501
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 15:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1860000	603000	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG611288-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39502
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 15:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	65000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**	6850	**Samplenum:**	WG615781-01
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39699
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 14:35	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	37000	11500	3.22	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**	6850	**Samplenum:**	WG615781-02
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39700
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 14:54	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	925	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**	6850	**Samplenum:**	WG615781-03
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39701
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 15:13	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36900	11100	3.32	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**	6850	**Samplenum:**	WG615781-07
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39698
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 14:16	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	39400	13000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**	6850	**Samplenum:**	WG615781-08
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39710
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 18:03	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44600	15400	2.90	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**	6850	**Samplenum:**	WG615781-09
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39723
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 22:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	47600	16200	2.94	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG615784-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39696
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 13:38	**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 #:	L17051389	**Prep Method:**		**Samplenum:**	WG615784-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39697
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 13:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	198000	61400	3.22	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG615784-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39709
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 17:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	216000	68200	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG615784-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39711
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 18:22	**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 #:	L17051389	**Prep Method:**		**Samplenum:**	WG615784-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39722
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 21:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	226000	72200	3.13	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051389	**Prep Method:**		**Samplenum:**	WG615784-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39724
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 22:29	**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 Semivolatiles Data

2.2.2 GC/MS Semivolatiles Data (827 Dioxane)

2.2.2.1 Summary Data

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3520C	**Prep Date:**	06/05/2017 15:06
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG616972	**Analyst:**	LJH	**Run Date:**	06/07/2017 18:55
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	15M21296
Sample Tag:	REDL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	21.6	J,H1	10.0	5.00	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	1970	20	129	*

J,H1	The reported result is an estimated value. Sample was analyzed past holding time.

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3520C	**Prep Date:**	05/30/2017 16:02
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG616244	**Analyst:**	LJH	**Run Date:**	06/02/2017 14:45
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	15M21271
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	17.7	J	10.0	5.00	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	1810	20	129	*

J	The reported result is an estimated value.

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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: WG615718
Analyst: CPD
Spike Analyst: CPD
Method: 3520C
Run Date: 05/30/2017 16:02
SOP: EXB01 Revison 20
Spike Witness: BNB
Surr Solution: STD80323

TIME ON: 16:10 OFF: 10:30 ON: 11:55 OFF: 08:10
Methylene Chloride Lot #: COA19736
Na2SO4, Anhydrous, Granular Lot #: COA19759
1:1 H2SO4 Lot #: RGT40290
10N NaOH Lot #: RGT40171

	SAMPLE #	Type	Reference	Prod	pH	Init Amnt	Surr Amnt	Spike Amnt	Spike Sol	Final Vol	Color
1	L17051389-01	SAMP		827-DIOXANE	<2>12	1000 mL	.05 mL			1 mL	Colored
2	L17051391-01	SAMP		827-DIOXANE	<2>12	900 mL	.05 mL			1 mL	Colored
3	L17051403-01	SAMP		827-DIOXANE	<2>12	1000 mL	.05 mL			1 mL	Colored
4	L17051403-02	SAMP		827-DIOXANE	<2>12	980 mL	.05 mL			1 mL	Colored
5	L17051403-03	SAMP		827-DIOXANE	<2>12	960 mL	.05 mL			1 mL	Colored
6	L17051403-04	SAMP		827-DIOXANE	<2>12	950 mL	.05 mL			1 mL	Colored
7	L17051403-05	SAMP		827-DIOXANE	<2>12	920 mL	.05 mL			1 mL	Colored
8	L17051403-06	SAMP		827-DIOXANE	<2>12	940 mL	.05 mL			1 mL	Colored
9	L17051479-01	RS01		827-DIOXANE	<2>12	940 mL	.05 mL			1 mL	Colored
10	L17051479-02	MS01	L17051479-01	827-DIOXANE	<2>12	940 mL	.05 mL	.05 mL	STD77209	1 mL	Colored
11	L17051479-03	SD01	L17051479-01	827-DIOXANE	<2>12	940 mL	.05 mL	.05 mL	STD77209	1 mL	Colored
12	WG615718-01	BLANK		827-DIOXANE	<2>12	1000 mL	.05 mL			1 mL	Transparent
13	WG615718-02	LCS		827-DIOXANE	<2>12	1000 mL	.05 mL	.05 mL	STD77209	1 mL	Colored
14	WG615718-03	REF	L17051479-01	827-DIOXANE	<2>12	940 mL	.05 mL			1 mL	Colored
15	WG615718-04	MS	L17051479-01	827-DIOXANE	<2>12	940 mL	.05 mL	.05 mL	STD77209	1 mL	Colored
16	WG615718-05	MSD	L17051479-01	827-DIOXANE	<2>12	940 mL	.05 mL	.05 mL	STD77209	1 mL	Colored

pH 0-3 Lot#230515
pH 10-12 Lot#213515
TV1P5

L17051479-01	LEFT PINK RESIDUE ON ZYMARK
L17051479-02	LEFT PINK RESIDUE ON ZYMARK
L17051479-03	LEFT PINK RESIDUE ON ZYMARK
WG615718-03	LEFT PINK RESIDUE ON ZYMARK
WG615718-04	LEFT PINK RESIDUE ON ZYMARK
WG615718-05	LEFT PINK RESIDUE ON ZYMARK

Analyst: Kendrick Davis

Reviewer: Jessica DeSong

EXTRACT - Modified 01/23/2009
PDF ID: 5318947
Report generated: 06/01/2017 15:13

Microbac Laboratories Inc.
Continuous Sample Extract Log

Workgroup: WG616526
Analyst: CPD
Spike Analyst: CPD
Method: 3520C
Run Date: 06/05/2017 15:06
SOP: EXB01 Revison 20
Spike Witness: JLD
Surr Solution: STD80323

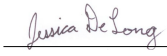
TIME ON: 17:00 OFF: 11:05 ON: 14:25 OFF: 08:50
Methylene Chloride Lot #: COA19736
Sodium Sulfate , Anhydrous , Granul Lot #: COA19381
1:1 H2SO4 Lot #: RGT40290
10N NaOH Lot #: RGT40294

	SAMPLE #	Type	Reference	Prod	pH	Init Amnt	Surr Amnt	Spike Amnt	Spike Sol	Final Vol	Color
1	L17051389-01	SAMP		827-DIOXANE	<2>12	1000 mL	.05 mL			1 mL	Colored
2	L17060076-01	SAMP		827-DIOXANE	<2>12	880 mL	.05 mL			1 mL	Transparent
3	L17060076-02	SAMP		827-DIOXANE	<2>12	980 mL	.05 mL			1 mL	Colored
4	L17060076-03	SAMP		827-DIOXANE	<2>12	920 mL	.05 mL			1 mL	Colored
5	L17060132-01	SAMP		827-DIOXANE	<2>12	1000 mL	.05 mL			1 mL	Colored
6	L17060132-02	SAMP		827-DIOXANE	<2>12	870 mL	.05 mL			1 mL	Colored
7	L17060133-01	SAMP		827-DIOXANE	<2>12	950 mL	.05 mL			1 mL	Colored
8	WG616526-01	BLANK		827-DIOXANE	<2>12	1000 mL	.05 mL			1 mL	Transparent
9	WG616526-02	LCS		827-DIOXANE	<2>12	1000 mL	.05 mL	.05 mL	STD79978	1 mL	Colored
10	WG616526-03	LCS2		827-DIOXANE	<2>12	1000 mL	.05 mL	.05 mL	STD79978	1 mL	Colored

Due to insufficient sample volume, this preparation batch failed to include the method prescribed MS and MSD.
PH LOT#230515 PH LOT#213515 TV1:P5,6

L17051389-01	RE-EXT OUT OF HOLD

Analyst: 

Reviewer: 

EXTRACT - Modified 01/23/2009
PDF ID: 5327362
Report generated: 06/07/2017 14:35

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 050417
Analyst1: SCB 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: WG612906, WG611968

Internal STD: STD81022 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	15M21101	BAKE OUT	1	1		05/04/17 13:29
2	15M21102	WG612906-01 5PPM LL DFTPP	1	1	STD80383	05/04/17 14:00
3	15M21103	WG612906-02 5PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 14:18
4	15M21104	WG612906-03 10PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 14:40
5	15M21105	WG612906-04 7.5PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 15:03
6	15M21106	WG612906-05 2.5PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 15:26
7	15M21107	WG612906-06 1PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 15:48
8	15M21108	WG612906-07 0.4PPM 1,4-DIOX STD	1	1	STD80097	05/04/17 16:11
9	15M21109	WG612906-08 5PPM ALT 1,4-DIOX STD	1	1	STD80098	05/04/17 16:48
10	15M21110	WG611678-01 BLANK 827-DIOXANE	7	1	SOIL	05/04/17 17:11
11	15M21111	L17040008-50 827-DIOXANE	7	1	SOIL	05/04/17 17:34
12	15M21112	L17040008-51 827-DIOXANE	7	1	SOIL	05/04/17 17:56
13	15M21113	L17040008-52 827-DIOXANE	7	1	SOIL	05/04/17 18:19
14	15M21114	L17040008-53 827-DIOXANE	7	1	SOIL	05/04/17 18:43
15	15M21115	BAKE OUT	1	1		05/04/17 19:05
16	15M21116	BAKE OUT	1	1		05/04/17 19:28
17	15M21117	BAKE OUT	1	1		05/04/17 19:51

Comments

Seq.	Rerun	Dil.	Reason	Analytes
12				
	L17040008-51 827-DIOXANE low recovery-remix and reanalyze.			

Page: 1 Approved: 05-MAY-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 060217
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: WG616244
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	15M21257	BAKE OUT	1	1		06/02/17 08:56
2	15M21258	WG616311-01 5PPM LL DFTPP	1	1	STD80383	06/02/17 09:16
3	15M21259	WG616311-01 5PPM LL DFTPP	1	1	STD80383	06/02/17 09:44
4	15M21260	WG616311-01 5PPM LL DFTPP	1	1	STD80383	06/02/17 10:34
5	15M21261	WG616311-02 5PPM 1,4-DIOXANE STD	1	1	STD80097	06/02/17 10:52
6	15M21262	WG615718-01 BLANK 827-DIOXANE	1	1		06/02/17 11:15
7	15M21263	WG615718-02 LCS 827-DIOXANE	1	1		06/02/17 11:37
8	15M21264	WG615718-01 BLANK 827-DIOXANE	1	1		06/02/17 12:06
9	15M21265	L17051403-01 827-DIOXANE	1	1		06/02/17 12:29
10	15M21266	L17051403-02 827-DIOXANE	1	1		06/02/17 12:51
11	15M21267	L17051403-03 827-DIOXANE	1	1		06/02/17 13:14
12	15M21268	L17051403-04 827-DIOXANE	1	1		06/02/17 13:37
13	15M21269	L17051403-05 827-DIOXANE	1	1		06/02/17 14:00
14	15M21270	L17051403-06 827-DIOXANE	1	1		06/02/17 14:23
15	15M21271	L17051389-01 5X 827-DIOXANE	1	5		06/02/17 14:45
16	15M21272	L17051391-01 5X 827-DIOXANE	1	5		06/02/17 15:08
17	15M21273	L17051479-01 REF 10X 827-DIOXANE	1	10		06/02/17 15:31
18	15M21274	L17051479-02 MS 10X 827-DIOXANE	1	10		06/02/17 15:54
19	15M21275	L17051479-03 MSD 10X 827-DIOXANE	1	10		06/02/17 16:17
20	15M21276	L17051403-02 20X 827-DIOXANE	1	20		06/02/17 16:39
21	15M21277	L17051403-03 20X 827-DIOXANE	1	20		06/02/17 17:02
22	15M21278	L17051403-04 20X 827-DIOXANE	1	20		06/02/17 17:25
23	15M21279	L17051403-05 20X 827-DIOXANE	1	20		06/02/17 17:48
24	15M21280	L17051403-06 20X 827-DIOXANE	1	20		06/02/17 18:10
25	15M21281	L17051479-01 REF 20X 827-DIOXANE	1	20		06/02/17 18:33
26	15M21282	BAKE OUT	1	1		06/02/17 18:56
27	15M21283	BAKE OUT	1	1		06/02/17 19:18
28	15M21284	BAKE OUT	1	1		06/02/17 19:41

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
	WG616311-01 5PPM LL DFTPP had an ion failure, RR, NR.			

Page: 1 Approved: 05-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 060217
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: WG616244
Internal STD: STD81998 Surrogate STD: NA
CCV STD: STD80097 LCS STD:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
3				
	WG616311-01 5PPM LL DFTPP Pentachlorophenol was high. Maintenance was performed by cutting the column ~10 cm. RR, NR.			
8				
	WG615718-01 BLANK 827-DIOXANE unecessary RR, NR.			
10	X	20	Over Calibration Range	1,4 Dioxane
	L17051403-02 827-DIOXANE			
11	X	20	Over Calibration Range	1,4 Dioxane
	L17051403-03 827-DIOXANE			
12	X	20	Over Calibration Range	1,4 Dioxane
	L17051403-04 827-DIOXANE			
13	X	20	Over Calibration Range	1,4 Dioxane
	L17051403-05 827-DIOXANE			
14	X	20	Over Calibration Range	1,4 Dioxane
	L17051403-06 827-DIOXANE			
15			Surrogate standard failure	1,4-Dioxane-d8
	L17051389-01 5X 827-DIOXANE was ran at an initial dilution based on sample history. Surrogate failed high and sample had a hit. Re-extraction is necessary.			
16				
	L17051391-01 5X 827-DIOXANE was an at an initial dilution based on sample history.			
17	X	20	Over Calibration Range	1,4 Dioxane
	L17051479-01 REF 10X 827-DIOXANE was ran at an initial dilution due to the sample matrix being pink.			
18				
	L17051479-02 MS 10X 827-DIOXANE was ran at an initial dilution due to the sample matrix being pink. 1,4-dioxane failed low due to the presence of this analyte in the reference sample.			
19				
	L17051479-03 MSD 10X 827-DIOXANE was ran at an initial dilution due to the sample matrix being pink. 1,4-dioxane failed low due to the presence of this analyte in the reference sample.			

Page: 2 Approved: 05-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 060717
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: WG616972

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	15M21285	BAKE OUT	1	1		06/07/17 14:57
2	15M21286	WG616974-01 5PPM LL DFTPP	1	1	STD80383	06/07/17 15:17
3	15M21287	WG616974-01 5PPM LL DFTPP	1	1	STD80383	06/07/17 15:35
4	15M21288	WG616974-02 5PPM 1,4-DIOXANE STD	1	1	STD80097	06/07/17 15:53
20	15M21289	WG616526-01 BLANK 827-DIOXANE	1	1		06/07/17 16:15
21	15M21290	WG616526-02 LCS 827-DIOXANE	1	1		06/07/17 16:38
22	15M21291	WG616526-03 LCS2 827-DIOXANE	1	1		06/07/17 17:01
8	15M21292	L17060076-01 827-DIOXANE	1	1		06/07/17 17:24
9	15M21293	L17060076-03 827-DIOXANE	1	1		06/07/17 17:47
10	15M21294	L17060133-01 827-DIOXANE	1	1		06/07/17 18:10
11	15M21295	L17060076-02 2X 827-DIOXANE	1	2		06/07/17 18:33
12	15M21296	L17051389-01 RE 5X 827-DIOXANE	1	5		06/07/17 18:55
13	15M21297	L17060132-01 827-DIOXANE	1	1		06/07/17 19:18
14	15M21298	L17060132-02 827-DIOXANE	1	1		06/07/17 19:41
15	15M21299	L17060132-01 20X 827-DIOXANE	1	20		06/07/17 20:04
16	15M21300	L17060132-02 20X 827-DIOXANE	1	20		06/07/17 20:27
17	15M21301	BAKE OUT	1	1		06/07/17 20:49
18	15M21302	BAKE OUT	1	1		06/07/17 21:12
19	15M21303	BAKE OUT	1	1		06/07/17 21:35

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
	WG616974-01 5PPM LL DFTPP had an ion failure, RR, NR.			
10	X	10	Over Calibration Range	1,4-Dioxane
	L17060133-01 827-DIOXANE			
11				
	L17060076-02 2X 827-DIOXANE was ran at an initial dilution based on it's history.			
12				1,4-Dioxane-d8
	L17051389-01 RE 5X 827-DIOXANE: 1,4-Dioxane-d8 surrogate failed high. This confirms the high recovery in the original extraction and suggests sample matrix interference.			
13	X	20	Over Calibration Range	1,4-Dioxane
	L17060132-01 827-DIOXANE			

Page: 1 Approved: 08-JUN-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS15 Dataset: 060717
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: WG616972
Internal STD: STD81998 Surrogate STD: NA
CCV STD: STD80097 LCS STD:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
14	X	20	Over Calibration Range	1,4-Dioxane
	L17060132-02 827-DIOXANE			

Approved: 08-JUN-17

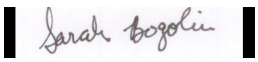
Microbac Laboratories Inc.

Data Checklist

Date: 04-MAY-2017
Analyst: SCB
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: NA
Runlog ID: 81976
Analytical Workgroups: WG612906, L17040008

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	X
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)	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	NA
Check for completeness	X
Primary Reviewer	SCB
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:
05-MAY-2017



Secondary Reviewer:
05-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-05-2017 17:10:06

Microbac Laboratories Inc.

Data Checklist

Date: 02-JUN-2017
Analyst: LJH
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: NA
Runlog ID: 82551
Analytical Workgroups: L17051389, L17051391, L17051403, L17051479

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	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	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: 05-JUN-2017
Secondary Reviewer: 05-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-05-2017 11:00:29

Microbac Laboratories Inc.

Data Checklist

Date: 07-JUN-2017
Analyst: LJH
Analyst: NA
Method: 827-DIOX
Instrument: HPMS15
Curve Workgroup: NA
Runlog ID: 82643
Analytical Workgroups: L17051389, L17060076, L17060132, L17060133

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	X
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-JUN-2017 Lacey J. Henderschot

Secondary Reviewer: 08-JUN-2017 Eric C. Zumwalt

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-08-2017 14:34:29

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8270D AAB#: WG616244

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/30/2017	6	7		06/02/17	2.9	40	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5321168
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8270D AAB#: WG616972

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					06/05/2017	12	7	*	06/07/17	2.2	40	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5321168
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17051389
Instrument Id: HPMS15
Workgroup (AAB#): WG616244

Method: 827-DIOXANE
CAL ID: HPMS15-04-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1
L17051389-01	5.00	DL01	1810
WG615718-01	1.00	01	51.6
WG615718-02	1.00	01	48.6

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: 5321177
Report generated: 06/08/2017 14:29

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17051389
Instrument Id: HPMS15
Workgroup (AAB#): WG616972

Method: 827-DIOXANE
CAL ID: HPMS15-04-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1
L17051389-01	5.00	REDL01	1970
WG616526-01	1.00	01	52.6
WG616526-02	1.00	01	42.5
WG616526-03	1.00	01	44.7

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: 5321177
Report generated: 06/08/2017 14:29

METHOD BLANK SUMMARY

Login Number:	L17051389	**Work Group:**	WG616244
Blank File ID:	15M21262	**Blank Sample ID:**	WG615718-01
Prep Date:	05/30/17 16:02	**Instrument ID:**	HPMS15
Analyzed Date:	06/02/17 11:15	**Method:**	8270D
Analyst:	LJH		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615718-02	15M21263	06/02/17 11:37	01
LH18/24-SP140-7442-GRAB	L17051389-01	15M21271	06/02/17 14:45	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5321169
Report generated 06/08/2017 14:29

METHOD BLANK SUMMARY

Login Number: L17051389
Work Group: WG616972
Blank File ID: 15M21289
Blank Sample ID: WG616526-01
Prep Date: 06/05/17 15:06
Instrument ID: HPMS15
Analyzed Date: 06/07/17 16:15
Method: 8270D
Analyst: LJH

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG616526-02	15M21290	06/07/17 16:38	01
LCS2	WG616526-03	15M21291	06/07/17 17:01	01
LH18/24-SP140-7442-GRAB	L17051389-01	15M21296	06/07/17 18:55	REDL01

Report Name: BLANK_SUMMARY
PDF File ID: 5321169
Report generated 06/08/2017 14:29

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 05/30/17 16:02 Sample ID: WG615718-01
Instrument ID: HPMS15 Run Date: 06/02/17 11:15 Prep Method: 3520C
File ID: 15M21262 Analyst: LJH Method: 8270D
Workgroup (AAB#): WG616244 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS15-04-MAY-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	51.6	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: 5321170
08-JUN-2017 14:16

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 06/05/17 15:06 Sample ID: WG616526-01
Instrument ID: HPMS15 Run Date: 06/07/17 16:15 Prep Method: 3520C
File ID: 15M21289 Analyst: LJH Method: 8270D
Workgroup (AAB#): WG616972 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS15-04-MAY-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	52.6	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: 5321170
08-JUN-2017 14:16

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 Run Date: 06/02/2017 Sample ID: WG615718-02
Instrument ID: HPMS15 Run Time: 11:37 Prep Method: 3520C
File ID: 15M21263 Analyst: LJH Method: 8270D
Workgroup (AAB#): WG616244 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD77209 Cal ID: HPMS15-04-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
1,4-Dioxane	5.00	2.73	54.7	30 - 104	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,4-Dioxane-d8	48.6	20 - 129	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 5321171
Report generated: 06/08/2017 14:16

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 Run Date: 06/07/2017 Sample ID: WG616526-02
Instrument ID: HPMS15 Run Time: 16:38 Prep Method: 3520C
File ID: 15M21290 Analyst: LJH Method: 8270D
Workgroup (AAB#): WG616972 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD79978 Cal ID: HPMS15-04-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
1,4-Dioxane	5.00	2.75	55.0	30 - 104	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,4-Dioxane-d8	42.5	20 - 129	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 5321171
Report generated: 06/08/2017 14:16

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 Analyst: LJH Prep Method: 3520C
Instrument ID: HPMS15 Matrix: Water Method: 8270D
Workgroup (AAB#): WG616972 Units: ug/L
QC Key: DOD4 Lot #: STD79978

Sample ID: WG616526-02 LCS File ID: 15M21290 Run Date: 06/07/2017 16:38
Sample ID: WG616526-03 LCS2 File ID: 15M21291 Run Date: 06/07/2017 17:01

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,4-Dioxane	5.00	2.75	55.0	5.00	2.83	56.6	2.95	30 - 104	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,4-Dioxane-d8	42.5	44.7	20 - 129	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5328776
Report generated: 06/08/2017 14:16

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17051389
Instrument: HPMS15
Analyst: SCB
Workgroup: WG612906

Tune ID: WG612906-01
Run Date: 05/04/2017
Run Time: 14:00
File ID: 15M21102
Cal ID: HPMS15-04-MAY-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	39.8	100763	PASS
68.0	69.0	0	2.00	1.94	2347	PASS
69.0	198	0	100	47.6	120729	PASS
70.0	69.0	0	2.00	0.764	922	PASS
127	198	40.0	60.0	52.2	132295	PASS
197	198	0	1.00	0.399	1011	PASS
198	198	100	100	100	253422	PASS
199	198	5.00	9.00	6.86	17396	PASS
275	198	10.0	30.0	24.4	61731	PASS
365	198	1.00	100	2.74	6948	PASS
441	443	0.0100	100	72.9	21184	PASS
442	198	40.0	100	55.7	141072	PASS
443	442	17.0	23.0	20.6	29074	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG612906-02	STD-CCV	01	05/04/2017 14:18	
WG612906-03	STD	01	05/04/2017 14:40	
WG612906-04	STD	01	05/04/2017 15:03	
WG612906-05	STD	01	05/04/2017 15:26	
WG612906-06	STD	01	05/04/2017 15:48	
WG612906-07	STD	01	05/04/2017 16:11	
WG612906-08	SSCV	01	05/04/2017 16:48	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5321174
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17051389
Instrument: HPMS15
Analyst: LJH
Workgroup: WG616311

Tune ID: WG616311-01
Run Date: 06/02/2017
Run Time: 10:34
File ID: 15M21260
Cal ID: HPMS15-04-MAY-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	39.4	74447	PASS
68.0	69.0	0	2.00	1.90	1638	PASS
69.0	198	0	100	45.7	86307	PASS
70.0	69.0	0	2.00	0.651	562	PASS
127	198	40.0	60.0	51.2	96616	PASS
197	198	0	1.00	0.755	1426	PASS
198	198	100	100	100	188815	PASS
199	198	5.00	9.00	7.30	13778	PASS
275	198	10.0	30.0	24.8	46787	PASS
365	198	1.00	100	3.59	6771	PASS
441	443	0.0100	100	78.3	16773	PASS
442	198	40.0	100	58.3	110131	PASS
443	442	17.0	23.0	19.4	21408	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG616311-02	CCV	01	06/02/2017 10:52	
WG615718-01	BLANK	01	06/02/2017 11:15	
WG615718-02	LCS	01	06/02/2017 11:37	
L17051389-01	LH18/24-SP140-7442-GRAB	DL01	06/02/2017 14:45	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5321174
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L17051389
Instrument: HPMS15
Analyst: LJH
Workgroup: WG616974

Tune ID: WG616974-01
Run Date: 06/07/2017
Run Time: 15:35
File ID: 15M21287
Cal ID: HPMS15-04-MAY-17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	42.4	91998	PASS
68.0	69.0	0	2.00	1.43	1510	PASS
69.0	198	0	100	48.8	105911	PASS
70.0	69.0	0	2.00	1.06	1127	PASS
127	198	40.0	60.0	51.8	112557	PASS
197	198	0	1.00	0	0	PASS
198	198	100	100	100	217098	PASS
199	198	5.00	9.00	6.67	14490	PASS
275	198	10.0	30.0	25.3	54824	PASS
365	198	1.00	100	3.33	7228	PASS
441	443	0.0100	100	71.2	17301	PASS
442	198	40.0	100	55.3	119963	PASS
443	442	17.0	23.0	20.3	24313	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG616974-02	CCV	01	06/07/2017 15:53	
WG616526-01	BLANK	01	06/07/2017 16:15	
WG616526-02	LCS	01	06/07/2017 16:38	
WG616526-03	LCS2	01	06/07/2017 17:01	
L17051389-01	LH18/24-SP140-7442-GRAB	RE	06/07/2017 18:55	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5321174
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17051389
Analytical Method: 8270D
ICAL Workgroup: WG612906

Instrument ID: HPMS15
Initial Calibration Date: 04-MAY-17 16:11
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
1,4-Dioxane		0.3110	1.82		

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

INT_CAL - Modified 03/06/2008
PDF File ID: 5321172
Report generated 06/08/2017 14:16

Login Number: L17051389
Analytical Method: 8270D
Instrument ID: HPMS15
Initial Calibration Date: 04-MAY-17 16:11
Column ID: F

Analyte	WG612906-02			WG612906-03			WG612906-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,4-Dioxane	5.00	126741.000	0.3085	10.0	226922.000	0.3188	7.50	171013.000	0.3132

INT_CAL - Modified 03/06/2008
PDF File ID: 5321172
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17051389
Analytical Method: 8270D
Instrument ID: HPMS15
Initial Calibration Date: 04-MAY-17 16:11
Column ID: F

Analyte	WG612906-05			WG612906-06			WG612906-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,4-Dioxane	2.50	53891.0000	0.3099	1.00	21636.0000	0.3135	0.400	8746.00000	0.3020

INT_CAL - Modified 03/06/2008
PDF File ID: 5321172
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051389 Run Date: 05/04/2017 Sample ID: WG612906-08
Instrument ID: HPMS15 Run Time: 16:48 Method: 8270D
File ID: 15M21109 Analyst: SCB/LJH QC Key: DOD4
ICal Workgroup: WG612906 Cal ID: HPMS15 - 04-MAY-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,4-Dioxane		5000	4430	ug/L	0.274	11.4	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5321173
Report generated 06/08/2017 14:16

Login Number: L17051389 Run Date: 06/02/2017 Sample ID: WG616311-02
Instrument ID: HPMS15 Run Time: 10:52 Method: 8270D
File ID: 15M21261 Analyst: LJH QC Key: DOD4
Workgroup (AAB#): WG616244 Cal ID: HPMS15 - 04-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,4-Dioxane		5000	4850	ug/L	0.302	2.91	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5321175
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/07/2017 Sample ID: WG616974-02
Instrument ID: HPMS15 Run Time: 15:53 Method: 8270D
File ID: 15M21288 Analyst: LJH QC Key: DOD4
Workgroup (AAB#): WG616972 Cal ID: HPMS15 - 04-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,4-Dioxane		5000	4830	ug/L	0.301	3.37	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5321175
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17051389
Instrument ID: HPMS15
Workgroup (AAB#): WG616244

ICAL CCV Number: WG612906-02
CAL ID: HPMS15-04-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG612906-02	NA	NA	82158
Upper Limit	NA	NA	164316
Lower Limit	NA	NA	41079
L17051389-01	5.00	DL01	86906
WG615718-01	1.00	01	81982
WG615718-02	1.00	01	71184

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5321176
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L17051389
Instrument ID: HPMS15
Workgroup (AAB#): WG616972

ICAL CCV Number: WG612906-02
CAL ID: HPMS15-04-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG612906-02	NA	NA	82158
Upper Limit	NA	NA	164316
Lower Limit	NA	NA	41079
L17051389-01	5.00	RE	100139
WG616526-01	1.00	01	72862
WG616526-02	1.00	01	87198
WG616526-03	1.00	01	92764

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 5321176
Report generated 06/08/2017 14:16

Microbac Laboratories Inc.

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

Login Number: L17051389
Instrument ID: HPMS15
Workgroup (AAB#): WG616244

ICAL CCV Number: WG612906-02
CAL ID: HPMS15-04-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG612906-02	NA	NA	7.2
Upper Limit	NA	NA	7.7
Lower Limit	NA	NA	6.7
L17051389-01	5.00	DL01	7.176
WG615718-01	1.00	01	7.176
WG615718-02	1.00	01	7.176

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5321178
Report generated: 06/08/2017 14:16

Microbac Laboratories Inc.

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

Login Number: L17051389
Instrument ID: HPMS15
Workgroup (AAB#): WG616972

ICAL CCV Number: WG612906-02
CAL ID: HPMS15-04-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG612906-02	NA	NA	7.2
Upper Limit	NA	NA	7.7
Lower Limit	NA	NA	6.7
L17051389-01	5.00	RE	7.179
WG616526-01	1.00	01	7.18
WG616526-02	1.00	01	7.18
WG616526-03	1.00	01	7.179

IS-1 - 1,4-Dichlorobenzene-d4

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 5321178
Report generated: 06/08/2017 14:16

2.3 Metals Data

2.3.1 Metals I C P Data

2.3.1.1 Summary Data

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 09:42
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	06/01/2017 11:29
Workgroup #:	WG616048	**Analyst:**	KKB	**Run Date:**	06/01/2017 16:52
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	T4.060117.165241
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Aluminum, Total	7429-90-5	0.200	U	0.200	0.200	0.100
Iron, Total	7439-89-6	0.0570	J	0.100	0.100	0.0500
Selenium, Total	7782-49-2	0.0200	U	0.0200	0.0200	0.0100

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 #: L17051389
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: WG615868
Analyst: ERP
Spike Analyst: ERP
Run Date: 05/30/2017 09:42
Method: 3015A
Balance: BAL019
Instrument: MW-1
Instrument Start: 05/30/2017 09:58

SOP: ME407 Revison 19
Spike Solution: STD81778
Spike Witness: VC
HNO3 Lot #: COA19718
HCL Lot #: COA19685
40 & 50 ML. DIGESTION TU COA19487
ICP FILTERS LOT#R6sa4256 RGT40011

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG615868-02	BLANK	1	40 mL	50 mL	206.735 g	206.717 g		
2	WG615868-03	LCS	1	40 mL	50 mL	212.379 g	212.351 g	5 mL	
3	L17051380-26	SAMP	1	40 mL	50 mL	205.622 g	205.596 g		06/05/17
4	L17051380-27	SAMP	1	40 mL	50 mL	206.151 g	206.126 g		06/05/17
5	L17051380-28	SAMP	1	40 mL	50 mL	204.84 g	204.816 g		06/05/17
6	L17051389-01	SAMP	1	40 mL	50 mL	203.928 g	203.907 g		06/05/17
7	L17051391-01	SAMP	1	40 mL	50 mL	206.157 g	206.139 g		06/05/17
8	WG615868-01	REF	1	40 mL	50 mL	206.164 g	206.14 g		
9	L17051398-04	RS02	1	40 mL	50 mL	206.164 g	206.14 g		06/08/17
10	WG615868-04	MS	1	40 mL	50 mL	209.461 g	209.431 g	5 mL	
11	L17051398-05	MS02	1	40 mL	50 mL	209.461 g	209.431 g	5 mL	06/08/17
12	WG615868-05	MSD	1	40 mL	50 mL	211.213 g	211.185 g	5 mL	
13	L17051398-06	SD02	1	40 mL	50 mL	211.213 g	211.185 g	5 mL	06/08/17
14	L17051398-11	SAMP	1	40 mL	50 mL	205.551 g	205.531 g		06/08/17
15	L17051398-14	SAMP	1	40 mL	50 mL	207.409 g	207.38 g		06/08/17
16	L17051398-17	SAMP	1	40 mL	50 mL	206.961 g	206.943 g		06/08/17
17	L17051398-20	SAMP	1	40 mL	50 mL	203.605 g	203.573 g		06/08/17
18	L17051398-23	SAMP	1	40 mL	50 mL	208.305 g	208.283 g		06/08/17
19	L17051398-26	SAMP	1	40 mL	50 mL	207.554 g	207.534 g		06/08/17
20	L17051398-29	SAMP	1	40 mL	50 mL	206.132 g	206.09 g		06/08/17
21	L17051403-01	SAMP	1	40 mL	50 mL	204.995 g	204.961 g		06/05/17
22	L17051403-02	SAMP	1	40 mL	50 mL	208.594 g	208.567 g		06/05/17
23	L17051403-03	SAMP	1	40 mL	50 mL	205.211 g	205.191 g		06/05/17
24	L17051403-04	SAMP	1	40 mL	50 mL	205.057 g	205.023 g		06/05/17
25	L17051403-05	SAMP	1	40 mL	50 mL	207.806 g	207.768 g		06/05/17
26	L17051403-06	SAMP	1	40 mL	50 mL	206.509 g	206.49 g		06/05/17
27	L17051497-01	SAMP	1	40 mL	50 mL	205.001 g	204.967 g		06/09/17

L17051398-17	filtered digestate

Analyst: Erin Potter

Reviewer: Vicki Collins

MW_DIG - Modified 09/30/2009
PDF ID: 5314510
Report generated: 05/30/2017 10:39

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 060117T4.1
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81957 ICV Std: STD81979 Post Spike: STD80131
ICSA: STD82116 ICSAB: STD81939 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 615862,616020,616025,616048,616173

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	T4.060117.111435	WG616329-01	Calibration Point		1		06/01/17 11:14
2	T4.060117.111818	WG616329-02	Calibration Point		1		06/01/17 11:18
3	T4.060117.112201	WG616329-03	Calibration Point		1		06/01/17 11:22
4	T4.060117.112544	WG616329-04	Calibration Point		1		06/01/17 11:25
5	T4.060117.112912	WG616329-05	Calibration Point		1		06/01/17 11:29
6	T4.060117.113238	WG616329-06	Initial Calibration Verification		1		06/01/17 11:32
7	T4.060117.114028	WG616329-07	Initial Calib Blank		1		06/01/17 11:40
8	T4.060117.114412	WG616329-08	Low Level Initial Calibration V		1		06/01/17 11:44
9	T4.060117.115008	WG616329-09	LLICV		1		06/01/17 11:50
10	T4.060117.115346	WG616329-10	LLICV		1		06/01/17 11:53
11	T4.060117.115726	WG616329-11	Interference Check		1		06/01/17 11:57
12	T4.060117.120111	WG616329-12	Interference Check		1		06/01/17 12:01
13	T4.060117.122813	WG616329-13	CCV		1		06/01/17 12:28
14	T4.060117.123142	WG616329-14	CCB		1		06/01/17 12:31
15	T4.060117.123527	WG615670-02	Method/Prep Blank	40/50	1		06/01/17 12:35
16	T4.060117.123911	WG615670-03	Laboratory Control S	40/50	1		06/01/17 12:39
17	T4.060117.124239	L17051380-01	AAA3178	40/50	1		06/01/17 12:42
18	T4.060117.124618	L17051380-02	AAA3178	40/50	1		06/01/17 12:46
19	T4.060117.124958	L17051380-03	AAA3179	40/50	1		06/01/17 12:49
20	T4.060117.125338	L17051380-04	AAA3179	40/50	1		06/01/17 12:53
21	T4.060117.125716	L17051380-05	AAA3180	40/50	1		06/01/17 12:57
22	T4.060117.130053	L17051380-06	AAA3180	40/50	1		06/01/17 13:00
23	T4.060117.130430	WG615862-03	Post Digestion Spike		1	L17051380-06	06/01/17 13:04
24	T4.060117.130757	WG615862-04	Serial Dilution		5	L17051380-06	06/01/17 13:07
25	T4.060117.131137	WG616329-15	CCV		1		06/01/17 13:11
26	T4.060117.131504	WG616329-16	CCB		1		06/01/17 13:15
27	T4.060117.131851	L17051380-07	AAA3181	40/50	1		06/01/17 13:18
28	T4.060117.132227	L17051380-08	AAA3181	40/50	1		06/01/17 13:22
29	T4.060117.132605	L17051380-09	AAA3182	40/50	1		06/01/17 13:26
30	T4.060117.132944	L17051380-10	AAA3182	40/50	1		06/01/17 13:29
31	T4.060117.133323	WG615670-01	Reference Sample		1	L17051380-17	06/01/17 13:33
32	T4.060117.133701	WG615670-04	Matrix Spike	40/50	1	L17051380-17	06/01/17 13:37
33	T4.060117.134029	WG615670-05	Matrix Spike Duplica	40/50	1	L17051380-17	06/01/17 13:40
34	T4.060117.134357	WG616329-17	CCV		1		06/01/17 13:43

Page: 1 Approved: June 02, 2017

Kym H. Rhoden

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 060117T4.1
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81957 ICV Std: STD81979 Post Spike: STD80131
ICSA: STD82116 ICSAB: STD81939 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 615862,616020,616025,616048,616173

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	T4.060117.134725	WG616329-18	CCB		1		06/01/17 13:47
36	T4.060117.135111	WG615827-02	Method/Prep Blank	40/50	1		06/01/17 13:51
37	T4.060117.135455	WG615827-03	Laboratory Control S	40/50	1		06/01/17 13:54
38	T4.060117.135822	L17051380-11	AAA3183	40/50	1		06/01/17 13:58
39	T4.060117.140200	L17051380-12	AAA3183	40/50	1		06/01/17 14:02
40	T4.060117.140539	L17051380-13	EB0300	40/50	1		06/01/17 14:05
41	T4.060117.140923	L17051380-14	EB0300	40/50	1		06/01/17 14:09
42	T4.060117.141305	L17051380-15	AAB3209	40/50	1		06/01/17 14:13
43	T4.060117.141644	L17051380-16	AAB3209	40/50	1		06/01/17 14:16
44	T4.060117.142024	WG616020-03	Post Digestion Spike		1	L17051380-16	06/01/17 14:20
45	T4.060117.142352	WG616020-04	Serial Dilution		5	L17051380-16	06/01/17 14:23
46	T4.060117.142735	WG616329-19	CCV		1		06/01/17 14:27
47	T4.060117.143103	WG616329-20	CCB		1		06/01/17 14:31
48	T4.060117.143447	WG615827-01	Reference Sample		1	L17051380-18	06/01/17 14:34
49	T4.060117.143825	WG615827-04	Matrix Spike	40/50	1	L17051380-18	06/01/17 14:38
50	T4.060117.144153	WG615827-05	Matrix Spike Duplica	40/50	1	L17051380-18	06/01/17 14:41
51	T4.060117.144521	L17051380-23	AAB3211	40/50	1		06/01/17 14:45
52	T4.060117.144900	L17051380-24	AAB3211	40/50	1		06/01/17 14:49
53	T4.060117.145237	L17051380-25	AAB3212	40/50	1		06/01/17 14:52
54	T4.060117.145617	WG616329-21	CCV		1		06/01/17 14:56
55	T4.060117.145946	WG616329-22	CCB		1		06/01/17 14:59
56	T4.060117.150330	WG615901-03	Method/Prep Blank	40/50	1		06/01/17 15:03
57	T4.060117.150713	WG615901-04	Laboratory Control S	40/50	1		06/01/17 15:07
58	T4.060117.151042	WG615901-01	Reference Sample		100	L17051479-01	06/01/17 15:10
59	T4.060117.151423	WG615901-05	Matrix Spike	40/50	100	L17051479-01	06/01/17 15:14
60	T4.060117.151805	WG615901-06	Matrix Spike Duplica	40/50	100	L17051479-01	06/01/17 15:18
61	T4.060117.152147	WG615901-02	Reference Sample		1	L17051497-22	06/01/17 15:21
62	T4.060117.152525	WG615901-07	Matrix Spike	40/50	1	L17051497-22	06/01/17 15:25
63	T4.060117.152853	WG615901-08	Matrix Spike Duplica	40/50	1	L17051497-22	06/01/17 15:28
64	T4.060117.153221	L17051497-27	AAC3262	40/50	1		06/01/17 15:32
65	T4.060117.153600	L17051497-28	AAC3262	40/50	1		06/01/17 15:36
66	T4.060117.153939	WG616329-23	CCV		1		06/01/17 15:39
67	T4.060117.154307	WG616329-24	CCB		1		06/01/17 15:43
68	T4.060117.154650	L17051497-29	EB0303	40/50	1		06/01/17 15:46

Page: 2 Approved: June 02, 2017

Kym H. Rhoden

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 060117T4.1
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81957 ICV Std: STD81979 Post Spike: STD80131
ICSA: STD82116 ICSAB: STD81939 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 615862,616020,616025,616048,616173

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	T4.060117.155034	L17051497-30	EB0303	40/50	1		06/01/17 15:50
70	T4.060117.155418	WG616025-03	Post Digestion Spike		1	L17051497-30	06/01/17 15:54
71	T4.060117.155746	WG616025-04	Serial Dilution		5	L17051497-30	06/01/17 15:57
72	T4.060117.160130	WG616329-25	CCV		1		06/01/17 16:01
73	T4.060117.160459	WG616329-26	CCB		1		06/01/17 16:04
74	T4.060117.160842	WG616329-27	Low Level Continuing Calibra		1		06/01/17 16:08
75	T4.060117.161222	WG616329-28	LLCCV		1		06/01/17 16:12
76	T4.060117.161600	WG616329-29	Low Level Continuing Calibra		1		06/01/17 16:16
77	T4.060117.161938	WG616329-30	Interference Check		1		06/01/17 16:19
78	T4.060117.162324	WG616329-31	Interference Check		1		06/01/17 16:23
79	T4.060117.162706	WG616329-32	CCV		1		06/01/17 16:27
80	T4.060117.163040	WG616329-33	CCB		1		06/01/17 16:30
81	T4.060117.163423	WG615868-02	Method/Prep Blank	40/50	1		06/01/17 16:34
82	T4.060117.163806	WG615868-03	Laboratory Control S	40/50	1		06/01/17 16:38
83	T4.060117.164135	L17051380-26	AAB3212	40/50	1		06/01/17 16:41
84	T4.060117.164514	L17051380-27	EB0301	40/50	1		06/01/17 16:45
85	T4.060117.164859	L17051380-28	EB0301	40/50	1		06/01/17 16:48
86	T4.060117.165241	L17051389-01	LH18/24-SP140-7442-GRAB	40/50	1		06/01/17 16:52
87	T4.060117.165621	L17051391-01	LH18/24-SP650-6442-GRAB	40/50	1		06/01/17 16:56
88	T4.060117.170000	WG615868-01	Reference Sample		1	L17051398-04	06/01/17 17:00
89	T4.060117.170342	WG615868-04	Matrix Spike	40/50	1	L17051398-04	06/01/17 17:03
90	T4.060117.170711	WG615868-05	Matrix Spike Duplica	40/50	1	L17051398-04	06/01/17 17:07
91	T4.060117.171042	WG616329-34	CCV		1		06/01/17 17:10
92	T4.060117.171410	WG616329-35	CCB		1		06/01/17 17:14
93	T4.060117.171754	L17051398-11	MW2E-333-14	40/50	1		06/01/17 17:17
94	T4.060117.172137	L17051398-14	MW4B-333-14	40/50	1		06/01/17 17:21
95	T4.060117.172518	L17051398-17	MW4B2-333-14	40/50	1		06/01/17 17:25
96	T4.060117.172857	L17051398-20	MW5A-333-14	40/50	1		06/01/17 17:28
97	T4.060117.173239	L17051398-23	OW1B-333-14	40/50	1		06/01/17 17:32
98	T4.060117.173620	L17051398-26	OW2A-333-14	40/50	1		06/01/17 17:36
99	T4.060117.174004	L17051398-29	OW3A-333-14	40/50	1		06/01/17 17:40
100	T4.060117.174347	L17051403-01	TCF-EB01-052317	40/50	1		06/01/17 17:43
101	T4.060117.174730	L17051403-02	MW26-GW-052317	40/50	1		06/01/17 17:47
102	T4.060117.175140	L17051403-03	MW23-GW-052417	40/50	1		06/01/17 17:51

Page: 3 Approved: June 02, 2017

Kym H. Rhoden

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 060117T4.1
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81957 ICV Std: STD81979 Post Spike: STD80131
ICSA: STD82116 ICSAB: STD81939 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 615862,616020,616025,616048,616173

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
103	T4.060117.175552	WG616329-36	CCV		1		06/01/17 17:55
104	T4.060117.175920	WG616329-37	CCB		1		06/01/17 17:59
105	T4.060117.180304	L17051403-04	MW21-GW-052417	40/50	1		06/01/17 18:03
106	T4.060117.180714	L17051403-05	MW35-GW-052417	40/50	1		06/01/17 18:07
107	T4.060117.181123	L17051403-06	MW35-GW-052417D	40/50	1		06/01/17 18:11
108	T4.060117.181534	L17051497-01	AAB3213	40/50	1		06/01/17 18:15
109	T4.060117.181912	WG616048-01	Post Digestion Spike		1	L17051497-01	06/01/17 18:19
110	T4.060117.182240	WG616048-02	Serial Dilution		5	L17051497-01	06/01/17 18:22
111	T4.060117.182620	WG616329-38	CCV		1		06/01/17 18:26
112	T4.060117.182947	WG616329-39	CCB		1		06/01/17 18:29
113	T4.060117.183330	WG615875-02	Method/Prep Blank	40/50	1		06/01/17 18:33
114	T4.060117.183712	WG615875-03	Laboratory Control S	40/50	1		06/01/17 18:37
115	T4.060117.184041	L17051497-02	AAB3213	40/50	1		06/01/17 18:40
116	T4.060117.184420	L17051497-03	AAB3214	40/50	1		06/01/17 18:44
117	T4.060117.184759	L17051497-04	AAB3214	40/50	1		06/01/17 18:47
118	T4.060117.185137	L17051497-05	AAB3215	40/50	1		06/01/17 18:51
119	T4.060117.185516	L17051497-06	AAB3215	40/50	1		06/01/17 18:55
120	T4.060117.185854	L17051497-07	AAB3216	40/50	1		06/01/17 18:58
121	T4.060117.190234	WG616173-01	Post Digestion Spike		1	L17051497-07	06/01/17 19:02
122	T4.060117.190602	WG616173-02	Serial Dilution		5	L17051497-07	06/01/17 19:06
123	T4.060117.190944	WG616329-40	CCV		1		06/01/17 19:09
124	T4.060117.191312	WG616329-41	CCB		1		06/01/17 19:13
125	T4.060117.191657	L17051497-08	AAB3216	40/50	1		06/01/17 19:16
126	T4.060117.192037	L17051497-09	AAC3256	40/50	1		06/01/17 19:20
127	T4.060117.192417	L17051497-10	AAC3256	40/50	1		06/01/17 19:24
128	T4.060117.192756	L17051497-11	AAC3257	40/50	1		06/01/17 19:27
129	T4.060117.193136	L17051497-12	AAC3257	40/50	1		06/01/17 19:31
130	T4.060117.193515	L17051497-13	AAC3258	40/50	1		06/01/17 19:35
131	T4.060117.193854	L17051497-14	AAC3258	40/50	1		06/01/17 19:38
132	T4.060117.194234	L17051497-15	AAC3259	40/50	1		06/01/17 19:42
133	T4.060117.194612	L17051497-16	AAC3259	40/50	1		06/01/17 19:46
134	T4.060117.194952	L17051497-17	AAC3260	40/50	1		06/01/17 19:49
135	T4.060117.195332	WG616329-42	CCV		1		06/01/17 19:53
136	T4.060117.195659	WG616329-43	CCB		1		06/01/17 19:56

Page: 4 Approved: June 02, 2017

Kym H. Rhoden

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-THERMO4 Dataset: 060117T4.1
Analyst1: KKB Analyst2: N/A
Method: 200.7/6010B/6010C SOP: ME600G Rev: 8
Maintenance Log ID:

Calibration Std: STD81957 ICV Std: STD81979 Post Spike: STD80131
ICSA: STD82116 ICSAB: STD81939 Int. Std: RGT39282
CCV: STD81717 LLCCV: COA19621 Tuning Sol :
Stannous : Hydroxylamine :

Workgroups: 615862,616020,616025,616048,616173

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
137	T4.060117.200044	L17051497-18	AAC3260	40/50	1		06/01/17 20:00
138	T4.060117.200422	L17051497-19	EB0302	40/50	1		06/01/17 20:04
139	T4.060117.200806	L17051497-20	EB0302	40/50	1		06/01/17 20:08
140	T4.060117.201149	WG615875-01	Reference Sample		1	L17051497-21	06/01/17 20:11
141	T4.060117.201528	WG615875-04	Matrix Spike	40/50	1	L17051497-21	06/01/17 20:15
142	T4.060117.201855	WG615875-05	Matrix Spike Duplica	40/50	1	L17051497-21	06/01/17 20:18
143	T4.060117.202223	WG616329-44	CCV		1		06/01/17 20:22
144	T4.060117.202551	WG616329-45	CCB		1		06/01/17 20:25
145	T4.060117.202935	WG616329-46	LLCCV		1		06/01/17 20:29
146	T4.060117.203314	WG616329-47	LLCCV		1		06/01/17 20:33
147	T4.060117.203653	WG616329-48	Low Level Continuing Calibra		1		06/01/17 20:36
148	T4.060117.204031	WG616329-49	Interference Check		1		06/01/17 20:40
149	T4.060117.204416	WG616329-50	Interference Check		1		06/01/17 20:44
150	T4.060117.204756	WG616329-51	CCV		1		06/01/17 20:47
151	T4.060117.205123	WG616329-52	CCB		1		06/01/17 20:51

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Microbac Laboratories Inc.

Data Checklist

Date: 01-JUN-2017
Analyst: KKB
Analyst: NA
Method: 6010B/6010C/200.7
Instrument: ICP-THERMO4
Curve Workgroup: 616329
Runlog ID: 82520
Analytical Workgroups: 615862,616020,616025,616048,616173

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	X
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	X
Client Forms	X
Level X	
Level 3	
Level 4	1479,1403
Check for compliance with method and project specific requirements	1380,1497,1389,1391
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	KKB
Secondary Reviewer	KHR
Comments	

Primary Reviewer:
02-JUN-2017

Secondary Reviewer:
02-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-02-2017 12:17:26

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6010C AAB#: WG616048

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/30/2017	5.8	180		06/01/17	8.1	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5319891
Report generated 06/02/2017 10:34

METHOD BLANK SUMMARY

Login Number:	L17051389	**Work Group:**	WG616048
Blank File ID:	T4.060117.163423	**Blank Sample ID:**	WG615868-02
Prep Date:	05/30/17 09:42	**Instrument ID:**	ICP-THERMO4
Analyzed Date:	06/01/17 16:34	**Method:**	6010C
Analyst:	KKB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615868-03	T4.060117.163806	06/01/17 16:38	01
LH18/24-SP140-7442-GRAB	L17051389-01	T4.060117.165241	06/01/17 16:52	01

Report Name: BLANK_SUMMARY
PDF File ID: 5319892
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 05/30/17 09:42 Sample ID: WG615868-02
Instrument ID: ICP-THERMO4 Run Date: 06/01/17 16:34 Prep Method: 3015A
File ID: T4.060117.163423 Analyst: KKB Method: 6010C
Workgroup (AAB#): WG616048 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-TH-01-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Aluminum, Total	0.100	0.200	0.100	1	U
Iron, Total	0.0500	0.100	0.0500	1	U
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: 5319893
02-JUN-2017 10:34

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 **Run Date:** 06/01/2017 **Sample ID:** WG615868-03
Instrument ID: ICP-THERMO4 **Run Time:** 16:38 **Prep Method:** 3015A
File ID: T4.060117.163806 **Analyst:** KKB **Method:** 6010C
Workgroup (AAB#): WG616048 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD81778 **Cal ID:** ICP-TH-01-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Aluminum, Total	6.25	6.28	101	80 - 120	
Iron, Total	2.50	2.48	99.2	80 - 120	
Selenium, Total	0.250	0.234	93.5	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5319894
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum:L17051389 Cal ID:ICP-THERMO4- Worknum:WG616048
Instrument ID:ICP-THERMO4 Contract #: Method:6010C
Parent ID:WG615868-01 File ID:T4.060117.170000 Dil:1 Matrix:WATER
Sample ID:WG615868-04 MS File ID:T4.060117.170342 Dil:1 Units:mg/L
Sample ID:WG615868-05 MSD File ID:T4.060117.170711 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum	0.336	6.25	6.39	96.9	6.25	6.36	96.4	0.418	80 - 120	20	
Iron	0.835	2.50	2.71	74.8	2.50	2.66	73.1	1.57	80 - 120	20	*
Selenium	ND	0.250	0.231	92.5	0.250	0.226	90.3	2.36	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: 5319895
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17051389 **Worknum:** WG616048
Instrument: ICP-THERMO4 **Method:** 6010C
Serial Dil: WG616048-02 **File ID:** T4.060117.182240 **Dil:** 5 **Units:** ug/L
Sample: L17051497-01 **File ID:** T4.060117.181534 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Aluminum	11.3		0.750	F	93.40	E
Iron	2760		2780		0.60	
Selenium	2.82		41.9		1390.00	E

U = Result is below MDL.
F = Result is greater than or equal to MDL and less than the RL.
X = Result is greater than or equal to RL and less than 25 times the MDL.
E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 25 times the MDL.

SERIAL_DIL - Modified 09/22/2008
PDF File ID: 5319889
06/02/2017 10:34

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17051389 **Worknum:** WG616048
Instrument ID: ICP-THERMO4 **Method:** 6010C
Post Spike ID: WG616048-01 **File ID:** T4.060117.181912 **Dil:** 1 **Units:** ug/L
Sample ID: L17051497-01 **File ID:** T4.060117.181534 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ALUMINUM	4930		0	U	5000	98.6	75 - 125	
IRON	4450		2760		2000	98.2	75 - 125	
SELENIUM	189		0	U	200	94.3	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: 5319890
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17051389**	Workgroup (AAB#):	**WG616048**
Analytical Method:	**6010C**	Instrument ID:	**ICP-THERMO4**
ICAL Worknum:	**WG616329**	Initial Calibration Date:	**01-JUN-2017 11:29**

	WG616329-01		WG616329-02		WG616329-03		WG616329-04		WG616329-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	0.00203	.1	0.00326	.2	0.00406	10	0.113	20	0.219	.999633	
IRON	0	-0.0000300	.04	0.000850	.08	0.00118	4	0.0692	8	0.138	.999538	
SELENIUM	0	-0.0000600	NA	NA	.008	0.0000800	.4	0.00621	.8	0.0124	.999631	

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: 5319898
Report generated: 02-JUN-2017 10:34

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-07
Instrument ID: ICP-THERMO4 Run Time: 11:40 Method: 6010C
File ID: T4.060117.114028 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG616048 Cal ID: ICP-THERI - 01-JUN-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ALUMINUM	.08	.16	.08	U
IRON	.04	.08	.04	U
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: 5319900
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-14
Instrument ID: ICP-THERMO4 Run Time: 12:31 Method: 6010C
File ID: T4.060117.123142 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Iron	0.0400	0.0800	0.0400	U
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: 5319903
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-26
Instrument ID: ICP-THERMO4 Run Time: 16:04 Method: 6010C
File ID: T4.060117.160459 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Iron	0.0400	0.0800	0.0400	U
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: 5319903
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-33
Instrument ID: ICP-THERMO4 Run Time: 16:30 Method: 6010C
File ID: T4.060117.163040 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Iron	0.0400	0.0800	0.0400	U
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: 5319903
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17051389	**Run Date:**	06/01/2017	**Sample ID:**	WG616329-35
Instrument ID:	ICP-THERMO4	**Run Time:**	17:14	**Method:**	6010C
File ID:	T4.060117.171410	**Analyst:**	KKB	**Units:**	mg/L
Workgroup (AAB#):	WG616048	**Cal ID:**	ICP-TH - 01-JUN-17		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Iron	0.0400	0.0800	0.0400	U
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.

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Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-37
Instrument ID: ICP-THERMO4 Run Time: 17:59 Method: 6010C
File ID: T4.060117.175920 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Iron	0.0400	0.0800	0.0400	U
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: 5319903
Report generated 06/02/2017 10:34

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-39
Instrument ID: ICP-THERMO4 Run Time: 18:29 Method: 6010C
File ID: T4.060117.182947 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Iron	0.0400	0.0800	0.0400	U
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.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 | Run Date: 06/01/2017 | Sample ID: WG616329-45
Instrument ID: ICP-THERMO4 | Run Time: 20:25 | Method: 6010C
File ID: T4.060117.202551 | Analyst: KKB | Units: mg/L
Workgroup (AAB#): WG616048 | Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Iron	0.0400	0.0800	0.0400	U
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.

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CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17051389	**Run Date:**	06/01/2017	**Sample ID:**	WG616329-52
Instrument ID:	ICP-THERMO4	**Run Time:**	20:51	**Method:**	6010C
File ID:	T4.060117.205123	**Analyst:**	KKB	**Units:**	mg/L
Workgroup (AAB#):	WG616048	**Cal ID:**	ICP-TH - 01-JUN-17		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Iron	0.0400	0.0800	0.0400	U
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: 5319903
Report generated 06/02/2017 10:34

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INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-06
Instrument ID: ICP-THERMO4 Run Time: 11:32 Method: 6010C
File ID: T4.060117.113238 Analyst: KKB Units: mg/L
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Aluminum		10	10.1	101	90 - 110	
Iron		4	4.00	100	90 - 110	
Selenium		.4	0.412	103	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5319899
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-13
Instrument ID: ICP-THERMO4 Run Time: 12:28 Method: 6010C
File ID: T4.060117.122813 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	4.01	mg/L	100	90 - 110		
Selenium		0.400	0.402	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

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Report generated 06/02/2017 10:34

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-25

Instrument ID: ICP-THERMO4 Run Time: 16:01 Method: 6010C

File ID: T4.060117.160130 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Iron		4.00	4.04	mg/L	101	90 - 110		
Selenium		0.400	0.399	mg/L	99.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5319902

Report generated 06/02/2017 10:34

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-32
Instrument ID: ICP-THERMO4 Run Time: 16:27 Method: 6010C
File ID: T4.060117.162706 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	4.01	mg/L	100	90 - 110		
Selenium		0.400	0.399	mg/L	99.8	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5319902
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Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-34

Instrument ID: ICP-THERMO4 Run Time: 17:10 Method: 6010C

File ID: T4.060117.171042 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	3.98	mg/L	99.6	90 - 110		
Selenium		0.400	0.395	mg/L	98.7	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5319902

Report generated 06/02/2017 10:34

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-36
Instrument ID: ICP-THERMO4 Run Time: 17:55 Method: 6010C
File ID: T4.060117.175552 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Iron		4.00	4.01	mg/L	100	90 - 110		
Selenium		0.400	0.396	mg/L	99.0	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5319902
Report generated 06/02/2017 10:34

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-38
Instrument ID: ICP-THERMO4 Run Time: 18:26 Method: 6010C
File ID: T4.060117.182620 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Iron		4.00	4.06	mg/L	102	90 - 110		
Selenium		0.400	0.398	mg/L	99.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-44
Instrument ID: ICP-THERMO4 Run Time: 20:22 Method: 6010C
File ID: T4.060117.202223 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Iron		4.00	4.04	mg/L	101	90 - 110		
Selenium		0.400	0.402	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5319902
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-51
Instrument ID: ICP-THERMO4 Run Time: 20:47 Method: 6010C
File ID: T4.060117.204756 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Iron		4.00	4.05	mg/L	101	90 - 110		
Selenium		0.400	0.409	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5319902
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.

LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-08

Instrument ID: ICP-THERMO4 Run Time: 11:44 Method: 6010C

File ID: T4.060117.114412 Analyst: KKB QC Key: DOD4

Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.175	mg/L	110	70 - 130		
Iron		0.0800	0.0672	mg/L	84.0	70 - 130		
Selenium		0.0160	0.0194	mg/L	121	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010

PDF File ID: 5319904

Report generated 06/02/2017 10:34

Microbac Laboratories Inc.
LOW LEVEL CALIBRATION VERIFICATION

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-27
Instrument ID: ICP-THERMO4 Run Time: 16:08 Method: 6010C
File ID: T4.060117.160842 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.176	mg/L	110	70 - 130		
Iron		0.0800	0.0706	mg/L	88.3	70 - 130		
Selenium		0.0160	0.0167	mg/L	104	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5319904
Report generated 06/02/2017 10:34

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616329-48
Instrument ID: ICP-THERMO4 Run Time: 20:36 Method: 6010C
File ID: T4.060117.203653 Analyst: KKB QC Key: DOD4
Workgroup (AAB#): WG616048 Cal ID: ICP-TH - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		0.160	0.180	mg/L	113	70 - 130		
Iron		0.0800	0.0973	mg/L	122	70 - 130		
Selenium		0.0160	0.0169	mg/L	106	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5319904
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17051389 **Workgroup (AAB#):** WG616048
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG616329-11 **File ID:** T4.060117.115726 **Units:** mg/L
Sol. AB : WG616329-12 **File ID:** T4.060117.120111 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Aluminum	250	242	96.8	250	241	96.4	
Iron	100	97.6	97.6	100	96.9	96.9	
Selenium	NS	0.00355	NS	0.250	0.245	98.0	

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: 5319901
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Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17051389 **Workgroup (AAB#):** WG616048
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG616329-30 **File ID:** T4.060117.161938 **Units:** mg/L
Sol. AB : WG616329-31 **File ID:** T4.060117.162324 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Aluminum	250	248	99.2	250	242	96.8	
Iron	100	96.8	96.8	100	95.7	95.7	
Selenium	NS	0.000440	NS	0.250	0.243	97.2	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).
+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5319901
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17051389 **Workgroup (AAB#):** WG616048
Instrument ID: ICP-THERMO4 **Method:** 6010C
Sol. A : WG616329-49 **File ID:** T4.060117.204031 **Units:** mg/L
Sol. AB : WG616329-50 **File ID:** T4.060117.204416 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Aluminum	250	245	98.0	250	244	97.6	
Iron	100	97.0	97.0	100	96.4	96.4	
Selenium	NS	0.00138	NS	0.250	0.241	96.4	

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: 5319901
Report generated 06/02/2017 10:34

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17051389 **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: 5319897
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17051389 **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: 5319897
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17051389 **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: 5319897
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17051389 **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: 5319897
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17051389 **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: 5319897
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17051389 **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: 5319897
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L17051389 **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: 5319897
Report generated: 06/02/2017 10:34

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17051389 **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: 5319896
Report generated: 06/02/2017 10:34

2.3 Metals Data

2.3.2 Metals ICP-MS Data

2.3.2.1 Summary Data

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 07:36
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	06/01/2017 16:12
Workgroup #:	WG615899	**Analyst:**	JYH	**Run Date:**	06/01/2017 16:58
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	NI.060117.165851
Sample Tag:	02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Total	7440-47-3	0.00260	J	0.00400	0.00200	0.00100
Vanadium, Total	7440-62-2	0.00100	U	0.00200	0.00100	0.000500

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 #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 07:36
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	06/01/2017 12:20
Workgroup #:	WG615899	**Analyst:**	JYH	**Run Date:**	06/01/2017 14:04
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	NI.060117.140407
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Antimony, Total	7440-36-0	0.00100	U	0.00200	0.00100	0.000500
Arsenic, Total	7440-38-2	0.000780	J	0.00200	0.00100	0.000500
Barium, Total	7440-39-3	0.197		0.00600	0.00300	0.00150
Cadmium, Total	7440-43-9	0.000600	U	0.00120	0.000600	0.000300
Cobalt, Total	7440-48-4	0.00100	U	0.00200	0.00100	0.000500
Lead, Total	7439-92-1	0.00100	U	0.00200	0.00100	0.000500
Manganese, Total	7439-96-5	0.0790		0.00400	0.00200	0.00100
Nickel, Total	7440-02-0	0.00400	U	0.00800	0.00400	0.00200
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500
Thallium, Total	7440-28-0	0.000200	U	0.000400	0.000200	0.000100
Zinc, Total	7440-66-6	0.0250	U	0.0500	0.0250	0.0125

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 #: L17051389
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: WG615832
Analyst: VC
Spike Analyst: VC
Run Date: 05/30/2017 07:36
Method: 3015A
Balance: BAL016
Instrument: MW-3
Instrument Start: 05/30/2017 07:48

SOP: ME407 Revison 19
Spike Solution: STD80296
Spike Witness: ERP
HNO3 Lot #: COA19718
40 & 50 ML. DIGESTION TU COA19487
MS Filters- fisher-Lot#r RGT40013

	SAMPLE #	Type	Matrix	Initial Amount	Final Volume	Initial Vessel Wt	Final Vessel Wt	Spike Amount	Due Date
1	WG615832-02	BLANK	1	20 mL	50 mL	183.14 g	183.134 g		
2	WG615832-04	FLT_BLK	1	20 mL	50 mL	182.746 g	182.723 g		
3	WG615832-03	LCS	1	20 mL	50 mL	185.688 g	185.679 g	.25 mL	
4	L17051380-23	SAMP	1	20 mL	50 mL	181.783 g	181.76 g		06/05/17
5	L17051380-24	SAMP	1	20 mL	50 mL	185.225 g	185.244 g		06/05/17
6	L17051380-25	SAMP	1	20 mL	50 mL	182.751 g	182.734 g		06/05/17
7	L17051380-26	SAMP	1	20 mL	50 mL	181.473 g	181.45 g		06/05/17
8	L17051380-27	SAMP	1	20 mL	50 mL	181.733 g	181.712 g		06/05/17
9	L17051380-28	SAMP	1	20 mL	50 mL	181.681 g	181.642 g		06/05/17
10	L17051389-01	SAMP	1	20 mL	50 mL	182.843 g	182.843 g		06/05/17
11	L17051391-01	SAMP	1	20 mL	50 mL	184.014 g	184 g		06/05/17
12	L17051403-01	SAMP	1	20 mL	50 mL	182.906 g	182.919 g		06/05/17
13	L17051403-02	SAMP	1	20 mL	50 mL	184.058 g	184.073 g		06/05/17
14	L17051403-03	SAMP	1	20 mL	50 mL	181.61 g	181.63 g		06/05/17
15	L17051403-04	SAMP	1	20 mL	50 mL	182.048 g	182.053 g		06/05/17
16	L17051403-05	SAMP	1	20 mL	50 mL	182.766 g	182.757 g		06/05/17
17	L17051403-06	SAMP	1	20 mL	50 mL	182.921 g	182.929 g		06/05/17
18	L17051419-01	SAMP	1	20 mL	50 mL	185.047 g	185.035 g		06/01/17
19	WG615832-01	REF	1	20 mL	50 mL	183.003 g	183.01 g		
20	L17051479-01	RS01	1	20 mL	50 mL	183.003 g	183.01 g		06/06/17
21	WG615832-05	MS	1	20 mL	50 mL	184.869 g	184.876 g	.25 mL	
22	L17051479-02	MS01	1	20 mL	50 mL	184.869 g	184.876 g	.25 mL	06/06/17
23	WG615832-06	MSD	1	20 mL	50 mL	183.474 g	183.472 g	.25 mL	
24	L17051479-03	SD01	1	20 mL	50 mL	183.474 g	183.472 g	.25 mL	06/06/17

L17051403-04	FILTERED DIGESTATE

Analyst: Vicki Collins

Reviewer: Erin Potter

MW_DIG - Modified 09/30/2009
PDF ID: 5313787
Report generated: 05/30/2017 08:43

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 060117A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

Calibration Std: STD81946 ICV Std: STD81801 Post Spike: STD79415
ICSA: STD81802 ICSAB: STD81803 Int. Std: RGT39300
CCV: STD81947 LLCCV: STD81819 Tuning Sol : STD81373
Stannous : Hydroxylamine :

Workgroups: 615899,616234

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.060117.120743	Blank	Blank		1		06/01/17 12:07
2	NI.060117.121049	WG616242-01	Calibration Point		1		06/01/17 12:10
3	NI.060117.121354	WG616242-02	Calibration Point		1		06/01/17 12:13
4	NI.060117.121659	WG616242-03	Calibration Point		1		06/01/17 12:16
5	NI.060117.122005	WG616242-04	Calibration Point		1		06/01/17 12:20
6	NI.060117.122312	WG616242-05	Initial Calibration Verification		1		06/01/17 12:23
7	NI.060117.122619	WG616242-06	Initial Calib Blank		1		06/01/17 12:26
8	NI.060117.122926	WG616242-07	Low Level Initial Calibration V		1		06/01/17 12:29
9	NI.060117.123231	WG616242-08	Interference Check		1		06/01/17 12:32
10	NI.060117.123537	WG616242-09	Interference Check		1		06/01/17 12:35
11	NI.060117.123844	WG616242-10	CCV		1		06/01/17 12:38
12	NI.060117.124149	WG616242-11	CCB		1		06/01/17 12:41
13	NI.060117.124457	WG615832-02	Method/Prep Blank	20/50	1		06/01/17 12:44
14	NI.060117.124802	WG615832-03	Laboratory Control S	20/50	1		06/01/17 12:48
15	NI.060117.125221	WG615832-04	Filter Blank		1		06/01/17 12:52
16	NI.060117.125526	WG615832-01	Reference Sample		5	L17051479-01	06/01/17 12:55
17	NI.060117.125832	WG615832-05	Matrix Spike	20/50	5	L17051479-01	06/01/17 12:58
18	NI.060117.130137	WG615832-06	Matrix Spike Duplica	20/50	5	L17051479-01	06/01/17 13:01
19	NI.060117.130443	L17051380-23	AAB3211	20/50	1		06/01/17 13:04
20	NI.060117.130748	L17051380-24	AAB3211	20/50	1		06/01/17 13:07
21	NI.060117.131054	WG615899-01	Post Digestion Spike		1	L17051380-24	06/01/17 13:10
22	NI.060117.131359	WG615899-02	Serial Dilution		5	L17051380-24	06/01/17 13:13
23	NI.060117.131707	WG616242-12	CCV		1		06/01/17 13:17
24	NI.060117.132013	WG616242-13	CCB		1		06/01/17 13:20
25	NI.060117.132320	L17051403-01	TCF-EB01-052317	20/50	1		06/01/17 13:23
26	NI.060117.132625	L17051403-02	MW26-GW-052317	20/50	5		06/01/17 13:26
27	NI.060117.132931	L17051403-03	MW23-GW-052417	20/50	5		06/01/17 13:29
28	NI.060117.133237	L17051403-04	MW21-GW-052417	20/50	5		06/01/17 13:32
29	NI.060117.133542	L17051403-05	MW35-GW-052417	20/50	5		06/01/17 13:35
30	NI.060117.133847	L17051403-06	MW35-GW-052417D	20/50	5		06/01/17 13:38
31	NI.060117.134153	L17051419-01	T7E1247-01	20/50	1		06/01/17 13:41
32	NI.060117.134458	L17051380-25	AAB3212	20/50	1		06/01/17 13:44
33	NI.060117.134804	L17051380-26	AAB3212	20/50	1		06/01/17 13:48
34	NI.060117.135109	L17051380-27	EB0301	20/50	1		06/01/17 13:51

Page: 1 Approved: June 02, 2017

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 060117A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

Calibration Std: STD81946 ICV Std: STD81801 Post Spike: STD79415
ICSA: STD81802 ICSAB: STD81803 Int. Std: RGT39300
CCV: STD81947 LLCCV: STD81819 Tuning Sol : STD81373
Stannous : Hydroxylamine :

Workgroups: 615899,616234

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
35	NI.060117.135416	WG616242-14	CCV		1		06/01/17 13:54
36	NI.060117.135721	WG616242-15	CCB		1		06/01/17 13:57
37	NI.060117.140028	L17051380-28	EB0301	20/50	1		06/01/17 14:00
38	NI.060117.140407	L17051389-01	LH18/24-SP140-7442-GRAB	20/50	1		06/01/17 14:04
39	NI.060117.140712	L17051391-01	LH18/24-SP650-6442-GRAB	20/50	1		06/01/17 14:07
40	NI.060117.141019	WG616242-16	CCV		1		06/01/17 14:10
41	NI.060117.141325	WG616242-17	CCB		1		06/01/17 14:13
42	NI.060117.141632	WG616242-18	Interference Check		1		06/01/17 14:16
43	NI.060117.141937	WG616242-19	Interference Check		1		06/01/17 14:19
44	NI.060117.142308	WG616242-20	CCV		1		06/01/17 14:23
45	NI.060117.142614	WG616242-21	CCB		1		06/01/17 14:26
46	NI.060117.142921	WG616242-22	Low Level Continuing Calibra		1		06/01/17 14:29
47	NI.060117.143249	WG616135-02	Method/Prep Blank	20/50	1		06/01/17 14:32
48	NI.060117.143555	WG616135-03	Laboratory Control S	20/50	1		06/01/17 14:35
49	NI.060117.143900	L17051497-20	EB0302	20/50	1		06/01/17 14:39
50	NI.060117.144206	WG616135-01	Reference Sample		1	L17051497-22	06/01/17 14:42
51	NI.060117.144511	WG616135-04	Matrix Spike	20/50	1	L17051497-22	06/01/17 14:45
52	NI.060117.144817	WG616135-05	Matrix Spike Duplica	20/50	1	L17051497-22	06/01/17 14:48
53	NI.060117.145123	L17051497-27	AAC3262	20/50	1		06/01/17 14:51
54	NI.060117.145429	WG616234-01	Post Digestion Spike		1	L17051497-27	06/01/17 14:54
55	NI.060117.145734	WG616234-02	Serial Dilution		5	L17051497-27	06/01/17 14:57
56	NI.060117.150040	WG616234-02	Serial Dilution		25	L17051497-27	06/01/17 15:00
57	NI.060117.150347	WG616242-23	CCV		1		06/01/17 15:03
58	NI.060117.150652	WG616242-24	CCB		1		06/01/17 15:06
59	NI.060117.150959	L17051497-28	AAC3262	20/50	1		06/01/17 15:09
60	NI.060117.151326	L17051497-29	EB0303	20/50	1		06/01/17 15:13
61	NI.060117.151631	L17051497-30	EB0303	20/50	1		06/01/17 15:16
62	NI.060117.151937	L17051554-02	AO9-MW11-Y2S2	20/50	1		06/01/17 15:19
63	NI.060117.152243	L17051554-03	AO9-MW12-Y2S2	20/50	1		06/01/17 15:22
64	NI.060117.152548	L17051391-01	LH18/24-SP650-6442-GRAB	20/50	50		06/01/17 15:25
65	NI.060117.152855	WG616242-25	Interference Check		1		06/01/17 15:28
66	NI.060117.153200	WG616242-26	Interference Check		1		06/01/17 15:32
67	NI.060117.153508	WG616242-27	CCV		1		06/01/17 15:35
68	NI.060117.153814	WG616242-28	CCB		1		06/01/17 15:38

Page: 2 Approved: June 02, 2017

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 060117A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

Calibration Std: STD81946 ICV Std: STD81801 Post Spike: STD79415
ICSA: STD81802 ICSAB: STD81803 Int. Std: RGT39300
CCV: STD81947 LLCCV: STD81819 Tuning Sol : STD81373
Stannous : Hydroxylamine :

Workgroups: 615899,616234

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
69	NI.060117.154120	WG616242-29	Low Level Continuing Calibra		1		06/01/17 15:41

Comments

Seq.	Rerun	Dil.	Reason	Analytes
32			Seq. 32-34: Wrong sample labels. JYH	
37			Wrong sample label. JYH	

Page: 3 Approved: June 02, 2017

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: ICP-MS2 Dataset: 060117B.REP
Analyst1: JYH Analyst2: N/A
Method: 6020/6020A/200.8 SOP: ME700A Rev: 3
Maintenance Log ID:

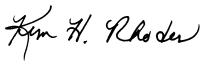
Calibration Std: STD81946 ICV Std: STD81801 Post Spike: STD79415
ICSA: STD81802 ICSAB: STD81803 Int. Std: RGT39300
CCV: STD81947 LLCCV: STD81819 Tuning Sol : STD81373
Stannous : Hydroxylamine :

Workgroups: 615899

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	NI.060117.160023	Blank	Blank		1		06/01/17 16:00
2	NI.060117.160329	WG616294-01	Calibration Point		1		06/01/17 16:03
3	NI.060117.160635	WG616294-02	Calibration Point		1		06/01/17 16:06
4	NI.060117.160940	WG616294-03	Calibration Point		1		06/01/17 16:09
5	NI.060117.161246	WG616294-04	Calibration Point		1		06/01/17 16:12
6	NI.060117.161554	WG616294-05	Initial Calibration Verification		1		06/01/17 16:15
7	NI.060117.161901	WG616294-06	Initial Calib Blank		1		06/01/17 16:19
8	NI.060117.162208	WG616294-07	Low Level Initial Calibration V		1		06/01/17 16:22
9	NI.060117.162513	WG616294-08	Interference Check		1		06/01/17 16:25
10	NI.060117.162819	WG616294-09	Interference Check		1		06/01/17 16:28
11	NI.060117.163126	WG616294-10	CCV		1		06/01/17 16:31
12	NI.060117.163431	WG616294-11	CCB		1		06/01/17 16:34
13	NI.060117.163738	WG615832-02	Method/Prep Blank	20/50	1		06/01/17 16:37
14	NI.060117.164044	WG615832-03	Laboratory Control S	20/50	1		06/01/17 16:40
15	NI.060117.164444	L17051479-01	MW01-GW-052517		5	WG615832-01	06/01/17 16:44
16	NI.060117.164934	L17051479-02	MW01-GW-052517 MS	20/50	5	WG615832-05	06/01/17 16:49
17	NI.060117.165240	L17051479-03	MW01-GW-052517 MSD	20/50	5	WG615832-06	06/01/17 16:52
18	NI.060117.165545	L17051391-01	LH18/24-SP650-6442-GRAB	20/50	1		06/01/17 16:55
19	NI.060117.165851	L17051389-01	LH18/24-SP140-7442-GRAB	20/50	1		06/01/17 16:58
20	NI.060117.170156	WG615899-03	Post Digestion Spike		1	L17051389-01	06/01/17 17:01
21	NI.060117.170502	WG615899-04	Serial Dilution		5	L17051389-01	06/01/17 17:05
22	NI.060117.170808	WG616294-12	CCV		1		06/01/17 17:08
23	NI.060117.171114	WG616294-13	CCB		1		06/01/17 17:11
24	NI.060117.171421	WG616294-14	Low Level Continuing Calibra		1		06/01/17 17:14
25	NI.060117.171727	40 PPB SE	40 PPB SE		10		06/01/17 17:17

Page: 1 Approved: June 02, 2017



Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 01-JUN-2017
Analyst: JYH
Analyst: NA
Method: 6020/6020A/200.8
Instrument: ICP-MS
Curve Workgroup: 616242
Runlog ID: 82517
Analytical Workgroups: 615899,616234

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	1380,1389,1391,1403,1479,1497
	1554
Client Forms	X
Level X	
Level 3	1403,1479
Level 4	1380,1389,1391,1497,1554
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:
02-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-02-2017 09:50:08

Microbac Laboratories Inc.

Data Checklist

Date: 01-JUN-2017
Analyst: JYH
Analyst: NA
Method: 6020/6020A/200.8
Instrument: ICP-MS
Curve Workgroup: 616294
Runlog ID: 82524
Analytical Workgroups: 615899

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	
Client Forms	X
Level X	
Level 3	
Level 4	1389,1391
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:
02-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-02-2017 11:41:39

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6020A **AAB#:** WG615899

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/30/2017	5.7	180		06/01/17	8.1	180	
LH18/24-SP140-7442-GRAB	01	05/24/17					05/30/2017	5.7	180		06/01/17	8	180	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5318855
Report generated 06/02/2017 08:18

METHOD BLANK SUMMARY

Login Number: L17051389
Work Group: WG615899
Blank File ID: NI.060117.124457
Blank Sample ID: WG615832-02
Prep Date: 05/30/17 07:36
Instrument ID: ICP-MS2
Analyzed Date: 06/01/17 12:44
Method: 6020A
Analyst: JYH

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615832-03	NI.060117.124802	06/01/17 12:48	01
FLT_BLK	WG615832-04	NI.060117.125221	06/01/17 12:52	01
LH18/24-SP140-7442-GRAB	L17051389-01	NI.060117.140407	06/01/17 14:04	01
LCS	WG615832-03	NI.060117.164044	06/01/17 16:40	02
LH18/24-SP140-7442-GRAB	L17051389-01	NI.060117.165851	06/01/17 16:58	02

Report Name: BLANK_SUMMARY
PDF File ID: 5318856
Report generated 06/02/2017 08:24

METHOD BLANK SUMMARY

Login Number: L17051389
Work Group: WG615899
Blank File ID: NI.060117.163738
Blank Sample ID: WG615832-02
Prep Date: 05/30/17 07:36
Instrument ID: ICP-MS2
Analyzed Date: 06/01/17 16:37
Method: 6020A
Analyst: JYH

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615832-03	NI.060117.124802	06/01/17 12:48	01
FLT_BLK	WG615832-04	NI.060117.125221	06/01/17 12:52	01
LH18/24-SP140-7442-GRAB	L17051389-01	NI.060117.140407	06/01/17 14:04	01
LCS	WG615832-03	NI.060117.164044	06/01/17 16:40	02
LH18/24-SP140-7442-GRAB	L17051389-01	NI.060117.165851	06/01/17 16:58	02

Report Name: BLANK_SUMMARY
PDF File ID: 5318856
Report generated 06/02/2017 08:24

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 05/30/17 07:36 Sample ID: WG615832-02
Instrument ID: ICP-MS2 Run Date: 06/01/17 12:44 Prep Method: 3015A
File ID: NI.060117.124457 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG615899 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-MS-01-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Antimony, Total	0.000500	0.00200	0.000500	1	U
Arsenic, Total	0.000500	0.00200	0.000500	1	U
Barium, Total	0.00150	0.00600	0.00150	1	U
Cadmium, Total	0.000300	0.00120	0.000300	1	U
Cobalt, Total	0.000500	0.00200	0.000500	1	U
Lead, Total	0.000500	0.00200	0.000500	1	U
Manganese, Total	0.00100	0.00400	0.00100	1	U
Nickel, Total	0.00200	0.00800	0.00200	1	U
Silver, Total	0.000500	0.00200	0.000500	1	U
Thallium, Total	0.000100	0.000400	0.000100	1	U
Zinc, Total	0.0125	0.0500	0.0125	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: 5318857
02-JUN-2017 10:16

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 05/30/17 07:36 Sample ID: WG615832-02
Instrument ID: ICP-MS2 Run Date: 06/01/17 16:37 Prep Method: 3015A
File ID: NI.060117.163738 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG615899 Matrix: Water Units: mg/L
Contract #: Cal ID: ICP-MS-01-JUN-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Chromium, Total	0.00100	0.00400	0.00100	1	U
Vanadium, 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: 5318857
02-JUN-2017 10:16

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG615832-03
Instrument ID: ICP-MS2 Run Time: 12:48 Prep Method: 3015A
File ID: NI.060117.124802 Analyst: JYH Method: 6020A
Workgroup (AAB#): WG615899 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD80296 Cal ID: ICP-MS-01-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Antimony, Total	0.125	0.117	93.7	80 - 120	
Arsenic, Total	0.125	0.119	94.9	80 - 120	
Barium, Total	0.125	0.119	95.2	80 - 120	
Cadmium, Total	0.125	0.122	97.5	80 - 120	
Cobalt, Total	0.125	0.120	96.0	80 - 120	
Lead, Total	0.125	0.120	96.2	80 - 120	
Manganese, Total	0.125	0.122	97.5	80 - 120	
Nickel, Total	0.125	0.123	98.2	80 - 120	
Silver, Total	0.125	0.124	99.6	80 - 120	
Thallium, Total	0.125	0.124	99.3	80 - 120	
Zinc, Total	0.125	0.124	99.1	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5318858
Report generated: 06/02/2017 10:16

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 **Run Date:** 06/01/2017 **Sample ID:** WG615832-03
Instrument ID: ICP-MS2 **Run Time:** 16:40 **Prep Method:** 3015A
File ID: NI.060117.164044 **Analyst:** JYH **Method:** 6020A
Workgroup (AAB#): WG615899 **Matrix:** Water **Units:** mg/L
QC Key: DOD4 **Lot#:** STD80296 **Cal ID:** ICP-MS-01-JUN-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Chromium, Total	0.125	0.119	95.4	80 - 120	
Vanadium, Total	0.125	0.118	94.8	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5318858
Report generated: 06/02/2017 10:16

Microbac Laboratories Inc.

MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum:L17051389 Cal ID:ICP-MS2- Worknum:WG615899

Instrument ID:ICP-MS2 Contract #: Method:6020A

Parent ID:WG615832-01 File ID:NI.060117.125526 Dil:5 Matrix:WATER

Sample ID:WG615832-05 MS File ID:NI.060117.125832 Dil:5 Units:mg/L

Sample ID:WG615832-06 MSD File ID:NI.060117.130137 Dil:5

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Antimony	0.00114	0.125	0.116	92.0	0.125	0.118	93.2	1.28	80 - 120	20	
Arsenic	ND	0.125	0.119	95.2	0.125	0.127	102	6.72	80 - 120	20	
Barium	53.3	0.125	53.0	-248	0.125	57.3	3180	7.76	80 - 120	20	*
Cadmium	0.000544	0.125	0.112	89.4	0.125	0.113	90.2	0.857	80 - 120	20	
Cobalt	0.0119	0.125	0.126	91.6	0.125	0.130	94.9	3.20	80 - 120	20	
Lead	0.000989	0.125	0.127	100	0.125	0.128	102	1.55	80 - 120	20	
Manganese	20.8	0.125	20.2	-490	0.125	21.5	549	6.22	80 - 120	20	*
Nickel	0.171	0.125	0.251	63.5	0.125	0.254	66.1	1.26	80 - 120	20	*
Silver	ND	0.125	0.107	85.2	0.125	0.109	87.5	2.66	80 - 120	20	
Thallium	0.000725	0.125	0.125	99.4	0.125	0.128	101	2.01	80 - 120	20	
Zinc	0.0268	0.125	0.143	92.7	0.125	0.150	98.2	4.68	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: 5318859

Report generated 06/02/2017 10:16

Microbac Laboratories Inc.
MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum:L17051389 Cal ID:ICP-MS2- Worknum:WG615899
Instrument ID:ICP-MS2 Contract #: Method:6020A
Parent ID:WG615832-01 File ID:NI.060117.164444 Dil:5 Matrix:WATER
Sample ID:WG615832-05 MS File ID:NI.060117.164934 Dil:5 Units:mg/L
Sample ID:WG615832-06 MSD File ID:NI.060117.165240 Dil:5

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chromium	0.0165	0.125	0.133	93.1	0.125	0.128	89.3	3.64	80 - 120	20	
Vanadium	ND	0.125	0.127	101	0.125	0.124	99.1	2.28	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: 5318859
Report generated 06/02/2017 10:16

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17051389 **Worknum:** WG615899
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG615899-02 **File ID:** NI.060117.131359 **Dil:** 5 **Units:** ug/L
Sample: L17051380-24 **File ID:** NI.060117.130748 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Antimony	ND	U	1.90	F	3920.00	
Arsenic	3.12	X	3.48	F	11.60	
Barium	35.2	X	35.7	X	1.50	
Cadmium	ND	U	ND	U		
Chromium	ND	U	ND	U		
Cobalt	0.977	X	ND	U		
Lead	ND	U	ND	U		
Manganese	80.9		82.8		2.36	
Nickel	2.85	F	ND	U		
Silver	ND	U	ND	U		
Thallium	0.0464	F	ND	U		
Vanadium	ND	U	ND	U		
Zinc	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: 5318853
06/02/2017 08:24

Microbac Laboratories Inc.
Serial Dilution Report

Login: L17051389 **Worknum:** WG615899
Instrument: ICP-MS2 **Method:** 6020A
Serial Dil: WG615899-04 **File ID:** NI.060117.170502 **Dil:** 5 **Units:** ug/L
Sample: L17051389-01 **File ID:** NI.060117.165851 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Antimony	ND	U	1.60	F	736.00	
Arsenic	ND	U	ND	U		
Barium	78.4		77.8		0.75	
Cadmium	ND	U	ND	U		
Chromium	1.04	F	2.39	F	129.00	
Cobalt	ND	U	ND	U		
Lead	ND	U	ND	U		
Manganese	33.1	X	32.7	X	1.34	
Nickel	ND	U	ND	U		
Silver	ND	U	ND	U		
Thallium	ND	U	ND	U		
Vanadium	ND	U	ND	U		
Zinc	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: 5318853
06/02/2017 08:24

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17051389 **Worknum:** WG615899
Instrument ID: ICP-MS2 **Method:** 6020A
Post Spike ID: WG615899-01 **File ID:** NI.060117.131054 **Dil:** 1 **Units:** ug/L
Sample ID: L17051380-24 **File ID:** NI.060117.130748 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ANTIMONY	51.0		0	U	50	102.0	75 - 125	
ARSENIC	56.2		3.12		50	106.1	75 - 125	
BARIUM	86.3		35.2		50	102.1	75 - 125	
CADMIUM	50.8		0	U	50	101.6	75 - 125	
CHROMIUM	51.2		0	U	50	102.4	75 - 125	
COBALT	50.3		0.977		50	98.7	75 - 125	
LEAD	51.0		0	U	50	102.0	75 - 125	
MANGANESE	133		80.9		50	104.1	75 - 125	
NICKEL	51.7		2.85	F	50	97.8	75 - 125	
SILVER	48.2		0	U	50	96.4	75 - 125	
THALLIUM	51.1		0.0464	F	50	102.2	75 - 125	
VANADIUM	50.6		0	U	50	101.3	75 - 125	
ZINC	52.6		0	U	50	105.3	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: 5318854
Report generated: 06/02/2017 08:24

Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L17051389 **Worknum:** WG615899
Instrument ID: ICP-MS2 **Method:** 6020A
Post Spike ID: WG615899-03 **File ID:** NI.060117.170156 **Dil:** 1 **Units:** ug/L
Sample ID: L17051389-01 **File ID:** NI.060117.165851 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ANTIMONY	49.0		0	U	50	97.9	75 - 125	
ARSENIC	52.3		0	U	50	104.5	75 - 125	
BARIUM	127		78.4		50	97.8	75 - 125	
CADMIUM	48.1		0	U	50	96.2	75 - 125	
CHROMIUM	52.9		1.04	F	50	103.8	75 - 125	
COBALT	51.0		0	U	50	102.0	75 - 125	
LEAD	51.2		0	U	50	102.5	75 - 125	
MANGANESE	84.4		33.1		50	102.5	75 - 125	
NICKEL	50.7		0	U	50	101.4	75 - 125	
SILVER	38.5		0	U	50	77.0	75 - 125	
THALLIUM	51.2		0	U	50	102.3	75 - 125	
VANADIUM	52.4		0	U	50	104.8	75 - 125	
ZINC	53.6		0	U	50	107.2	75 - 125	

N = % Recovery exceeds control limits
F = Result is between MDL and RL
U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 5318854
Report generated: 06/02/2017 08:24

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17051389**	Workgroup (AAB#):	**WG615899**
Analytical Method:	**6020A**	Instrument ID:	**ICP-MS2**
ICAL Worknum:	**WG616242**	Initial Calibration Date:	**01-JUN-2017 12:20**

	WG616242-01		WG616242-02		WG616242-03		WG616242-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ANTIMONY	0	237	.4	441	50	244000	100	476000	1	
ARSENIC	0	-18.8	.4	33.2	50	56000	100	107000	.999873	
BARIUM	0	31.7	.4	107	50	75300	100	145000	.999957	
CADMIUM	0	5.30	.4	83.6	50	82600	100	160000	.999989	
CHROMIUM	0	8270	.4	8550	50	355000	100	672000	.999884	
COBALT	0	329	.4	746	50	455000	100	865000	.999842	
LEAD	0	476	.4	793	50	292000	100	558000	.999956	
MANGANESE	0	2740	.4	3270	50	591000	100	1130000	.999894	
NICKEL	0	291	.4	415	50	98000	100	186000	.999815	
SILVER	0	111	.4	381	50	272000	100	515000	.999878	
THALLIUM	0	97.7	.4	432	50	349000	100	668000	.999971	
VANADIUM	0	1970	.4	2310	50	387000	100	743000	.999925	
ZINC	0	413	.4	494	50	55800	100	108000	.999981	

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: 5318862
Report generated: 02-JUN-2017 08:18

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	**L17051389**	Workgroup (AAB#):	**WG615899**
Analytical Method:	**6020A**	Instrument ID:	**ICP-MS2**
ICAL Worknum:	**WG616294**	Initial Calibration Date:	**01-JUN-2017 16:12**

	WG616294-01		WG616294-02		WG616294-03		WG616294-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ANTIMONY	0	253	.4	410	50	227000	100	461000	.999936	
ARSENIC	0	-15.1	.4	48.3	50	51900	100	106000	.999916	
BARIUM	0	30.3	.4	102	50	70200	100	141000	.999986	
CADMIUM	0	4.00	.4	82.3	50	77400	100	156000	.999968	
CHROMIUM	0	5490	.4	5900	50	320000	100	639000	.999968	
COBALT	0	216	.4	590	50	408000	100	819000	.99998	
LEAD	0	428	.4	701	50	278000	100	557000	.999962	
MANGANESE	0	2000	.4	2450	50	534000	100	1060000	.999995	
NICKEL	0	232	.4	299	50	88000	100	176000	.99999	
SILVER	0	112	.4	348	50	253000	100	510000	.999972	
THALLIUM	0	13.0	.4	308	50	328000	100	657000	.999962	
VANADIUM	0	1190	.4	1610	50	350000	100	707000	.999943	
ZINC	0	410	.4	476	50	51800	100	104000	.99996	

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: 5318862
Report generated: 02-JUN-2017 08:18

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-06
Instrument ID: ICP-MS2 Run Time: 12:26 Method: 6020A
File ID: NI.060117.122619 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS2 - 01-JUN-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SILVER	.2	.8	.2	U
ARSENIC	.2	.8	.2	U
BARIUM	.6	2.4	.6	U
CADMIUM	.12	.48	.12	U
COBALT	.2	.8	.2	U
CHROMIUM	.4	1.6	.4	U
MANGANESE	.4	1.6	.4	U
NICKEL	.8	3.2	.8	U
LEAD	.2	.8	.2	U
ANTIMONY	.2	.8	.2	U
THALLIUM	.04	.16	.04	U
VANADIUM	.2	.8	.2	U
ZINC	5	20	5	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: 5318864
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616294-06
Instrument ID: ICP-MS2 Run Time: 16:19 Method: 6020A
File ID: NI.060117.161901 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS2 - 01-JUN-17
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
SILVER	.2	.8	.2	U
ARSENIC	.2	.8	.2	U
BARIUM	.6	2.4	.6	U
CADMIUM	.12	.48	.12	U
COBALT	.2	.8	.2	U
CHROMIUM	.4	1.6	.4	U
MANGANESE	.4	1.6	.4	U
NICKEL	.8	3.2	.8	U
LEAD	.2	.8	.2	U
ANTIMONY	.2	.8	.2	U
THALLIUM	.04	.16	.04	U
VANADIUM	.2	.8	.2	U
ZINC	5	20	5	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: 5318864
Report generated 06/02/2017 08:18

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-11
Instrument ID: ICP-MS2 Run Time: 12:41 Method: 6020A
File ID: NI.060117.124149 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.200	U
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	0.400	U
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-13
Instrument ID: ICP-MS2 Run Time: 13:20 Method: 6020A
File ID: NI.060117.132013 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.207	F
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	0.400	U
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 | Run Date: 06/01/2017 | Sample ID: WG616242-15
Instrument ID: ICP-MS2 | Run Time: 13:57 | Method: 6020A
File ID: NI.060117.135721 | Analyst: JYH | Units: ug/L
Workgroup (AAB#): WG615899 | Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.200	U
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	0.400	U
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-17
Instrument ID: ICP-MS2 Run Time: 14:13 Method: 6020A
File ID: NI.060117.141325 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.200	U
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	-0.458	F
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-21
Instrument ID: ICP-MS2 Run Time: 14:26 Method: 6020A
File ID: NI.060117.142614 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.331	F
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	-0.453	F
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-24
Instrument ID: ICP-MS2 Run Time: 15:06 Method: 6020A
File ID: NI.060117.150652 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.219	F
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	0.400	U
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-28
Instrument ID: ICP-MS2 Run Time: 15:38 Method: 6020A
File ID: NI.060117.153814 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.284	F
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	-0.422	F
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616294-11
Instrument ID: ICP-MS2 Run Time: 16:34 Method: 6020A
File ID: NI.060117.163431 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.200	U
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	0.400	U
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 | Run Date: 06/01/2017 | Sample ID: WG616294-13
Instrument ID: ICP-MS2 | Run Time: 17:11 | Method: 6020A
File ID: NI.060117.171114 | Analyst: JYH | Units: ug/L
Workgroup (AAB#): WG615899 | Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Antimony	0.200	0.800	0.200	U
Arsenic	0.200	0.800	0.200	U
Barium	0.600	2.40	0.600	U
Cadmium	0.120	0.480	0.120	U
Chromium	0.400	1.60	0.400	U
Cobalt	0.200	0.800	0.200	U
Lead	0.200	0.800	0.200	U
Manganese	0.400	1.60	0.400	U
Nickel	0.800	3.20	0.800	U
Silver	0.200	0.800	0.200	U
Thallium	0.0400	0.160	0.0400	U
Vanadium	0.200	0.800	0.200	U
Zinc	5.00	20.0	5.00	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: 5318867
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-05
Instrument ID: ICP-MS2 Run Time: 12:23 Method: 6020A
File ID: NI.060117.122312 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Antimony		50	49.9	99.8	90 - 110	
Arsenic		50	49.8	99.6	90 - 110	
Barium		50	49.7	99.4	90 - 110	
Cadmium		50	50.0	99.9	90 - 110	
Chromium		50	49.6	99.3	90 - 110	
Cobalt		50	49.7	99.3	90 - 110	
Lead		50	49.8	99.6	90 - 110	
Manganese		50	49.9	99.9	90 - 110	
Nickel		50	49.7	99.5	90 - 110	
Silver		50	50.3	101	90 - 110	
Thallium		50	49.7	99.4	90 - 110	
Vanadium		50	49.4	98.9	90 - 110	
Zinc		50	49.6	99.2	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5318863
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616294-05
Instrument ID: ICP-MS2 Run Time: 16:15 Method: 6020A
File ID: NI.060117.161554 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Antimony		50	48.6	97.2	90 - 110	
Arsenic		50	48.5	97.0	90 - 110	
Barium		50	48.5	97.0	90 - 110	
Cadmium		50	48.5	97.1	90 - 110	
Chromium		50	48.8	97.6	90 - 110	
Cobalt		50	48.6	97.2	90 - 110	
Lead		50	48.4	96.9	90 - 110	
Manganese		50	49.0	98.1	90 - 110	
Nickel		50	48.7	97.3	90 - 110	
Silver		50	48.8	97.5	90 - 110	
Thallium		50	48.5	97.1	90 - 110	
Vanadium		50	48.2	96.3	90 - 110	
Zinc		50	48.9	97.8	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 5318863
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-10
Instrument ID: ICP-MS2 Run Time: 12:38 Method: 6020A
File ID: NI.060117.123844 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0504	mg/L	101	90 - 110		
Arsenic		0.0500	0.0488	mg/L	97.7	90 - 110		
Barium		0.0500	0.0483	mg/L	96.5	90 - 110		
Cadmium		0.0500	0.0495	mg/L	99.0	90 - 110		
Chromium		0.0500	0.0488	mg/L	97.5	90 - 110		
Cobalt		0.0500	0.0488	mg/L	97.7	90 - 110		
Lead		0.0500	0.0489	mg/L	97.8	90 - 110		
Manganese		0.0500	0.0487	mg/L	97.5	90 - 110		
Nickel		0.0500	0.0486	mg/L	97.3	90 - 110		
Silver		0.0500	0.0499	mg/L	99.8	90 - 110		
Thallium		0.0500	0.0487	mg/L	97.4	90 - 110		
Vanadium		0.0500	0.0484	mg/L	96.8	90 - 110		
Zinc		0.0500	0.0489	mg/L	97.7	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5318866
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-12

Instrument ID: ICP-MS2 Run Time: 13:17 Method: 6020A

File ID: NI.060117.131707 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0491	mg/L	98.2	90 - 110		
Arsenic		0.0500	0.0484	mg/L	96.9	90 - 110		
Barium		0.0500	0.0492	mg/L	98.3	90 - 110		
Cadmium		0.0500	0.0490	mg/L	98.1	90 - 110		
Chromium		0.0500	0.0478	mg/L	95.7	90 - 110		
Cobalt		0.0500	0.0475	mg/L	95.1	90 - 110		
Lead		0.0500	0.0493	mg/L	98.6	90 - 110		
Manganese		0.0500	0.0478	mg/L	95.7	90 - 110		
Nickel		0.0500	0.0477	mg/L	95.3	90 - 110		
Silver		0.0500	0.0496	mg/L	99.2	90 - 110		
Thallium		0.0500	0.0491	mg/L	98.1	90 - 110		
Vanadium		0.0500	0.0477	mg/L	95.4	90 - 110		
Zinc		0.0500	0.0483	mg/L	96.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5318866

Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-14
Instrument ID: ICP-MS2 Run Time: 13:54 Method: 6020A
File ID: NI.060117.135416 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0494	mg/L	98.9	90 - 110		
Arsenic		0.0500	0.0496	mg/L	99.1	90 - 110		
Barium		0.0500	0.0502	mg/L	100	90 - 110		
Cadmium		0.0500	0.0499	mg/L	99.8	90 - 110		
Chromium		0.0500	0.0478	mg/L	95.6	90 - 110		
Cobalt		0.0500	0.0477	mg/L	95.5	90 - 110		
Lead		0.0500	0.0500	mg/L	100	90 - 110		
Manganese		0.0500	0.0476	mg/L	95.3	90 - 110		
Nickel		0.0500	0.0482	mg/L	96.3	90 - 110		
Silver		0.0500	0.0502	mg/L	100	90 - 110		
Thallium		0.0500	0.0496	mg/L	99.2	90 - 110		
Vanadium		0.0500	0.0477	mg/L	95.4	90 - 110		
Zinc		0.0500	0.0486	mg/L	97.2	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5318866
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-16

Instrument ID: ICP-MS2 Run Time: 14:10 Method: 6020A

File ID: NI.060117.141019 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0500	mg/L	100	90 - 110		
Arsenic		0.0500	0.0500	mg/L	99.9	90 - 110		
Barium		0.0500	0.0510	mg/L	102	90 - 110		
Cadmium		0.0500	0.0505	mg/L	101	90 - 110		
Chromium		0.0500	0.0493	mg/L	98.5	90 - 110		
Cobalt		0.0500	0.0490	mg/L	98.0	90 - 110		
Lead		0.0500	0.0509	mg/L	102	90 - 110		
Manganese		0.0500	0.0493	mg/L	98.6	90 - 110		
Nickel		0.0500	0.0489	mg/L	97.8	90 - 110		
Silver		0.0500	0.0511	mg/L	102	90 - 110		
Thallium		0.0500	0.0503	mg/L	101	90 - 110		
Vanadium		0.0500	0.0492	mg/L	98.3	90 - 110		
Zinc		0.0500	0.0494	mg/L	98.8	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5318866

Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-20
Instrument ID: ICP-MS2 Run Time: 14:23 Method: 6020A
File ID: NI.060117.142308 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0499	mg/L	99.8	90 - 110		
Arsenic		0.0500	0.0492	mg/L	98.5	90 - 110		
Barium		0.0500	0.0498	mg/L	99.7	90 - 110		
Cadmium		0.0500	0.0491	mg/L	98.3	90 - 110		
Chromium		0.0500	0.0481	mg/L	96.2	90 - 110		
Cobalt		0.0500	0.0475	mg/L	95.0	90 - 110		
Lead		0.0500	0.0491	mg/L	98.2	90 - 110		
Manganese		0.0500	0.0481	mg/L	96.2	90 - 110		
Nickel		0.0500	0.0478	mg/L	95.6	90 - 110		
Silver		0.0500	0.0494	mg/L	98.8	90 - 110		
Thallium		0.0500	0.0485	mg/L	97.0	90 - 110		
Vanadium		0.0500	0.0479	mg/L	95.9	90 - 110		
Zinc		0.0500	0.0484	mg/L	96.8	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5318866
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-23

Instrument ID: ICP-MS2 Run Time: 15:03 Method: 6020A

File ID: NI.060117.150347 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0509	mg/L	102	90 - 110		
Arsenic		0.0500	0.0495	mg/L	99.0	90 - 110		
Barium		0.0500	0.0500	mg/L	100	90 - 110		
Cadmium		0.0500	0.0510	mg/L	102	90 - 110		
Chromium		0.0500	0.0486	mg/L	97.2	90 - 110		
Cobalt		0.0500	0.0479	mg/L	95.7	90 - 110		
Lead		0.0500	0.0504	mg/L	101	90 - 110		
Manganese		0.0500	0.0484	mg/L	96.8	90 - 110		
Nickel		0.0500	0.0481	mg/L	96.2	90 - 110		
Silver		0.0500	0.0515	mg/L	103	90 - 110		
Thallium		0.0500	0.0498	mg/L	99.7	90 - 110		
Vanadium		0.0500	0.0485	mg/L	97.0	90 - 110		
Zinc		0.0500	0.0491	mg/L	98.2	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5318866

Report generated 06/02/2017 08:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-27

Instrument ID: ICP-MS2 Run Time: 15:35 Method: 6020A

File ID: NI.060117.153508 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0514	mg/L	103	90 - 110		
Arsenic		0.0500	0.0490	mg/L	98.0	90 - 110		
Barium		0.0500	0.0495	mg/L	98.9	90 - 110		
Cadmium		0.0500	0.0504	mg/L	101	90 - 110		
Chromium		0.0500	0.0479	mg/L	95.8	90 - 110		
Cobalt		0.0500	0.0478	mg/L	95.6	90 - 110		
Lead		0.0500	0.0495	mg/L	99.0	90 - 110		
Manganese		0.0500	0.0482	mg/L	96.3	90 - 110		
Nickel		0.0500	0.0479	mg/L	95.7	90 - 110		
Silver		0.0500	0.0514	mg/L	103	90 - 110		
Thallium		0.0500	0.0493	mg/L	98.6	90 - 110		
Vanadium		0.0500	0.0479	mg/L	95.8	90 - 110		
Zinc		0.0500	0.0486	mg/L	97.1	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 5318866

Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616294-10
Instrument ID: ICP-MS2 Run Time: 16:31 Method: 6020A
File ID: NI.060117.163126 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0503	mg/L	101	90 - 110		
Arsenic		0.0500	0.0498	mg/L	99.7	90 - 110		
Barium		0.0500	0.0494	mg/L	98.7	90 - 110		
Cadmium		0.0500	0.0500	mg/L	100	90 - 110		
Chromium		0.0500	0.0502	mg/L	100	90 - 110		
Cobalt		0.0500	0.0499	mg/L	99.8	90 - 110		
Lead		0.0500	0.0497	mg/L	99.4	90 - 110		
Manganese		0.0500	0.0506	mg/L	101	90 - 110		
Nickel		0.0500	0.0502	mg/L	100	90 - 110		
Silver		0.0500	0.0507	mg/L	101	90 - 110		
Thallium		0.0500	0.0496	mg/L	99.2	90 - 110		
Vanadium		0.0500	0.0500	mg/L	99.9	90 - 110		
Zinc		0.0500	0.0499	mg/L	99.7	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5318866
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616294-12
Instrument ID: ICP-MS2 Run Time: 17:08 Method: 6020A
File ID: NI.060117.170808 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.0500	0.0502	mg/L	100	90 - 110		
Arsenic		0.0500	0.0506	mg/L	101	90 - 110		
Barium		0.0500	0.0505	mg/L	101	90 - 110		
Cadmium		0.0500	0.0498	mg/L	99.5	90 - 110		
Chromium		0.0500	0.0509	mg/L	102	90 - 110		
Cobalt		0.0500	0.0504	mg/L	101	90 - 110		
Lead		0.0500	0.0509	mg/L	102	90 - 110		
Manganese		0.0500	0.0510	mg/L	102	90 - 110		
Nickel		0.0500	0.0504	mg/L	101	90 - 110		
Silver		0.0500	0.0481	mg/L	96.1	90 - 110		
Thallium		0.0500	0.0502	mg/L	100	90 - 110		
Vanadium		0.0500	0.0507	mg/L	101	90 - 110		
Zinc		0.0500	0.0501	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 5318866
Report generated 06/02/2017 08:18

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-07
Instrument ID: ICP-MS2 Run Time: 12:29 Method: 6020A
File ID: NI.060117.122926 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.400	0.439	ug/L	110	70 - 130		
Arsenic		0.400	0.414	ug/L	103	70 - 130		
Barium		0.750	0.708	ug/L	94.4	70 - 130		
Cadmium		0.240	0.243	ug/L	101	70 - 130		
Chromium		0.800	0.629	ug/L	78.6	70 - 130		
Cobalt		0.400	0.386	ug/L	96.5	70 - 130		
Lead		0.200	0.201	ug/L	100	70 - 130		
Manganese		0.500	0.450	ug/L	90.0	70 - 130		
Nickel		1.60	1.47	ug/L	91.8	70 - 130		
Silver		0.400	0.425	ug/L	106	70 - 130		
Thallium		0.0800	0.0914	ug/L	114	70 - 130		
Vanadium		0.400	0.296	ug/L	74.0	70 - 130		
Zinc		6.25	6.19	ug/L	99.0	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5318868
Report generated 06/02/2017 08:24

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-22
Instrument ID: ICP-MS2 Run Time: 14:29 Method: 6020A
File ID: NI.060117.142921 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.400	0.512	ug/L	128	70 - 130		
Arsenic		0.400	0.399	ug/L	99.8	70 - 130		
Barium		0.750	0.761	ug/L	101	70 - 130		
Cadmium		0.240	0.231	ug/L	96.2	70 - 130		
Chromium		0.800	0.474	ug/L	59.3	70 - 130		*
Cobalt		0.400	0.372	ug/L	93.1	70 - 130		
Lead		0.200	0.200	ug/L	100	70 - 130		
Manganese		0.500	0.437	ug/L	87.5	70 - 130		
Nickel		1.60	1.44	ug/L	89.8	70 - 130		
Silver		0.400	0.464	ug/L	116	70 - 130		
Thallium		0.0800	0.0795	ug/L	99.4	70 - 130		
Vanadium		0.400	0.263	ug/L	65.6	70 - 130		*
Zinc		6.25	6.10	ug/L	97.6	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5318868
Report generated 06/02/2017 08:24

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616242-29
Instrument ID: ICP-MS2 Run Time: 15:41 Method: 6020A
File ID: NI.060117.154120 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.400	0.454	ug/L	113	70 - 130		
Arsenic		0.400	0.383	ug/L	95.8	70 - 130		
Barium		0.750	0.692	ug/L	92.3	70 - 130		
Cadmium		0.240	0.228	ug/L	94.9	70 - 130		
Chromium		0.800	0.455	ug/L	56.8	70 - 130		*
Cobalt		0.400	0.347	ug/L	86.7	70 - 130		
Lead		0.200	0.176	ug/L	88.2	70 - 130		
Manganese		0.500	0.408	ug/L	81.6	70 - 130		
Nickel		1.60	1.39	ug/L	87.1	70 - 130		
Silver		0.400	0.424	ug/L	106	70 - 130		
Thallium		0.0800	0.0686	ug/L	85.8	70 - 130		
Vanadium		0.400	0.235	ug/L	58.9	70 - 130		*
Zinc		6.25	5.91	ug/L	94.6	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5318868
Report generated 06/02/2017 08:24

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616294-07
Instrument ID: ICP-MS2 Run Time: 16:22 Method: 6020A
File ID: NI.060117.162208 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.400	0.378	ug/L	94.4	70 - 130		
Arsenic		0.400	0.380	ug/L	94.9	70 - 130		
Barium		0.750	0.704	ug/L	93.9	70 - 130		
Cadmium		0.240	0.229	ug/L	95.5	70 - 130		
Chromium		0.800	0.808	ug/L	101	70 - 130		
Cobalt		0.400	0.381	ug/L	95.2	70 - 130		
Lead		0.200	0.187	ug/L	93.4	70 - 130		
Manganese		0.500	0.456	ug/L	91.3	70 - 130		
Nickel		1.60	1.51	ug/L	94.1	70 - 130		
Silver		0.400	0.375	ug/L	93.9	70 - 130		
Thallium		0.0800	0.0867	ug/L	108	70 - 130		
Vanadium		0.400	0.343	ug/L	85.7	70 - 130		
Zinc		6.25	5.91	ug/L	94.5	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5318868
Report generated 06/02/2017 08:24

Login Number: L17051389 Run Date: 06/01/2017 Sample ID: WG616294-14
Instrument ID: ICP-MS2 Run Time: 17:14 Method: 6020A
File ID: NI.060117.171421 Analyst: JYH QC Key: DOD4
Workgroup (AAB#): WG615899 Cal ID: ICP-MS - 01-JUN-17
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Antimony		0.400	0.419	ug/L	105	70 - 130		
Arsenic		0.400	0.365	ug/L	91.3	70 - 130		
Barium		0.750	0.713	ug/L	95.1	70 - 130		
Cadmium		0.240	0.225	ug/L	93.5	70 - 130		
Chromium		0.800	0.865	ug/L	108	70 - 130		
Cobalt		0.400	0.380	ug/L	95.0	70 - 130		
Lead		0.200	0.194	ug/L	96.8	70 - 130		
Manganese		0.500	0.484	ug/L	96.7	70 - 130		
Nickel		1.60	1.51	ug/L	94.2	70 - 130		
Silver		0.400	0.459	ug/L	115	70 - 130		
Thallium		0.0800	0.0847	ug/L	106	70 - 130		
Vanadium		0.400	0.372	ug/L	93.0	70 - 130		
Zinc		6.25	6.05	ug/L	96.7	70 - 130		

* Exceeds LIMITS Criteria

LLCCV - Modified 1/7/2010
PDF File ID: 5318868
Report generated 06/02/2017 08:24

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17051389 **Workgroup (AAB#):** WG615899
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG616242-08 **File ID:** NI.060117.123231 **Units:** ug/L
Sol. AB : WG616242-09 **File ID:** NI.060117.123537 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Antimony	NS	0.0223	NS	100	100	100	
Arsenic	NS	0.0388	NS	100	102	102	
Barium	NS	0.0416	NS	100	100	100	
Cadmium	NS	-0.0288	NS	100	99.9	99.9	
Chromium	NS	-0.274	NS	100	100	100	
Cobalt	NS	0.0406	NS	100	99.0	99.0	
Lead	NS	0.0130	NS	100	101	101	
Manganese	NS	0.285	NS	100	100	100	
Nickel	NS	0.326	NS	100	98.5	98.5	
Silver	NS	0.00450	NS	100	92.2	92.2	
Thallium	NS	0.00500	NS	100	100	100	
Vanadium	NS	-0.0634	NS	100	99.4	99.4	
Zinc	NS	1.37	NS	100	102	102	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).
+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5318865
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17051389 **Workgroup (AAB#):** WG615899
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG616242-18 **File ID:** NI.060117.141632 **Units:** ug/L
Sol. AB : WG616242-19 **File ID:** NI.060117.141937 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Antimony	NS	0.0272	NS	100	99.4	99.4	
Arsenic	NS	0.0199	NS	100	99.9	99.9	
Barium	NS	0.0468	NS	100	101	101	
Cadmium	NS	0.00890	NS	100	98.9	98.9	
Chromium	NS	-0.337	NS	100	96.5	96.5	
Cobalt	NS	0.0404	NS	100	96.1	96.1	
Lead	NS	0.00990	NS	100	100	100	
Manganese	NS	0.198	NS	100	96.1	96.1	
Nickel	NS	0.314	NS	100	96.3	96.3	
Silver	NS	0.00430	NS	100	93.8	93.8	
Thallium	NS	0.00250	NS	100	98.9	98.9	
Vanadium	NS	-0.0810	NS	100	96.6	96.6	
Zinc	NS	1.89	NS	100	99.9	99.9	

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: 5318865
Report generated 06/02/2017 08:18

Login number: L17051389 **Workgroup (AAB#):** WG615899
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG616242-25 **File ID:** NI.060117.152855 **Units:** ug/L
Sol. AB : WG616242-26 **File ID:** NI.060117.153200 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Antimony	NS	0.0191	NS	100	101	101	
Arsenic	NS	0.00820	NS	100	101	101	
Barium	NS	0.0574	NS	100	99.7	99.7	
Cadmium	NS	0.0179	NS	100	100	100	
Chromium	NS	-0.339	NS	100	96.7	96.7	
Cobalt	NS	0.0443	NS	100	95.5	95.5	
Lead	NS	0.0153	NS	100	100	100	
Manganese	NS	0.172	NS	100	96.4	96.4	
Nickel	NS	0.321	NS	100	95.2	95.2	
Silver	NS	0.00530	NS	100	60.4	60.4	*
Thallium	NS	-0.00250	NS	100	99.6	99.6	
Vanadium	NS	-0.0877	NS	100	96.7	96.7	
Zinc	NS	1.61	NS	100	100	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: 5318865
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L17051389 **Workgroup (AAB#):** WG615899
Instrument ID: ICP-MS2 **Method:** 6020A
Sol. A : WG616294-08 **File ID:** NI.060117.162513 **Units:** ug/L
Sol. AB : WG616294-09 **File ID:** NI.060117.162819 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Antimony	NS	0.0214	NS	100	98.6	98.6	
Arsenic	NS	0.00550	NS	100	100	100	
Barium	NS	0.0355	NS	100	97.8	97.8	
Cadmium	NS	-0.00380	NS	100	95.8	95.8	
Chromium	NS	-0.110	NS	100	99.5	99.5	
Cobalt	NS	0.0505	NS	100	100	100	
Lead	NS	0.0227	NS	100	98.7	98.7	
Manganese	NS	0.184	NS	100	100	100	
Nickel	NS	0.323	NS	100	99.4	99.4	
Silver	NS	0.00970	NS	100	38.1	38.1	*
Thallium	NS	0.00660	NS	100	98.2	98.2	
Vanadium	NS	-0.0253	NS	100	99.4	99.4	
Zinc	NS	1.15	NS	100	102	102	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).
+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 5318865
Report generated 06/02/2017 08:18

Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L17051389 **Analytical Method:** 6020
Analytical Workgroup: WG615899 **Matrix:** 1
Instrument: ICP-MS2 **Analyst:** JYH
ICAL Date: 01-JUN-2017 12:10

			BISMUTH	GERMANIUM	INDIUM
Sample	Type	Run Date	% Rec	% Rec	% Rec
L17051380-24	SAMP	01-JUN-2017 13:07	93.208	98.697	95.404
L17051389-01	SAMP	01-JUN-2017 14:04	88.798	94.076	91.855
WG615832-02	BLANK	01-JUN-2017 12:44	98.166	102.456	101.363
WG615832-03	LCS	01-JUN-2017 12:48	98.404	102.466	100.72
WG615832-04	FLT_BLK	01-JUN-2017 12:52	97.678	102.09	99.646
WG615899-01	PSPK	01-JUN-2017 13:10	93.886	98.888	96.468
WG615899-02	SERIAL	01-JUN-2017 13:13	94.518	95.3	94.898
WG616242-05	ICV	01-JUN-2017 12:23	96.559	99.636	99.124
WG616242-06	ICB	01-JUN-2017 12:26	89.35	90.125	90.498
WG616242-07	LLICV	01-JUN-2017 12:29	96.571	98.586	97.72
WG616242-08	ICS	01-JUN-2017 12:32	92.29	95.479	94.69
WG616242-09	ICS	01-JUN-2017 12:35	97.185	102.955	100.479
WG616242-10	CCV	01-JUN-2017 12:38	96.314	100.644	99.217
WG616242-11	CCB	01-JUN-2017 12:41	93.265	92.871	94.169
WG616242-12	CCV	01-JUN-2017 13:17	96.903	100.627	98.165
WG616242-13	CCB	01-JUN-2017 13:20	95.424	97.482	95.401
WG616242-14	CCV	01-JUN-2017 13:54	92.72	93.463	92.276
WG616242-15	CCB	01-JUN-2017 13:57	93.098	92.756	90.717
WG616242-16	CCV	01-JUN-2017 14:10	93.707	96.572	95.075
WG616242-17	CCB	01-JUN-2017 14:13	86.644	84.446	84.334
WG616242-18	ICS	01-JUN-2017 14:16	89.034	89.803	88.464
WG616242-19	ICS	01-JUN-2017 14:19	94.682	97.551	95.288
WG616242-20	CCV	01-JUN-2017 14:23	95.326	95.937	95.914
WG616242-21	CCB	01-JUN-2017 14:26	93.053	92.968	92.612
WG616242-22	LLCCV	01-JUN-2017 14:29	93.645	93.39	92.483
WG616242-23	CCV	01-JUN-2017 15:03	92.115	95.792	93.566
WG616242-24	CCB	01-JUN-2017 15:06	92.478	92.982	92.816
WG616242-25	ICS	01-JUN-2017 15:28	86.578	89.711	87.701
WG616242-26	ICS	01-JUN-2017 15:32	92.627	98.219	95.394
WG616242-27	CCV	01-JUN-2017 15:35	92.215	95.953	93.465
WG616242-28	CCB	01-JUN-2017 15:38	92.153	93.964	92.823
WG616242-29	LLCCV	01-JUN-2017 15:41	92.715	94.288	92.77

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: 5318861
Report generated: 06/02/2017 08:24

Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L17051389 **Analytical Method:** 6020
Analytical Workgroup: WG615899 **Matrix:** 1
Instrument: ICP-MS2 **Analyst:** JYH
ICAL Date: 01-JUN-2017 16:03

			BISMUTH	GERMANIUM	INDIUM
Sample	Type	Run Date	% Rec	% Rec	% Rec
L17051389-01	SAMP	01-JUN-2017 16:58	95.809	103.374	101.88
WG615832-02	BLANK	01-JUN-2017 16:37	100.281	101.53	102.293
WG615832-03	LCS	01-JUN-2017 16:40	102.647	103.326	103.549
WG615899-03	PSPK	01-JUN-2017 17:01	96.373	104.734	104.188
WG615899-04	SERIAL	01-JUN-2017 17:05	95.924	98.994	98.606
WG616294-05	ICV	01-JUN-2017 16:15	100.326	102.975	102.191
WG616294-06	ICB	01-JUN-2017 16:19	99.658	100.024	100.531
WG616294-07	LLICV	01-JUN-2017 16:22	97.255	97.751	98.195
WG616294-08	ICS	01-JUN-2017 16:25	95.058	96.941	96.244
WG616294-09	ICS	01-JUN-2017 16:28	101.21	104.372	104.745
WG616294-10	CCV	01-JUN-2017 16:31	101.546	104.751	104.031
WG616294-11	CCB	01-JUN-2017 16:34	99.65	102.086	101.124
WG616294-12	CCV	01-JUN-2017 17:08	99.286	102.771	102.472
WG616294-13	CCB	01-JUN-2017 17:11	99.945	100.469	100.599
WG616294-14	LLCCV	01-JUN-2017 17:14	98.957	99.621	98.494

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: 5318861
Report generated: 06/02/2017 08:24

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L17051389 **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: 5318860
Report generated: 06/02/2017 08:18

2.4 General Chemistry Data

2.4.1 Method 9056

2.4.1.1 Summary Data

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	9056	**Prep Date:**	05/25/2017 16:04
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG615591	**Analyst:**	CAS	**Run Date:**	05/26/2017 01:22
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	I2_052517-32
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	121		10.0	5.00	2.50

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

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	9056	**Prep Date:**	05/25/2017 16:04
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG615591	**Analyst:**	CAS	**Run Date:**	05/26/2017 01:41
Collect Date:	05/24/2017 15:00	**Dilution:**	50	**File ID:**	I2_052517-33
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	460		20.0	10.0	5.00

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

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.4.1.2 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

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC2 Dataset: 052517 IC2.SEQ
Analyst1: CAS Analyst2: NA
Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254
Eluent ID#: RGT40258
Column 1 ID: AG14A-4MM Column 2 ID: AS14A-4MM
Workgroups: Analytical WG615591 (Waters)
Internal STD: NA Surrogate STD: NA Calibration STD STD81395 (04-11-2017)
CCV STD: STD81395 LCS STD: STD81396 MS/MSD STD: STD81396

Comments: System Backpressure: 1809 psi

Samples L17051318 (-03,05,07,09,11,13,15) were analyzed at dilutions only due to their pre-run screen results for sulfate, which were greater than the calibration maximum.

Samples L17051347-03 and L17051348-03 were analyzed at dilutions only due to their pre-run screen results for sulfate, which were greater than 200 ppm.

Samples L17051389-01 and L17051391-01 were analyzed at dilutions only due to their pre-run screen results for chloride, which were greater than 200 ppm.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I2_052517-01	ELUENT	1	1		05/25/17 15:25
2	I2_052517-02	DI WATER	1	1		05/25/17 15:45
3	I2_052517-03	WG615593-01 ANION CCV	1	1	STD81395	05/25/17 16:04
4	I2_052517-04	WG615593-02 ANION CCB	1	1		05/25/17 16:23
5	I2_052517-05	WG615591-01 ANION BLANK	1	1		05/25/17 16:42
6	I2_052517-06	WG615591-02 ANION LCS	1	1	STD81396	05/25/17 17:02
7	I2_052517-07	L17051318-01 (SO4) REF	1	1		05/25/17 17:21
8	I2_052517-08	WG615591-04 DUP 1318-01	2	1		05/25/17 17:40
9	I2_052517-09	WG615591-05 MS 1318-01	2	1	STD81396	05/25/17 17:59
10	I2_052517-10	WG615591-06 MSD 1318-01	2	1	STD81396	05/25/17 18:19
11	I2_052517-11	L17051318-03 (SO4) 20x (NR)	2	20		05/25/17 18:38
12	I2_052517-12	L17051318-05 (SO4) 50x	2	50		05/25/17 18:57
13	I2_052517-13	L17051318-07 (SO4) 50x	2	50		05/25/17 19:16
14	I2_052517-14	L17051318-09 (SO4) 10x	2	10		05/25/17 19:35
15	I2_052517-15	WG615593-03 ANION CCV	1	1	STD81395	05/25/17 19:55
16	I2_052517-16	WG615593-04 ANION CCB	1	1		05/25/17 20:14
17	I2_052517-17	L17051318-11 (SO4) 10x	2	10		05/25/17 20:33
18	I2_052517-18	L17051318-13 (SO4) 50x	2	50		05/25/17 20:52
19	I2_052517-19	L17051318-15 (SO4) 50x	2	50		05/25/17 21:12
20	I2_052517-20	L17051318-17 (SO4)	2	1		05/25/17 21:31
21	I2_052517-21	L17051318-19 (SO4)	2	1		05/25/17 21:50
22	I2_052517-22	L17051343-01 (F,CL,BR,SO4) REF	1	1		05/25/17 22:09
23	I2_052517-23	WG615591-08 DUP 1343-01	1	1		05/25/17 22:29
24	I2_052517-24	L17051347-03 (CL,SO4) 5x	2	5		05/25/17 22:48
25	I2_052517-25	L17051347-03 RR SO4 10x (NR)	2	10		05/25/17 23:07
26	I2_052517-26	WG615593-05 ANION CCV	1	1	STD81395	05/25/17 23:26
27	I2_052517-27	WG615593-06 ANION CCB	1	1		05/25/17 23:46
28	I2_052517-28	L17051348-03 (CL,SO4) 5x	2	5		05/26/17 00:05

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: IC2 Dataset: 052517 IC2.SEQ

Analyst1: CAS Analyst2: NA

Method: 300/9056 SOP: IC01 Rev: 19

Maintenance Log ID: Syringe Filter Lot#: 161205254

Eluent ID#: RGT40258

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

Analytical WG615591 (Waters)

Internal STD: NA Surrogate STD: NA STD81395 (04-11-2017)

CCV STD: STD81395 LCS STD: STD81396 STD81396

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
29	I2_052517-29	L17051348-03 RR SO4 10x	2	10		05/26/17 00:24
30	I2_052517-30	L17051383-01 (SO4)	1	1		05/26/17 00:43
31	I2_052517-31	L17051383-02 (SO4)	1	1		05/26/17 01:03
32	I2_052517-32	L17051389-01 (CL,SO4) 5x	1	5		05/26/17 01:22
33	I2_052517-33	L17051389-01 RR CL 50x	1	50		05/26/17 01:41
34	I2_052517-34	L17051391-01 (CL,SO4) 5x	1	5		05/26/17 02:00
35	I2_052517-35	L17051391-01 RR CL 50x	1	50		05/26/17 02:19
36	I2_052517-36	WG615593-07 ANION CCV	1	1	STD81395	05/26/17 02:39
37	I2_052517-37	WG615593-08 ANION CCB	1	1		05/26/17 02:58
38	I2_052517-38	WG615593-09 ANION CCV	1	1	STD81395	05/26/17 08:29
39	I2_052517-39	WG615593-10 ANION CCB	1	1		05/26/17 08:48
40	I2_052517-40	L17051318-03 (SO4) 50x	2	50		05/26/17 09:08
41	I2_052517-41	WG615593-11 ANION CCV	1	1	STD81395	05/26/17 09:27
42	I2_052517-42	WG615593-12 ANION CCB	1	1		05/26/17 09:46
43	I2_052517-43	END	1	1		05/26/17 10:05

Comments

Seq.	Rerun	Dil.	Reason	Analytes

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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: 25-MAY-2017
Analyst: CAS
Analyst: NA
Method: 300/9056
Instrument: IC2
Curve Workgroup: NA
Runlog ID: 82427
Analytical Workgroups: L17051318, L17051343, 1347, 1348, 1383, 1389, 1391

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)	1809 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:
26-MAY-2017

Secondary Reviewer:
26-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-26-2017 16:17:29

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 9056 **AAB#:** WG615591

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/25/2017	1	2		05/26/17	1.4	2	
LH18/24-SP140-7442-GRAB	01	05/24/17					05/25/2017	1	2		05/26/17	1.4	2	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5312941
Report generated 05/30/2017 10:45

METHOD BLANK SUMMARY

Login Number: L17051389
Blank File ID: I2_052517-05
Prep Date: 05/25/17 16:04
Analyzed Date: 05/25/17 16:42
Analyst: CAS

Work Group: WG615591
Blank Sample ID: WG615591-01
Instrument ID: IC2
Method: 9056

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615591-02	I2_052517-06	05/25/17 17:02	01
DUP	WG615591-04	I2_052517-08	05/25/17 17:40	01
DUP	WG615591-08	I2_052517-23	05/25/17 22:29	01
LH18/24-SP140-7442-GRAB	L17051389-01	I2_052517-32	05/26/17 01:22	DL01
LH18/24-SP140-7442-GRAB	L17051389-01	I2_052517-33	05/26/17 01:41	DL02

Report Name: BLANK_SUMMARY
PDF File ID: 5312942
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051389 Prep Date: 05/25/17 16:04 Sample ID: WG615591-01
Instrument ID: IC2 Run Date: 05/25/17 16:42 Prep Method: 9056
File ID: I2_052517-05 Analyst: CAS Method: 9056
Workgroup (AAB#): WG615591 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: 5312943
30-MAY-2017 10:45

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 **Run Date:** 05/25/2017 **Sample ID:** WG615591-02
Instrument ID: IC2 **Run Time:** 17:02 **Prep Method:** 9056
File ID: I2_052517-06 **Analyst:** CAS **Method:** 9056
Workgroup (AAB#): WG615591 **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	8.25	103	90 - 110	
Sulfate	40.0	41.6	104	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 5312944
Report generated: 05/30/2017 10:45

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17051389
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: 5314574
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17051389
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: 5314574
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17051389
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: 5314574
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051389 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: 5314575
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 05/25/2017 Sample ID: WG615593-02
Instrument ID: IC2 Run Time: 16:23 Method: 9056
File ID: I2_052517-04 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG615591 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: 5312946
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 05/25/2017 Sample ID: WG615593-04
Instrument ID: IC2 Run Time: 20:14 Method: 9056
File ID: I2_052517-16 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG615591 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: 5312946
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 05/25/2017 Sample ID: WG615593-06
Instrument ID: IC2 Run Time: 23:46 Method: 9056
File ID: I2_052517-27 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG615591 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: 5312946
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615593-08
Instrument ID: IC2 Run Time: 02:58 Method: 9056
File ID: I2_052517-37 Analyst: CAS Units: mg/L
Workgroup (AAB#): WG615591 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: 5312946
Report generated 05/30/2017 10:45

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 05/25/2017 Sample ID: WG615593-01

Instrument ID: IC2 Run Time: 16:04 Method: 9056

File ID: I2_052517-03 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG615591 Cal ID: IC2 - 11-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	7.79	mg/L	4.89	2.59	10	
Sulfate		40.0	38.9	mg/L	6.31	2.67	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5312945

Report generated 05/30/2017 10:45

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 05/25/2017 Sample ID: WG615593-03

Instrument ID: IC2 Run Time: 19:55 Method: 9056

File ID: I2_052517-15 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG615591 Cal ID: IC2 - 11-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.26	mg/L	4.59	3.24	10	
Sulfate		40.0	41.6	mg/L	5.86	4.02	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5312945

Report generated 05/30/2017 10:45

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 05/25/2017 Sample ID: WG615593-05

Instrument ID: IC2 Run Time: 23:26 Method: 9056

File ID: I2_052517-26 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG615591 Cal ID: IC2 - 11-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.30	mg/L	4.57	3.69	10	
Sulfate		40.0	41.6	mg/L	5.87	3.88	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5312945

Report generated 05/30/2017 10:45

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L17051389 Run Date: 05/26/2017 Sample ID: WG615593-07

Instrument ID: IC2 Run Time: 02:39 Method: 9056

File ID: I2_052517-36 Analyst: CAS QC Key: DOD4

Workgroup (AAB#): WG615591 Cal ID: IC2 - 11-APR-17

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Chloride		8.00	8.30	mg/L	4.56	3.80	10	
Sulfate		40.0	41.6	mg/L	5.86	4.02	10	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5312945

Report generated 05/30/2017 10:45

2.4 General Chemistry Data

2.4.2 COD Data

2.4.2.1 Summary Data

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	METHOD	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	410.4 MOD	**Cal Date:**	02/27/2017 11:47
Workgroup #:	WG615777	**Analyst:**	TMM	**Run Date:**	05/26/2017 08:30
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	00.1705260830-12
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chemical Oxygen Demand	COD	122		40.0	20.0	10.0

2.4.2.2 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: 26-MAY-2017
Analyst: TMM
Analyst: NA
Method: COD-LOW
Instrument: V-1200
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG615777

Calibration/Linearity	2/27/17
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:
26-MAY-2017

Secondary Reviewer:
30-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-30-2017 09:33:48

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 410.4 MOD AAB#: WG615777

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/26/2017	1.7	28		05/26/17	1.7	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5313746
Report generated 05/30/2017 08:25

METHOD BLANK SUMMARY

Login Number:	L17051389	**Work Group:**	WG615777
Blank File ID:	00.1705260830-03	**Blank Sample ID:**	WG615777-01
Prep Date:	05/26/17 08:30	**Instrument ID:**	V-1200
Analyzed Date:	05/26/17 08:30	**Method:**	410.4 MOD
Analyst:	TMM		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615777-02	00.1705260830-04	05/26/17 08:30	
LCS2	WG615777-03	00.1705260830-05	05/26/17 08:30	
LH18/24-SP140-7442-GRAB	L17051389-01	00.1705260830-12	05/26/17 08:30	
DUP	WG615777-05	00.1705260830-15	05/26/17 08:30	

Report Name: BLANK_SUMMARY
PDF File ID: 5313747
Report generated 05/30/2017 08:25

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L17051389 Prep Date:05/26/17 08:30 Sample ID:WG615777-01
Instrument ID:V-1200 Run Date:05/26/17 08:30 Prep Method:METHOD
File ID:00.1705260830-03 Analyst:TMM Method:410.4 MOD
Workgroup (AAB#):WG615777 Matrix:Water Units:mg/L
Contract #: Cal ID:V-1200-12-APR-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Chemical Oxygen Demand	10.0	40.0	10.0	1	J

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: 5313748
30-MAY-2017 08:25

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 Analyst: TMM Prep Method: METHOD
Instrument ID: V-1200 Matrix: Water Method: 410.4 MOD
Workgroup (AAB#): WG615777 Units: mg/L
QC Key: DOD4 Lot #: STD77863

Sample ID: WG615777-02 LCS File ID: 00.1705260830-04 Run Date: 05/26/2017 08:30
Sample ID: WG615777-03 LCS2 File ID: 00.1705260830-05 Run Date: 05/26/2017 08:30

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chemical Oxygen Demand	100	104	104	100	106	106	1.27	90 - 110	20	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5313749
Report generated: 05/30/2017 08:25

2.4.2.3 Raw Data

WG604321

Curves - low

Parameter: COD-low

Spectrophotometer: V-1200

Calibration (Curve) standard stock: STD 80541

Concentration: 10,000mg/L

Recipe for preparation of curve standards found in:
SOP: 5465 Revision: 17 Page: 10

Second Source Stock: 77863 (concentration: 1000mg/L)

Daily Preparation: 5(100)/50

concentration = 100

Calibration Standards (mg/L)	Volume (mL)	Cell Size (cm)	Wavelength (nm)	Absorbance	
5 (150)	2mL	1cm	420nm	0.205	0.197
6 (100)				0.326	0.316
7 (50)				0.437	0.442
8 (30)				0.482	0.495
9 (20)				0.505	0.502
BLK				0.541	0.561
2nd source (100)	↓	↓	↓	0.338	0.328

Analyst: Shaelyn Cauley Date/Time: 2-27-17 1145

DCN#124219

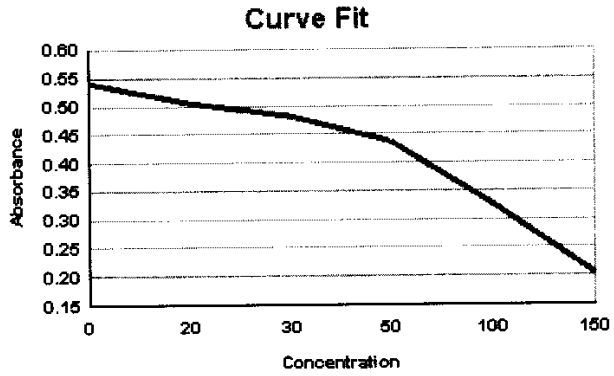
Microbac Laboratories Inc.
INITIAL CALIBRATION

Workgroup: WG604321
Analytical Method: 400
Instrument ID: V-1200

Analyst: SDC
Initial Calibration Date: 02/27/2017

Analyte: CHEMICAL OXYGEN DEMAND
Number of Points: 6
Slope: -0.00225645
Y-Intercept: 0.547626
Coef. Of Correlation (R^2): 0.998855
Coef. Of Correlation (R): 0.999427

Concentration X	Absorbance Y	X^2	X * Y	Y-Fitted (mX^2+B)
0.00	0.541	0.00	0.00	0.547626
20.0	0.505	400	10.1	0.502497
30.0	0.482	900	14.5	0.479933
50.0	0.437	2500	21.9	0.434804
100	0.326	10000	32.6	0.321981
150	0.205	22500	30.8	0.209158



WG_ICAL_CAL_WET - Modified 03/06/2008
Report generated 02/28/2017 14:28

[redacted]

Microbac Laboratories Inc.
ALTERNATE SOURCE REPORT

Workgroup #: WG604321
File ID: 00.1702271147-07
CCV ID: WG604321-07
Units: mg/L
Analyte: CHEMICAL OXYGEN DEMAND

Instrument ID: V-1200
Run Date: 02/27/2017
Run Time: 11:47
Analyst: SDC
Cal ID: V-1200 - 27-FEB-17 11:47:06

Analyte	Expected	Found	RF	%D	Q
Chemical Oxygen Demand	100	92.9	0.00338	7.1	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_SSCV - Modified 03/06/2008
Report generated 02/28/2017 14:29

[redacted]

WORKGROUP: WG615777

COD-low

EPA 410.4/SM5220D/HACH 8000 | CCV: 80541 | LCS: 77863 | Spike: 77863

SOP K4105 Revision #: 18 | Daily dilution: 3(10000)/50 = 6000 | Daily dilution: 5(1000)/50 | Daily dilution: 0.1(1000)/2

Curve ID: 2/27/17 | Daily dilution: 5(600)/50 = 60 | Daily dilution: =1000 | Daily dilution: =50

Wavelength (nm): 420 | Hot Block Temp: 150 C | Spectrophotometer: V-1200

All samples use 2ml | Hot Block ID: COD#2 | COD vial Lot #47003C

SAMPLE	DILUTION	ABSORBANCE 1	ABSORBANCE 2
CCV: 60 mg/L		0.408	
BLANK:		0.525	
LCS: 1000 mg/L		0.312	
LCS DUP: 1000 mg/L		0.309	
05-1428-01		0.520	
02		0.544	
03		0.555	
04		0.484	
05		0.535	
06		0.545	
05-1389-01		0.273	
05-1391-01		0.510	
05-1410-14		0.531	
RRM on high 05-1424-02		0.189	
DUP: 05-1410-14		0.524	
MS: (50)		0.404	
MDS: (50)		0.389	
CCV: 60 mg/L		0.407	

ANALYST: Jammy Mamos

DATE/TIME: (on) 5/26/17 @ 8:30

DATE/TIME: (off) 10:30

DCN#126103

Microbac Laboratories Inc.
SAMPLE REPORT

Workgroup: WG615777
Analyte: CHEMICAL OXYGEN DEMAND

Analyst: TMM
Date: 05/26/2017

Sample ID	I Vol	F Vol	Response	Slope	Y Intercept	Anal. Conc.	Rep. Conc.	Dil	Units
WG615777-01	2	2	0.525	-0.002256	0.5476	10.027	10.027	1	mg/L
WG615777-02	2	2	0.312	-0.002256	0.5476	104.42	104.42	1	mg/L
WG615777-03	2	2	0.309	-0.002256	0.5476	105.75	105.75	1	mg/L
L17051428-01	2	2	0.520	-0.002256	0.5476	12.243	12.243 F	1	mg/L
L17051428-02	2	2	0.544	-0.002256	0.5476	1.6071	ND	1	mg/L
L17051428-03	2	2	0.555	-0.002256	0.5476	-3.2678	ND	1	mg/L
L17051428-04	2	2	0.484	-0.002256	0.5476	28.198	28.198	1	mg/L
L17051428-05	2	2	0.535	-0.002256	0.5476	5.5957	ND	1	mg/L
L17051428-06	2	2	0.545	-0.002256	0.5476	1.1640	ND	1	mg/L
L17051389-01	2	2	0.273	-0.002256	0.5476	121.71	121.71	1	mg/L
L17051391-01	2	2	0.510	-0.002256	0.5476	16.675	16.675 F	1	mg/L
WG615777-04	2	2	0.531	-0.002256	0.5476	7.3684	7.3684	1	mg/L
L17051410-14	2	2	0.531	-0.002256	0.5476	7.3684	ND	1	mg/L
WG615777-05	2	2	0.524	-0.002256	0.5476	10.471	10.471	1	mg/L
WG615777-06	2	2	0.404	-0.002256	0.5476	63.651	63.651	1	mg/L
WG615777-07	2	2	0.389	-0.002256	0.5476	70.299	70.299	1	mg/L

[redacted]

UV_SAMPLE_REPORT - Modified 03/06/2008

Report generated 05/26/2017 14:35

Microbac Laboratories Inc.
CONTINUING CALIBRATION REPORT

Workgroup #: WG615801
File ID: 00.1705260830-01
CCV ID: WG615801-01
Units: mg/L
Analyte: CHEMICAL OXYGEN DEMAND

Instrument ID: V-1200
Run Date: 05/26/2017
Run Time: 08:30
Analyst: TMM
Cal ID: V-1200 - 12-APR-17

Analyte	Expected	Found	RF	%D	Q
Chemical Oxygen Demand	60	61.9	0.00680	3.2	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/26/2017 14:36

[redacted]

Microbac Laboratories Inc.

CONTINUING CALIBRATION REPORT

Workgroup #: WG615801
File ID: 00.1705260830-18
CCV ID: WG615801-03
Units: mg/L
Analyte: CHEMICAL OXYGEN DEMAND

Instrument ID: V-1200
Run Date: 05/26/2017
Run Time: 08:30
Analyst: TMM
Cal ID: V-1200 - 12-APR-17

Analyte	Expected	Found	RF	%D	Q
Chemical Oxygen Demand	60	62.3	0.00678	3.8	

* Exceeds %D Limit

CCC Calibrtion Check Compounds
SPCC System Performance Check Compounds

WET_WG_CCV - Modified 03/06/2008

Report generated 05/26/2017 14:36

[redacted]

2.4 General Chemistry Data

2.4.3 Oil and Grease Data

2.4.3.1 Summary Data

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051389-01	**PrePrep Method:**	N/A	**Instrument:**	HORIZON
Client ID:	LH18/24-SP140-7442-GRAB	**Prep Method:**	1664A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	1664A	**Cal Date:**	
Workgroup #:	WG615965	**Analyst:**	AWE	**Run Date:**	05/31/2017 08:46
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	ON.1705310846-08
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
n-Hexane Extractable Material (HEM)	OILGREASE	2.80	U	5.60	2.80	1.40

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051389
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.4.3.2 QC Summary Data

Example Oil and Grease - HEM Calculations

[(WT2 - WT1) * 1000000]/volume = mg/L

where:

WT1 = weight (grams) of empty container.
WT2 = weight (grams) of dried sample and container.
1000000 = factor to get to mg/L.
volume = mL of sample used.

The samples are not blank corrected.

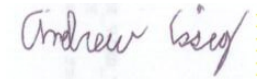
Microbac Laboratories Inc.

Data Checklist

Date: 31-MAY-2017
Analyst: AWE
Analyst: NA
Method: HEM
Instrument: HORIZON
Curve Workgroup: NA
Runlog ID:
Analytical Workgroups: WG615965

Calibration/Linearity	05/31/17
Second Source Check	
ICV/CCV (std)	
ICB/CCB	
Blank	X
LCS/LCS Dup	X
MS/MSD	
Duplicate	
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	X
Primary Reviewer	AWE
Secondary Reviewer	DIH
Comments	

Primary Reviewer:
01-JUN-2017



Secondary Reviewer:
01-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-01-2017 10:23:57

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 1664A AAB#: WG615965

Login Number: L17051389

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-SP140-7442-GRAB	01	05/24/17					05/31/2017	6.7	28		05/31/17	6.7	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5317597
Report generated 06/01/2017 09:47

METHOD BLANK SUMMARY

Login Number:	L17051389	**Work Group:**	WG615965
Blank File ID:	ON.1705310846-01	**Blank Sample ID:**	WG615965-01
Prep Date:	05/31/17 08:46	**Instrument ID:**	HORIZON
Analyzed Date:	05/31/17 08:46	**Method:**	1664A
Analyst:	AWE		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615965-02	ON.1705310846-02	05/31/17 08:46	
LCS2	WG615965-03	ON.1705310846-03	05/31/17 08:46	
LH18/24-SP140-7442-GRAB	L17051389-01	ON.1705310846-08	05/31/17 08:46	

Report Name: BLANK_SUMMARY
PDF File ID: 5317598
Report generated 06/01/2017 09:47

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L17051389 Prep Date:05/31/17 08:46 Sample ID:WG615965-01
Instrument ID:HORIZON Run Date:05/31/17 08:46 Prep Method:1664A
File ID:ON.1705310846-01 Analyst:AWE Method:1664A
Workgroup (AAB#):WG615965 Matrix:Water Units:mg/L
Contract #: Cal ID:HORIZO-

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
n-Hexane Extractable Material (HEM)	1.40	5.60	1.40	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: 5317599
01-JUN-2017 09:47

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051389 Analyst: AWE Prep Method: 1664A
Instrument ID: HORIZON Matrix: Water Method: 1664A
Workgroup (AAB#): WG615965 Units: mg/L
QC Key: DOD4 Lot #: STD82076

Sample ID: WG615965-02 LCS File ID: ON.1705310846-02 Run Date: 05/31/2017 08:46
Sample ID: WG615965-03 LCS2 File ID: ON.1705310846-03 Run Date: 05/31/2017 08:46

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
n-Hexane Extractable Material (HEM)	40.0	33.1	82.8	40.0	31.9	79.8	3.69	78 - 114	18	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5317600
Report generated: 06/01/2017 09:47

2.4.3.3 Raw Data

WORKGROUP: WG615965

Hexane Extractable Material

SOP K1664 Revision #: 12
EPA Method 1664A HEM or NPM

LCS: Std 82076
Daily Dilution: 5(8000)/1000=40
Matrix Spike: _____
Daily Dilution: _____

Speed Vap Temperature: 40
Balance: ANDGR-202 / other
Instrument: Horizon 3000XL PFE401

All results are mg/L

	Sample	Disk Type	pH Check	EXT. #	Volume (mL)	Initial Weight WT1 (g)	Dry Weight WT2 (g)	Comments
B	BLANK	✓	✓	3	1000			
L	LCS: _____mg/L	✓	✓	2	1000			
L2	LCSDUP: _____mg/L	✓	✓	1	1000			
1	051367-02	✓	✓	1	1000			
2	-04	✓	✓	2	1000			
3	-06	✓	✓	3	980			
4	051369-01	✓	✓	1,2	360			*
5	051389-01	✓	✓	3	1000			
6	051391-01	✓	✓	3	1000			
7	051417-05	✓	✓	1	1000			
8	051441-01	✓	✓	2	1000			
9	-02	✓	✓	3	1000			
10	051550-01	✓	✓	1	1000			
11	-02	✓	✓	2	1006			
12	-03	✓	✓	3	1006			
13	-04	✓	✓	1	1006			
14	051559-01	✓	✓	1	950			
15	051574-01	✓	✓	1,2,3	430			*
	DUP							

Beginning weight check
2 mg 0.0019
1 g 1.0001

Ending weight check
2 mg 0.0020
1 g 1.0001

Disk Type:			
P47 (Pacific 47mm)	P90 (Pacific 90mm)	PF (pre filter)	Hexane COA19521
Lot: _____	Lot: 510274	Lot: 70610210	Lot: 168389
			Silica Gel: _____
pH paper 15A15163	Lot #: _____		Lot: _____

Analyst: Andrew Ensing Date / Time: 5-31-17 0846 Daily Maintenance Witness: EPT

*Duplicates/MS/MSD are analyzed only if sufficient volume is submitted by the client.

* Sample had to be split and run on different stations due to thickness. All sample collected after running will be evaporated in same pan.

DCN#126142

Microbac Laboratories Inc.
GRAVIMETRIC REPORT

Workgroup (AAB#): WG615965
Analyst: AWE
Analyte: OIL & GREASE
Balance: BAL004

Method: 1664A
SOP: K1664 Revison 12
Spike Solution: STD82076
Daily Dilution:

SAMPLE [illegible]	Instrument #	HORIZONTAL VOL	INITIAL WT	DRY WT A	DRY WT B	DRY WT C	Anal. Conc	Rep. Conc.	Units
WG615965-01	B	1000	2.2935	2.2939	2.2938			0.3000	mg/L
WG615965-02	L	1000	2.3115	2.3448	2.3446			33.10	mg/L
WG615965-03	L2	1000	2.2789	2.3107	2.3108			31.90	mg/L
L17051367-02	1	1000	2.2603	2.2603	2.2604			ND	mg/L
L17051367-04	2	1000	2.289	2.2892	2.2892			ND	mg/L
L17051367-06	3	980	2.3307	2.3306	2.3308			ND	mg/L
L17051369-01	4	360	2.3505	2.3582	2.3581			21.11	mg/L
L17051389-01	5	1000	2.2887	2.2887	2.2891			ND	mg/L
L17051391-01	6	1000	2.3896	2.3904	2.3908			ND	mg/L
L17051417-05	7	1000	2.2919	2.2926	2.2925			ND	mg/L
L17051441-01	8	1000	2.2922	2.2929	2.2929			ND	mg/L
L17051441-02	9	1000	2.2618	2.2626	2.2627			ND	mg/L
L17051550-01	10	1000	2.3522	2.3673	2.3676			15.40	mg/L
L17051550-02	11	1000	2.3147	2.3167	2.3167			ND	mg/L
L17051550-03	12	1000	2.3369	2.34	2.3401			ND	mg/L
L17051550-04	13	1000	2.3652	2.3763	2.3764			11.20	mg/L
L17051559-01	14	950	2.3305	2.3306	2.3307			ND	mg/L
L17051574-01	15	430	2.3383	2.5444	2.5422	2.5419	473.5	473.5	mg/L

L17051550-01	Has yellow layer in bottom of pan.
L17051550-04	Has yellow layer in bottom of pan.
L17051574-01	Yellow layer of oil in bottom of pan.

Analyst: Andrew Casey

*Duplicate required on 10% of samples

Date/Time (on) : 05/31/2017 08:46
Date/Time (off): 05/31/2017 10:28
Date/Time (off): 05/31/2017 10:58
Date/Time (off): 05/31/2017 11:28

CONT_GRAV_REPORT - Modified 02/18/2011
PDF ID: 5316990
Report generated: 06/01/2017 07:01

Workgroup (AAB#): WG615965 | Method: 1664A
Analyst: AWE | SOP: K1664 Revison 12
Analyte: OIL & GREASE | Spike Solution: STD82076
Balance: BAL004 | Daily Dilution:
Instrument#: HORIZON

SAMPLE NUMBER		FINAL VOL	INITIAL WT	DRY WT A	DRY WT B	DRY WT C	Anal. Conc	Rep. Conc.	Units
WG615965-01	B	1000	2.2935	2.2939	2.2938			0.3000	mg/L
WG615965-02	L	1000	2.3115	2.3448	2.3446			33.10	mg/L
WG615965-03	L2	1000	2.2789	2.3107	2.3108			31.90	mg/L
L17051367-02	1	1000	2.2603	2.2603	2.2604			ND	mg/L
L17051367-04	2	1000	2.289	2.2892	2.2892			ND	mg/L
L17051367-06	3	980	2.3307	2.3306	2.3308			ND	mg/L
L17051369-01	4	360	2.3505	2.3582	2.3581			21.11	mg/L
L17051389-01	5	1000	2.2887	2.2887	2.2891			ND	mg/L
L17051391-01	6	1000	2.3896	2.3904	2.3908			ND	mg/L
L17051417-05	7	1000	2.2919	2.2926	2.2925			ND	mg/L
L17051441-01	8	1000	2.2922	2.2929	2.2929			ND	mg/L
L17051441-02	9	1000	2.2618	2.2626	2.2627			ND	mg/L
L17051550-01	10	1000	2.3522	2.3673	2.3676			15.40	mg/L
L17051550-02	11	1000	2.3147	2.3167	2.3167			ND	mg/L
L17051550-03	12	1000	2.3369	2.34	2.3401			ND	mg/L
L17051550-04	13	1000	2.3652	2.3763	2.3764			11.20	mg/L
L17051559-01	14	950	2.3305	2.3306	2.3307			ND	mg/L
L17051574-01	15	430	2.3383	2.5444	2.5422	2.5419	473.5	473.5	mg/L

L17051550-01	Has yellow layer in bottom of pan.
L17051550-04	Has yellow layer in bottom of pan.
L17051574-01	Yellow layer of oil in bottom of pan.

Analyst: Andrew Casey

*Duplicate required on 10% of samples

Date/Time (on) : 05/31/2017 08:46
Date/Time (off): 05/31/2017 10:28
Date/Time (off): 05/31/2017 10:58
Date/Time (off): 05/31/2017 11:28

CONT_GRAV_REPORT - Modified 02/18/2011
PDF ID: 5316357
Report generated: 06/01/2017 07:01

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
June 9, 2017

001 – BIO-CHEM TESTING WVDEP 220	002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental	004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES	006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES	008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND	AC – AMBER R. CARMICHAEL
ADC – ANTHONY D. CANTER	ADG – APRIL D. GREENE
ALS – ADRIANE L. STEED	AWE – ANDREW W. ESSIG
AZH – AFTER HOURS	BJO – BRIAN J. OGDEN
BLG – BRENDA L. GREENWALT	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
June 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
June 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 QUARTERLY INFLUENT SAMPLES

Prepared By: Scott Beesinger

P. O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: ROD Volatiles	Total Metals	Oil & Grease	Chemical Oxygen Demand	Chloride & Sulfate	1, 4 - DIOXANE	Perchlorate				Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP140-7442-GRAB	Water	05/24/17 / 15:00		5	3		2								HCL	
LH18/24-SP140-7442-GRAB	Water	05/24/17 / 15:00		1		1									HNO3	
LH18/24-SP140-7442-GRAB	Water	05/24/17 / 15:00		4					1	2	1				NONE	
LH18/24-SP140-7442-GRAB	Water	05/24/17 / 15:00		1				1							H2SO4	
Trip Blank	Water	05/24/17		2	2										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	05/24/17	15:45									

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: 05/25/2017 09:42
By: CARA STRICKLER
221000101299

Cara Strickler

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

00856570

MICROBAC

COOLER TEMP >6° C LOG

Cooler ID 1299

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

DWD 5/25/17

pH Exceptions

pH Lot # HC601354

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

PRESERVATIVE EXCEPTIONS

✓ NONE

AS NOTED

DWD 5/23/17

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17051389
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 05-JUN-2017

Samplenum	Container ID	Products
L17051389-01	913138	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	25-MAY-2017 14:25	BRG		
2	ANALYZ	V1	ORG4	25-MAY-2017 14:47	HRF	CLS	
3	STORE	ORG4	A1	08-JUN-2017 07:20	CLS	AWE	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	25-MAY-2017 14:25	BRG		
2	ANALYZ	V1	ORG4	25-MAY-2017 14:47	HRF	CLS	
3	STORE	ORG4	A1	08-JUN-2017 07:20	CLS	AWE	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	25-MAY-2017 14:25	BRG		
2	ANALYZ	V1	ORG4	25-MAY-2017 14:47	HRF	CLS	
3	STORE	ORG4	A1	08-JUN-2017 07:20	CLS	AWE	

Samplenum	Container ID	Products
L17051389-01	913139	827-DIOXANE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-MAY-2017 14:25	BRG		
2	PREP	W1	EXT	30-MAY-2017 14:57	CPD	CLS	
3	ANALYZ*	EXT	SEMI	01-JUN-2017 15:12	SCB	CPD	
4	DISP	EXT	DISP	07-JUN-2017 08:15	ZTB	JDH	

Sample extract/digestate/leachate

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-MAY-2017 14:25	BRG		
2	STORE	W1	A1	26-MAY-2017 09:02	CLS	CLS	
3	PREP	A1	EXT	05-JUN-2017 16:11	CPD	CLS	
4	ANALYZ*	EXT	SEMI	07-JUN-2017 14:46	SCB	CPD	

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: L17051389
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 05-JUN-2017

Samplenum	Container ID	Products
L17051389-01	913140	9056

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-MAY-2017 14:25	BRG		
2	PREP	W1	SEM	25-MAY-2017 15:13	CAS	BRG	
3	STORE	SEM	A1	26-MAY-2017 15:17	CLS	CAS	
4	ANALYZ*	SEM	SEMI	01-JUN-2017 15:12	SCB	CAS	

Sample extract/digestate/leachate

Samplenum	Container ID	Products
L17051389-01	913141	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-MAY-2017 14:25	BRG		
2	ANALYZ	W1	SEM	26-MAY-2017 08:19	JWR	CLS	

Samplenum	Container ID	Products
L17051389-01	913142	COD-HIGH COD-LOW

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	WET	25-MAY-2017 14:25	BRG		
2	STORE	WET	A1	30-MAY-2017 14:51	TMM	CLS	

Samplenum	Container ID	Products
L17051389-01	913143	OG-HEM

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-MAY-2017 14:25	BRG		<2
2	ANALYZ	W1	WET	31-MAY-2017 07:34	AWE	CLS	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER		25-MAY-2017 14:25	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

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L17051389
Account: 2551
Project: 2551.096
Samples: 2
Due Date: 05-JUN-2017

Samplenum	Container ID	Products
L17051389-01	913144	AG-MS AL AS-MS BA-MS CD-MS CO-MS CR-MS FE MN-M

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-MAY-2017 14:25	BRG		
2	PREP	W1	DIG	25-MAY-2017 14:56	ERP	BRG	
3	ANALYZ*	DIG	METALS	30-MAY-2017 12:33	JYH	ERP	
4	STORE	DIG	A1	30-MAY-2017 13:56	BRG	ERP	

Sample extract/digestate/leachate

Samplenum	Container ID	Products
L17051389-02	913145	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	25-MAY-2017 14:25	BRG		
2	ANALYZ	V1	ORG4	25-MAY-2017 14:47	HRF	CLS	
3	STORE	ORG4	A1	08-JUN-2017 07:20	CLS	AWE	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	V1	25-MAY-2017 14:25	BRG		
2	ANALYZ	V1	ORG4	25-MAY-2017 14:47	HRF	CLS	
3	STORE	ORG4	A1	08-JUN-2017 07:20	CLS	AWE	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

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: L17051391

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 June 06 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 #: L17051391
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?
0014619	I	4.0		J4616881640	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 #: L17051391
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-SP650-6442-GRAB	L17051391-01	05/24/2017 15:00	05/25/2017 09:42
TRIP BLANK	L17051391-02	05/24/2017 00:01	05/25/2017 09:42

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:**	L17051391
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-05 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	2017-06-05 15:24:55

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	827-DIOXANE
Prep Batch Number(s):	WG615718	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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	2017-05-30 19:38:48

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051391
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051391
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051391
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051391
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG615781	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-30 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:**	L17051391
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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		2017-06-05 18:34:55

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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					

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	6010
Prep Batch Number(s):	615868	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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		2017-06-05 18:39:57

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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				ER#2
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:**	L17051391
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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				ER#1
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:**	L17051391
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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:**	L17051391
Project Name:		**Method:**	6020
Prep Batch Number(s):	615832	**Reviewer Name:**	Kerri Buck
LRC Date:	2017-06-05 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 - The low level continuing calibration verification analyzed on 01-Jun-2017 at 14:29 yielded noncompliant recoveries for chromium and vanadium. Client sample 01 along with the batch QA/QC were reanalyzed on a later calibration which was compliant for analytes of concern.

ER#2 - Client sample 01 required dilution analysis in order to obtain results for barium and manganese within the calibration range.

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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	2017-05-26 20:09:23

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051391
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051391
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051391
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051391
Project Name:		**Method:**	9056
Prep Batch Number(s):	WG615591	**Reviewer Name:**	Eric Lawson
LRC Date:	2017-05-26 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:**	L17051391
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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	2017-05-31 18:20:28

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	COD
Prep Batch Number(s):	WG615777	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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	2017-05-31 18:21:06

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L17051391
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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:**	L17051391
Project Name:		**Method:**	OG-HEM
Prep Batch Number(s):	WG615965	**Reviewer Name:**	Deanna Hesson
LRC Date:	2017-05-31 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 #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG615570	**Analyst:**	ADC	**Run Date:**	05/26/2017 01:56
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	11M18654
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
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	5.59		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	27.8		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	108	70	120	
4-Bromofluorobenzene	115	75	120	
Dibromofluoromethane	107	85	115	
Toluene-d8	111	85	120	

J	Estimated value ; the analyte concentration was greater than the highest standard
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG615792	**Analyst:**	JDS	**Run Date:**	05/26/2017 19:41
Collect Date:	05/24/2017 15:00	**Dilution:**	20	**File ID:**	11M18676
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Acetone	67-64-1	249		200	100	50.0

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	111	70	120	
4-Bromofluorobenzene	109	75	120	
Dibromofluoromethane	102	85	115	
Toluene-d8	108	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 #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS15
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	3520C	**Prep Date:**	05/30/2017 16:02
Matrix:	Water	**Analytical Method:**	8270D	**Cal Date:**	05/04/2017 16:11
Workgroup #:	WG616244	**Analyst:**	LJH	**Run Date:**	06/02/2017 15:08
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	15M21272
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
1,4-Dioxane	123-91-1	18.1		11.1	5.56	2.78

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,4-Dioxane-d8	58.9	20	129	

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	6850	**Prep Date:**	05/26/2017 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG615781	**Analyst:**	JWR	**Run Date:**	05/26/2017 17:07
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39707
Sample Tag:	01	**Units:**	ug/L		

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

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO4
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 09:42
Matrix:	Water	**Analytical Method:**	6010C	**Cal Date:**	06/01/2017 11:29
Workgroup #:	WG616048	**Analyst:**	KKB	**Run Date:**	06/01/2017 16:56
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	T4.060117.165621
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Aluminum, Total	7429-90-5	0.123	J	0.200	0.200	0.100
Iron, Total	7439-89-6	0.868		0.100	0.100	0.0500
Selenium, Total	7782-49-2	0.0200	U	0.0200	0.0200	0.0100

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 #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 07:36
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	06/01/2017 16:12
Workgroup #:	WG615899	**Analyst:**	JYH	**Run Date:**	06/01/2017 16:55
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	NI.060117.165545
Sample Tag:	02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chromium, Total	7440-47-3	0.00207	J	0.00400	0.00200	0.00100
Vanadium, Total	7440-62-2	0.00100	U	0.00200	0.00100	0.000500

J	Estimated value ; the analyte concentration was less than the LOQ.
J	Estimated value ; the analyte concentration was greater than the highest standard
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 07:36
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	06/01/2017 12:20
Workgroup #:	WG615899	**Analyst:**	JYH	**Run Date:**	06/01/2017 14:07
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	NI.060117.140712
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Antimony, Total	7440-36-0	0.00100	U	0.00200	0.00100	0.000500
Arsenic, Total	7440-38-2	0.00211		0.00200	0.00100	0.000500
Cadmium, Total	7440-43-9	0.000600	U	0.00120	0.000600	0.000300
Cobalt, Total	7440-48-4	0.0110		0.00200	0.00100	0.000500
Lead, Total	7439-92-1	0.00100	U	0.00200	0.00100	0.000500
Nickel, Total	7440-02-0	0.0132		0.00800	0.00400	0.00200
Silver, Total	7440-22-4	0.00100	U	0.00200	0.00100	0.000500
Thallium, Total	7440-28-0	0.000200	U	0.000400	0.000200	0.000100
Zinc, Total	7440-66-6	0.0286	J	0.0500	0.0250	0.0125

J	Estimated value ; the analyte concentration was less than the LOQ.
J	Estimated value ; the analyte concentration was greater than the highest standard
U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	3015A	**Prep Date:**	05/30/2017 07:36
Matrix:	Water	**Analytical Method:**	6020A	**Cal Date:**	06/01/2017 12:20
Workgroup #:	WG615899	**Analyst:**	JYH	**Run Date:**	06/01/2017 15:25
Collect Date:	05/24/2017 15:00	**Dilution:**	50	**File ID:**	NI.060117.152548
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Barium, Total	7440-39-3	0.686		0.300	0.150	0.0750
Manganese, Total	7439-96-5	0.605		0.200	0.100	0.0500

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	9056	**Prep Date:**	05/25/2017 16:04
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG615591	**Analyst:**	CAS	**Run Date:**	05/26/2017 02:00
Collect Date:	05/24/2017 15:00	**Dilution:**	5	**File ID:**	I2_052517-34
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Sulfate	14808-79-8	51.0		10.0	5.00	2.50

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

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	IC2
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	9056	**Prep Date:**	05/25/2017 16:04
Matrix:	Water	**Analytical Method:**	9056	**Cal Date:**	04/11/2017 18:31
Workgroup #:	WG615591	**Analyst:**	CAS	**Run Date:**	05/26/2017 02:19
Collect Date:	05/24/2017 15:00	**Dilution:**	50	**File ID:**	I2_052517-35
Sample Tag:	DL02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chloride	16887-00-6	433		20.0	10.0	5.00

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

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	V-1200
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	METHOD	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	410.4 MOD	**Cal Date:**	02/27/2017 11:47
Workgroup #:	WG615777	**Analyst:**	TMM	**Run Date:**	05/26/2017 08:30
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	00.1705260830-13
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Chemical Oxygen Demand	COD	16.7	J	40.0	20.0	10.0

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

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	HORIZON
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	1664A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	1664A	**Cal Date:**	
Workgroup #:	WG615965	**Analyst:**	AWE	**Run Date:**	05/31/2017 08:46
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	ON.1705310846-09
Sample Tag:		**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
n-Hexane Extractable Material (HEM)	OILGREASE	2.80	U	5.60	2.80	1.40

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-02	**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:**	05/25/2017 15:51
Workgroup #:	WG615867	**Analyst:**	TMB	**Run Date:**	05/30/2017 16:17
Collect Date:	05/24/2017 00:01	**Dilution:**	1	**File ID:**	6M147646
Sample Tag:	02	**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	3.01	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	97.5	70	120	
4-Bromofluorobenzene	100	75	120	
Dibromofluoromethane	102	85	115	
Toluene-d8	99.6	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 #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Microbac

Lab Report #: L17051391
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 #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG615570	**Analyst:**	ADC	**Run Date:**	05/26/2017 01:56
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	11M18654
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
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	5.59		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	27.8		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	108	70	120	
4-Bromofluorobenzene	115	75	120	
Dibromofluoromethane	107	85	115	
Toluene-d8	111	85	120	

J	Estimated value ; the analyte concentration was greater than the highest standard
U	Analyte was not detected. The concentration is below the reported LOD.

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Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS11
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	05/16/2017 17:16
Workgroup #:	WG615792	**Analyst:**	JDS	**Run Date:**	05/26/2017 19:41
Collect Date:	05/24/2017 15:00	**Dilution:**	20	**File ID:**	11M18676
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Acetone	67-64-1	249		200	100	50.0

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	111	70	120	
4-Bromofluorobenzene	109	75	120	
Dibromofluoromethane	102	85	115	
Toluene-d8	108	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.

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Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-02	**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:**	05/25/2017 15:51
Workgroup #:	WG615867	**Analyst:**	TMB	**Run Date:**	05/30/2017 16:17
Collect Date:	05/24/2017 00:01	**Dilution:**	1	**File ID:**	6M147646
Sample Tag:	02	**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	3.01	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	97.5	70	120	
4-Bromofluorobenzene	100	75	120	
Dibromofluoromethane	102	85	115	
Toluene-d8	99.6	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.

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Lab Report #: L17051391
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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)]

	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

Analyst(s): BNB
Date: 5-24-17
Filter Lot #: 9803210

Agitator Speed 30 ± 2 rpm ☑

Balance ID: BAL020
pH Probe ID: T5
Temp probe ID: ☒ 1025 ☐ 1023

Analyst / Date		Analyst / Date	
BNB 5-24-17		BNB 5-25-17	
Time On	Temp On °C	Time Off	Temp Off °C
1520	22.9	754	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	05-1285-02	✓	10	10	1311	F1-231	S	100		✓	25.00	500
P	05-1283-02	✓	〃	〃	〃	〃	〃	〃		✓	25.01	500
Q												
R												
S												
NA	FBLK-1	NA	NA	NA	1311	F1-231	NA	NA	NA	NA	40	40

BNB 5-25-17

BNB 5-25-17

BNB 5-25-17

*Matrix Code = (S-solid) (SS-sand, soil or sludge) (P-paint) (O-organic) (W-water or waste)

Comments: NA

Peer Review By: [signature]

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS6 Dataset: 011217
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 24
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01 Rev: 18
Maintenance Log ID: 54037

Internal Standard: STD79772 Surrogate Standard: STD79772
CCV: STD79829; STD79571 LCS: STD79908; STD79496 MS/MSD: STD79909

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG598323; WG598431

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M144707	WG598323-01 50ng BFB STD 8260	NA	1	1	STD79474	01/12/17 08:36
6M144708	WG598323-02 5ug/L A9/FOO STD	NA	1	1	STD79571	01/12/17 09:02
6M144709	WG598323-03 20ug/L A9/FOO STD	NA	1	1	STD79571	01/12/17 09:37
6M144710	WG598323-04 50ug/L A9/FOO STD	NA	1	1	STD79571	01/12/17 10:10
6M144711	WG598323-05 100ug/L A9/FOO STD	NA	1	1	STD79571	01/12/17 10:42
6M144712	WG598323-06 200ug/L A9/FOO STD	NA	1	1	STD79571	01/12/17 11:14
6M144713	WG598323-07 300ug/L A9/FOO STD	NA	1	1	STD79571	01/12/17 11:47
6M144714	WG598323-08 400ug/L A9/FOO STD	NA	1	1	STD79571	01/12/17 12:19
6M144715	WG598323-09 500ug/L A9/FOO STD	NA	1	1	STD79571	01/12/17 12:52
6M144716	rinse	NA	1	1		01/12/17 13:25
6M144717	WG598323-10 100ug/L ALT SRC STD A9/F	NA	1	1	STD79496	01/12/17 13:56
6M144718	WG598430-01 50ng BFB STD 8260	NA	1	1	STD79474	01/12/17 14:27
6M144719	WG598430-02 50ug/L CCV STD 8260	NA	1	1	STD79829	01/12/17 14:52
6M144720	WG598452-01 100ug/L A9 CCV STD 8260	NA	1	1	STD79571	01/12/17 15:27
6M144721	WG598431-01 VBLK0112 BLANK STD 826	NA	1	1		01/12/17 15:59
6M144722	WG598431-02 20ug/L LCS STD 8260	NA	1	1	STD79908	01/12/17 16:32
6M144723	L16120615-05 B MS 826-A9-SPE	7	1	1	STD79909	01/12/17 17:04
6M144724	L16120615-06 B MSD 826-A9-SPE	7	1	1	STD79909	01/12/17 17:37
6M144725	WG598431-03 100ug/L A9/FOO LCS	NA	1	1	STD79496	01/12/17 18:09
6M144726	L16120718-01 B TB 826-AP-SPE	<2	1	1		01/12/17 18:42
6M144727	L16120973-01 B TB 826-AP-SPE	<2	1	1		01/12/17 19:14
6M144728	L16120615-01 B 826-AP-SPE	7	1	1		01/12/17 19:46
6M144729	L16120615-02 B 826-AP-SPE	7	1	1		01/12/17 20:19
6M144730	L16120615-03 B EB 826-AP-SPE	4	1	1		01/12/17 20:51
6M144731	L16120615-04 B RS 826-AP-SPE	7	1	1		01/12/17 21:23
6M144732	L16120615-07 B 826-AP-SPE	4	1	1		01/12/17 21:55
6M144733	L16120615-08 B 826-AP-SPE	7	1	1		01/12/17 22:27
6M144734	L16120615-09 B 826-AP-SPE	7	1	1		01/12/17 22:59
6M144735	L16120718-02 B 826-AP-SPE	7	1	1		01/12/17 23:31
6M144736	L16120718-03 B 826-AP-SPE	7	1	1		01/13/17 00:03
6M144737	L16120718-04 B 826-AP-SPE	4	1	1		01/13/17 00:36
6M144738	L16120718-05 B 826-AP-SPE	4	1	1		01/13/17 01:08
6M144739	L16120718-06 B 826-AP-SPE	7	1	1		01/13/17 01:40
6M144740	L16120718-07 B 826-AP-SPE	7	1	1		01/13/17 02:12

Approved: January 13, 2017

Sarah Vandenberg

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS6 Dataset: 011217
Analyst1: TMB Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 24
Method: 624 SOP: MSV10 Rev: 15
Method: 5030B/5030C/5035A SOP: PAT01 Rev: 18
Maintenance Log ID: 54037

Internal Standard: STD79772 Surrogate Standard: STD79772
CCV: STD79829; STD79571 LCS: STD79908; STD79496 MS/MSD: STD79909

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG598323; WG598431

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M144741	RINSE	NA	1	1		01/13/17 02:44
6M144742	WG598431-07 VBLK0112 BLANK STD 624	NA	2	1		01/13/17 03:16
6M144743	L17010300-04 A 624	7	2	1		01/13/17 03:47
6M144744	L17010466-03 A 624-SPE	7	2	1		01/13/17 04:20
6M144745	L17010446-02 A 624-SPE1	7	2	1		01/13/17 04:52
6M144746	CCV	NA	1	1		01/13/17 05:24
6M144747	RINSE	NA	1	1		01/13/17 05:56
6M144748	RINSE	NA	1	1		01/13/17 06:28

Approved: January 13, 2017
Sarah Vandenberg

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 050317
Analyst1: ADC Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 24,0
Method: 624 SOP: MSV10 Rev: 15
Method: 5035/ 5030B/ 5030C SOP: PAT01, OVAP PAT01 Rev: 18,1
Maintenance Log ID:

Internal Standard: STD81442 Surrogate Standard: STD81441
CCV: STD81698/STD81708 LCS: STD81656/STD81640 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG612363 WG612759

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M17986	WG612363-01 50ng BFB STD 8260	NA	1	1	STD81491	05/03/17 10:28
11M17987	RINSE	NA	1	1		05/03/17 10:52
11M17988	WG612363-02 .3ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 11:21
11M17989	WG612363-03 .4ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 11:50
11M17990	WG612363-04 1ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 12:19
11M17991	WG612363-05 2ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 12:48
11M17992	WG612363-06 5ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 13:17
11M17993	WG612363-07 20ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 13:46
11M17994	WG612363-08 50ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 14:15
11M17995	WG612363-09 100ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 14:44
11M17996	WG612363-10 200ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 15:13
11M17997	WG612363-11 300ug/L CCV ICAL 8260	NA	1	1	STD81698	05/03/17 15:42
11M17998	RINSE	NA	1	1		05/03/17 16:11
11M17999	WG612363-12 50ug/L ICV 8260	NA	1	1	STD81656	05/03/17 16:40
11M18000	WG612363-12 20ug/L ICV 8260	NA	1	1	STD81656	05/03/17 17:47
11M18001	WG612759-01 BFB 50ng A9FOO	NA	1	1	STD81491	05/03/17 19:14
11M18002	WG612759-02 5ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 19:42
11M18003	WG612759-03 20ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 20:10
11M18004	WG612759-04 50ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 20:39
11M18005	WG612759-05 100ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 21:08
11M18006	WG612759-06 200ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 21:36
11M18007	WG612759-07 300ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 22:05
11M18008	WG612759-08 400ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 22:34
11M18009	WG612759-09 500ug/L STD A9FOO	NA	1	1	STD81708	05/03/17 23:02
11M18010	RINSE	NA	1	1		05/03/17 23:31
11M18011	WG612759-10 100ug/L STD A9FOO	NA	1	1	STD81640	05/04/17 00:00

Comments

Seq.	Rerun	Dil.	Reason	Analytes
14	X			
File ID: 11M17999				
WG612363-12 ICV had multiple failures. RR at 20ppb.				

Approved: May 09, 2017

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Instrument Run Log

Instrument: HPMS11 Dataset: 051617
Analyst1: ADC 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:

Internal Standard: STD81876 Surrogate Standard: STD81877
CCV: STD81698 LCS: STD81861 MS/MSD: STD81861

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG614378 (ICAL)

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18429	WG614378-01 BFB 50ng 8260	NA	1	1	STD81491	05/16/17 12:01
11M18430	RINSE	NA	1	1		05/16/17 12:25
11M18431	WG614378-02 0.3ug/L CCV 8260	NA	1	1	STD81880	05/16/17 12:54
11M18432	WG614378-03 0.4ug/L CCV 8260	NA	1	1	STD81880	05/16/17 13:23
11M18433	WG614378-04 1.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 13:52
11M18434	WG614378-05 2.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 14:21
11M18435	WG614378-06 5.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 14:50
11M18436	WG614378-07 20.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 15:20
11M18437	WG614378-08 50.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 15:49
11M18438	WG614378-09 100.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 16:18
11M18439	WG614378-10 200.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 16:47
11M18440	WG614378-11 300.0ug/L CCV 8260	NA	1	1	STD81880	05/16/17 17:16
11M18441	RINSE	NA	1	1	STD81880	05/16/17 17:45
11M18442	WG614378-12 20.0ug/L ALT 8260	NA	1	1	STD81881	05/16/17 18:14

Approved: May 22, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS6 Dataset: 052517
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:

Internal Standard: STD81995 Surrogate Standard: STD81995
CCV: STD82074 LCS: STD82078 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG615531

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M147585	WG615531-01 50ng BFB STD 8260	NA	1	1	STD81972	05/25/17 09:59
6M147586	RINSE	NA	1	1		05/25/17 10:24
6M147587	WG615531-02 0.3ug/L STD 8260	NA	1	1	STD82074	05/25/17 10:54
6M147588	WG615531-03 0.4ug/L STD 8260	NA	1	1	STD82074	05/25/17 11:24
6M147589	WG615531-04 1ug/L STD 8260	NA	1	1	STD82074	05/25/17 11:54
6M147590	WG615531-05 2ug/L STD 8260	NA	1	1	STD82074	05/25/17 12:24
6M147591	WG615531-06 5ug/L STD 8260	NA	1	1	STD82074	05/25/17 12:54
6M147592	WG615531-04 1ug/L STD 8260	NA	1	1	STD82074	05/25/17 13:23
6M147593	WG615531-07 20ug/L STD 8260	NA	1	1	STD82074	05/25/17 13:53
6M147594	WG615531-08 50ug/L STD 8260	NA	1	1	STD82074	05/25/17 14:23
6M147595	WG615531-09 100ug/L STD 8260	NA	1	1	STD82074	05/25/17 14:53
6M147596	WG615531-10 200ug/L STD 8260	NA	1	1	STD82074	05/25/17 15:22
6M147597	WG615531-11 300ug/L STD 8260	NA	1	1	STD82074	05/25/17 15:51
6M147598	RINSE	NA	1	1		05/25/17 16:42
6M147599	RINSE	NA	1	1		05/25/17 17:13
6M147600	WG615531-12 20ug/L ALT SRC STD 8260	NA	1	1	STD82078	05/25/17 17:43
6M147601	RINSE	NA	1	1		05/25/17 18:13

Comments

Seq.	Rerun	Dil.	Reason	Analytes
5	X			
File ID: 6M147589				
			Iodomethane didn't have a secondary. DNR.	

Approved: May 31, 2017

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052517
Analyst1: ADC Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG615570

Comments: L17051374s and 1376s have % high LCS outliers; LCSDUP is acceptable. Samples are non-detect.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18631	WG615569-01 50ng BFB STD 8260	NA	1	1	STD81972	05/25/17 14:46
11M18632	WG615569-02 50ug/L CCV 8260	NA	1	1	STD81983	05/25/17 15:15
11M18633	WGXXXXXX-01 100ug/L CCV 826-A9	NA	1	1	STD81708	05/25/17 15:44
11M18634	WG615570-01 BLANK 8260	NA	1	1		05/25/17 16:14
11M18635	WG615570-02 20ug/L LCS 8260	NA	1	1	STD82009	05/25/17 16:43
11M18636	WG615570-03 20ug/L LCSDUP 8260	NA	1	1	STD82009	05/25/17 17:12
11M18637	L17051282-02 A1 10X AF 826-TC	NA	17	10		05/25/17 17:41
11M18638	L17051283-02 10X AF 826-TC	NA	17	10		05/25/17 18:10
11M18639	L17051285-02 10X AF 826-TC	NA	17	10		05/25/17 18:39
11M18640	L17051277-02 500X AF 826-TC	NA	17	500		05/25/17 19:08
11M18641	L17051374-01 A 826-SPE	<2	1	1		05/25/17 19:37
11M18642	L17051374-02 A 826-SPE	<2	1	1		05/25/17 20:07
11M18643	L17051374-03 A 826-SPE	<2	1	1		05/25/17 20:36
11M18644	L17051374-04 A 826-SPE	<2	1	1		05/25/17 21:05
11M18645	L17051374-05 A 826-SPE	<2	1	1		05/25/17 21:34
11M18646	L17051374-06 A 826-SPE	<2	1	1		05/25/17 22:03
11M18647	L17051374-07 A 826-SPE	<2	1	1		05/25/17 22:32
11M18648	L17051374-08 A 826-SPE	<2	1	1		05/25/17 23:01
11M18649	L17051374-09 A 826-SPE	<2	1	1		05/25/17 23:31
11M18650	L17051376-01 A 826-SPE	<2	1	1		05/26/17 00:00
11M18651	L17051391-02 A TB 826-SPE	<2	1	1		05/26/17 00:29
11M18652	L17051389-02 A TB 826-SPE	<2	1	1		05/26/17 00:58
11M18653	L17051389-01 A 826-SPE	<2	1	1		05/26/17 01:27
11M18654	L17051391-01 A 826-SPE	<2	1	1		05/26/17 01:56
11M18655	RINSE	NA	1	1		05/26/17 02:25
11M18656	WG615570-04 BLANK2 624	NA	2	1		05/26/17 02:54
11M18657	L17051329-01 B A1 624-SPE	6	2	1		05/26/17 03:23
11M18658	L17051379-01 A 624-SPE1	8	2	1		05/26/17 03:53
11M18659	CCV	NA	1	1		05/26/17 04:22
11M18660	RINSE	NA	1	1		05/26/17 04:52
11M18661	RINSE	NA	1	1		05/26/17 05:21
11M18662	WG615410-01 FBLK 826-TC	NA	17	10		05/26/17 05:51
11M18663	CLEANUP RINSE	NA	1	1		05/26/17 12:26
11M18664	CLEANUP RINSE	NA	1	1		05/26/17 12:55

Approved: May 30, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052517
Analyst1: ADC Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG615570

Comments: L17051374s and 1376s have % high LCS outliers; LCSDUP is acceptable. Samples are non-detect.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18665	CLEANUP RINSE	NA	1	1		05/26/17 13:24

Comments

Seq.	Rerun	Dil.	Reason	Analytes
7				
File ID: 11M18637				
	L17051282-02 two high surrogates; F flag hit. Reporting both runs.			
10				
File ID: 11M18640				
	L17051277-02 500X AF 826-TC needs reanalyzed. LCS is high for PCE.			
14			Surrogate standard failure	
File ID: 11M18644				
	L17051374-04			
18			Surrogate standard failure	
File ID: 11M18648				
	L17051374-08			
20			Surrogate standard failure	
File ID: 11M18650				
	L17051376-01			
21			Surrogate standard failure	
File ID: 11M18651				
	L17051391-02 DNR one high surrogate; F flag hit. Needs reanalyzed.			
22				
File ID: 11M18652				
	L17051389-02 oxylene and toluene high in LCS; sample ND for these analytes.			
23	X	100	Over Calibration Range	
File ID: 11M18653				
	L17051389-01 oxylene and toluene high in LCS; sample has hits. Unable to reanalye for these analytes due to other large hits.			
24	X	20	Over Calibration Range	
File ID: 11M18654				
	L17051391-01 TCE and ch2cl2 carryover. Needs reanalyzed at a 2X dilution.			
26			Carry-over contamination	TCE
File ID: 11M18656				
	WG615570-04			
27	X	1	Carry-over contamination	TCE
File ID: 11M18657				

Approved: May 30, 2017

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052517
Analyst1: ADC Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG615570

Comments: L17051374s and 1376s have % high LCS outliers; LCSDUP is acceptable. Samples are non-detect.

Comments

Seq.	Rerun	Dil.	Reason	Analytes
			L17051329-01 Reporting PCE only.	
28	X		Carry-over contamination	
File ID: 11M18658				
			L17051379-01 DNR	

Approved: May 30, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052617
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: Column 2 ID: RTX502.2
Workgroups: WG615792

Comments: For the 1440s LCS has 5 high outliers; LCSDUP is acceptable. 1440-06,-09, and 14 have hits of p-isopropyltoluene(high inLCS). 14 has a hit of 1,4-DCB (high in LCS). Samples all needed further dilutions for other analytes; unable to reanalyze. Also, insufficient sample volume to reanalyze without headspace.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18666	WG615791-01 50ng BFB STD 8260	NA	1	1	STD81972	05/26/17 14:49
11M18667	WG615791-02 50ug/L CCV 8260	NA	1	1	STD81983	05/26/17 15:13
11M18668	WG615791-02 50ug/L CCV 8260	NA	1	1	STD81983	05/26/17 15:48
11M18669	WGXXXXXX-01 100ug/L CCV 826-A9	NA	1	1	STD81708	05/26/17 16:17
11M18670	WG615792-01 BLANK 8260	NA	1	1		05/26/17 16:46
11M18671	L17050744-04 A 826-REF-BLK	<2	1	1		05/26/17 17:15
11M18672	L17050744-05 A 826-REF-BLK	<2	1	1		05/26/17 17:44
11M18673	WG615792-02 20ug/L LCS 8260	NA	1	1	STD82009	05/26/17 18:14
11M18674	WG615792-03 20ug/L LCSDUP 8260	NA	1	1	STD82009	05/26/17 18:43
11M18675	L17051389-01 B D1 100X 826-SPE	<2	1	100		05/26/17 19:12
11M18676	L17051391-01 B D1 20X 826-SPE	<2	1	20		05/26/17 19:41
11M18677	L17051440-01 A TB 826-SPE	<2	1	1		05/26/17 20:10
11M18678	L17051440-02 A 826-SPE	<2	1	1		05/26/17 20:38
11M18679	L17051440-03 A 826-SPE	<2	1	1		05/26/17 21:07
11M18680	L17051440-04 A 826-SPE	<2	1	1		05/26/17 21:36
11M18681	L17051440-07 A 826-SPE	<2	1	1		05/26/17 22:05
11M18682	L17051440-08 A 826-SPE	<2	1	1		05/26/17 22:34
11M18683	L17051440-13 A 826-SPE	<2	1	1		05/26/17 23:03
11M18684	L17051440-05 A 50X 826-SPE	<2	1	50		05/26/17 23:32
11M18685	L17051440-06 A 10X 826-SPE	<2	1	10		05/27/17 00:02
11M18686	L17051440-11 A 10X 826-SPE	<2	1	10		05/27/17 00:31
11M18687	L17051440-09 A 826-SPE	<2	1	1		05/27/17 01:00
11M18688	L17051440-10 A 826-SPE	<2	1	1		05/27/17 01:29
11M18689	L17051440-12 A 826-SPE	<2	1	1		05/27/17 01:58
11M18690	L17051440-14 A 826-SPE	<2	1	1		05/27/17 02:27
11M18691	RINSE	NA	2	1		05/27/17 02:56
11M18692	RINSE	NA	2	1		05/27/17 03:25
11M18693	RINSE	NA	2	1		05/27/17 03:55
11M18694	WG615792-04 BLANK2 624	NA	2	1		05/27/17 04:24
11M18695	L17051379-01 B A1 624-SPE1	7	2	1		05/27/17 04:54
11M18696	CCV	NA	1	1		05/27/17 05:24
11M18697	RINSE	NA	1	1		05/27/17 05:53

Approved: June 01, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS11 Dataset: 052617
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: Column 2 ID: RTX502.2
Workgroups: WG615792

Comments: For the 1440s LCS has 5 high outliers; LCSDUP is acceptable. 1440-06,-09, and 14 have hits of p-isopropyltoluene(high inLCS). 14 has a hit of 1,4-DCB (high in LCS). Samples all needed further dilutions for other analytes; unable to reanalyze. Also, insufficient sample volume to reanalyze without headspace.

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
11M18698	RINSE	NA	1	1		05/27/17 06:22

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2				
File ID: 11M18667				
	WG615791-02 50ug/L CCV rerun CCV, multiple analytes were low.			
6			Surrogate standard failure	
File ID: 11M18671				
	L17050744-04 mult. surr. failed high. F flag hits for acetone less than 1/2 RL. Needs reanalyzed.			
7			Surrogate standard failure	
File ID: 11M18672				
	L17050744-05 mult. surr. failed high. F flag hits for acetone less than 1/2 RL.			
11	X	2		
File ID: 11M18676				
	L17051391-01 acetone results from this and previous run do not match. RR for conf.			
13			Surrogate standard failure	
File ID: 11M18678				
	L17051440-02 mult. surr. failed high. sample ND for all target cmpds.			
16	X		Surrogate standard failure	
File ID: 11M18681				
	L17051440-07 mult. surr. failed high. sample took target hits above 1/2 RL. RR for conf.			
20	X	100	Over Calibration Range	
File ID: 11M18685				
	L17051440-06			
22	X	20	Over Calibration Range	
File ID: 11M18687				
	L17051440-09			
23	X		Carry-over contamination	
File ID: 11M18688				
	L17051440-10 mult. surr. failed high. C/O. DNR.			
24	X	1	Carry-over contamination	
File ID: 11M18689				
	L17051440-12 mult. surr. failed high. C/O. DNR			
25	X	25	Over Calibration Range	

Approved: June 01, 2017

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Instrument Run Log

Instrument: HPMS11 Dataset: 052617
Analyst1: JDS Analyst2: NA
Method: 8260 SOP: MSV01, OVAP MSV01 Rev: 25,0
Method: 624 SOP: MSV10 Rev: 10
Method: 5035, 5030B, 5030C SOP: PAT01, OVAP PAT01 Rev: 19,0
Maintenance Log ID:

Internal Standard: STD82876 Surrogate Standard: STD82877
CCV: STD81983 LCS: STD82009 MS/MSD: NA

Column 1 ID: Column 2 ID: RTX502.2
Workgroups: WG615792

Comments: For the 1440s LCS has 5 high outliers; LCSDUP is acceptable. 1440-06,-09, and 14 have hits of p-isopropyltoluene(high inLCS). 14 has a hit of 1,4-DCB (high in LCS). Samples all needed further dilutions for other analytes; unable to reanalyze. Also, insufficient sample volume to reanalyze without headspace.

Comments

Seq.	Rerun	Dil.	Reason	Analytes
File ID: 11M18690				
	L17051440-14 A 826-SPE			
29			Surrogate standard failure	benzene, xylenes
File ID: 11M18694				
	WG615792-04			
30			Carry-over contamination	
File ID: 11M18695				
	L17051379-01 benzene C/O present. was RR for trichloroethene C/O. report trichloroethene result from this run and all other results from previous run.			

Approved: June 01, 2017

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: HPMS6 Dataset: 053017
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:

Internal Standard: STD81995 Surrogate Standard: STD81995
CCV: STD82074 LCS: STD82078 MS/MSD: STD82078

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG615867

Comments:

File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
6M147632	RINSE	NA	1	1		05/30/17 08:51
6M147633	WG615866-01 50ng BFB STD 8260	NA	1	1	STD81972	05/30/17 09:46
6M147634	WG615866-02 50ug/L CCV STD 8260	NA	1	1	STD82074	05/30/17 10:12
6M147635	WG615866-02 50ug/L CCV STD 8260	NA	1	1	STD82074	05/30/17 10:49
6M147636	WG000000-01 100ug/L A9 CCV STD 8260	NA	1	1	STD81708	05/30/17 11:19
6M147637	WG615867-01 VBLK0530 BLANK STD 826	NA	1	1		05/30/17 11:49
6M147638	WG615867-02 20ug/L LCS STD 8260	NA	1	1	STD82078	05/30/17 12:19
6M147639	L17051497-23 A MS 826-SPE1	<2	1	1	STD82078	05/30/17 12:48
6M147640	L17051497-25 A MSD 826-SPE1	<2	1	1	STD82078	05/30/17 13:17
6M147641	RINSE	NA	1	1		05/30/17 13:47
6M147642	L17051497-31 A TB 826-SPE1	<2	1	1		05/30/17 14:17
6M147643	L17051497-29 A EB 826-SPE1	<2	1	1		05/30/17 14:47
6M147644	L17051497-19 A EB 826-SPE1	<2	1	1		05/30/17 15:17
6M147645	L17051497-21 A RS 826-SPE1	<2	1	1		05/30/17 15:47
6M147646	L17051391-02 B TB 826-SPE A1	<2	1	1		05/30/17 16:17
6M147647	L17051497-27 A 826-SPE1	<2	1	1		05/30/17 16:48
6M147648	L17051497-17 A 826-SPE1	<2	1	1		05/30/17 17:18
6M147649	L17051497-15 A 826-SPE1	<2	1	1		05/30/17 17:47
6M147650	L17051497-13 A 826-SPE1	<2	1	1		05/30/17 18:16
6M147651	L17051497-11 A 826-SPE1	<2	1	1		05/30/17 18:46
6M147652	L17051497-09 A 826-SPE1	<2	1	1		05/30/17 19:16
6M147653	L17051497-07 A 826-SPE1	<2	1	1		05/30/17 19:46
6M147654	L17051497-05 A 826-SPE1	<2	1	1		05/30/17 20:16
6M147655	L17051497-03 A 826-SPE1	<2	1	1		05/30/17 20:46
6M147656	L17051497-01 A 826-SPE1	<2	1	1		05/30/17 21:16
6M147657	WG615867-06 50ug/L CCV STD 8260	NA	1	1	STD82074	05/30/17 21:46
6M147658	RINSE	NA	1	1		05/30/17 22:16
6M147659	WG615867-07 VBLK0530 BLANK STD 624	NA	2	1		05/30/17 22:45
6M147660	L17051499-01 A 624-SPE CT1	7	2	1		05/30/17 23:15
6M147661	L17051499-02 A 624-SPE CT1	8	2	1		05/30/17 23:44
6M147662	L17051499-03 A 624-SPE CT1	7	2	1		05/31/17 00:14
6M147663	RINSE	NA	1	1		05/31/17 00:43
6M147664	RINSE	NA	1	1		05/31/17 01:13
6M147665	RINSE	NA	1	1		05/31/17 01:42

Approved: May 31, 2017

Sarah Vandenberg

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Microbac Laboratories Inc.

Instrument Run Log

Instrument:	HPMS6	Dataset:	053017		
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:					

Internal Standard: STD81995 Surrogate Standard: STD81995

CCV: STD82074 LCS: STD82078 MS/MSD: STD82078

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG615867

Comments:

Comments

Seq.	Rerun	Dil.	Reason	Analytes
3	X			
File ID: 6M147634				
	Vc was high, DNR.			
5				
File ID: 6M147636				
	Not needed, DNR.			

Approved: May 31, 2017

Sarah Vandenberg

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 12-JAN-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 79799
Analytical Workgroups: WG598323; WG598431

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	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:
13-JAN-2017
Tiffany Bailey

Secondary Reviewer:
13-JAN-2017
Sarah Vandenberg

CHECKLIST1 - Modified 03/05/2008
Generated: JAN-13-2017 13:54:15

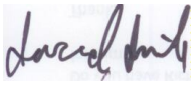
Microbac Laboratories Inc.

Data Checklist

Date: 03-MAY-2017
Analyst: ADC
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 81984
Analytical Workgroups: WG612363 WG612759

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	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	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:
08-MAY-2017



Secondary Reviewer:
09-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-09-2017 08:44:21

Microbac Laboratories Inc.

Data Checklist

Date: 16-MAY-2017
Analyst: ADC
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82278
Analytical Workgroups: WG614378

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	ADC
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	ADC
Secondary Reviewer	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:
19-MAY-2017

Secondary Reviewer:
22-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-22-2017 09:02:59

Microbac Laboratories Inc.

Data Checklist

Date: 26-MAY-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 82462
Analytical Workgroups: WG615531

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	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:
30-MAY-2017
Tiffany Bailey

Secondary Reviewer:
31-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-31-2017 13:42:19

Microbac Laboratories Inc.

Data Checklist

Date: 25-MAY-2017
Analyst: JDS
Analyst: ADC
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82441
Analytical Workgroups: WG615570

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	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	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:
29-MAY-2017

Secondary Reviewer:
30-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-30-2017 16:38:08

Microbac Laboratories Inc.

Data Checklist

Date: 26-MAY-2017
Analyst: JDS
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 82472
Analytical Workgroups: WG615792

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	X
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	X
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:
31-MAY-2017

Secondary Reviewer:
01-JUN-2017

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-01-2017 08:57:25

Microbac Laboratories Inc.

Data Checklist

Date: 30-MAY-2017
Analyst: TMB
Analyst: NA
Method: 8260B/624/OVAP
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 82473
Analytical Workgroups: WG615867

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	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:
31-MAY-2017
Tiffany Bailey

Secondary Reviewer:
31-MAY-2017
Sarah Vandenberg

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-31-2017 14:12:46

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B AAB#: WG615570

Login Number: L17051391

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-SP650-6442-GRAB	01	05/24/17					05/26/2017	1.5	14		05/26/17	1.5	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5313674
Report generated 06/06/2017 09:46

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B AAB#: WG615792

Login Number: L17051391

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-SP650-6442-GRAB	01	05/24/17					05/26/2017	2.2	14		05/26/17	2.2	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5313674
Report generated 06/06/2017 09:46

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8260B **AAB#:** WG615867

Login Number: L17051391

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	05/24/17					05/30/2017	6.7	14		05/30/17	6.7	14	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5313674
Report generated 06/06/2017 09:46

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17051391
Instrument Id: HPMS11
Workgroup (AAB#): WG615570

Method: 8260
CAL ID: HPMS11-16-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17051391-01	1.00	01	108	107	115	111
WG615570-01	1.00	01	109	98.8	117	109
WG615570-02	1.00	01	108	104	108	109
WG615570-03	1.00	01	106	102	106	108
WG615570-04	1.00	01	112	106	115	111

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: 5313682
Report generated: 06/06/2017 09:47

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17051391
Instrument Id: HPMS6
Workgroup (AAB#): WG615867

Method: 8260
CAL ID: HPMS6-25-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17051391-02	1.00	02	97.5	102	100	99.6
WG615867-01	1.00	01	98.2	101	99.6	99.2
WG615867-02	1.00	01	97.6	103	96.7	99.1
WG615867-06	1.00	01	101	103	97.0	96.8
WG615867-07	1.00	01	102	103	98.6	98.6

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: 5313682
Report generated: 06/06/2017 09:47

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L17051391
Instrument Id: HPMS11
Workgroup (AAB#): WG615792

Method: 8260
CAL ID: HPMS11-16-MAY-17
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L17051391-01	20.0	DL01	111	102	109	108
WG615792-01	1.00	01	110	104	115	110
WG615792-02	1.00	01	109	104	114	110
WG615792-03	1.00	01	108	104	113	110
WG615792-04	1.00	01	104	99.3	112	111

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: 5313682
Report generated: 06/06/2017 09:47

METHOD BLANK SUMMARY

Login Number:	L17051391	**Work Group:**	WG615570
Blank File ID:	11M18634	**Blank Sample ID:**	WG615570-01
Prep Date:	05/25/17 16:14	**Instrument ID:**	HPMS11
Analyzed Date:	05/25/17 16:14	**Method:**	8260B
Analyst:	ADC		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615570-02	11M18635	05/25/17 16:43	01
LCS2	WG615570-03	11M18636	05/25/17 17:12	01
LH18/24-SP650-6442-GRAB	L17051391-01	11M18654	05/26/17 01:56	01

Report Name: BLANK_SUMMARY
PDF File ID: 5313675
Report generated 06/06/2017 09:46

METHOD BLANK SUMMARY

Login Number: L17051391
Work Group: WG615792
Blank File ID: 11M18670
Blank Sample ID: WG615792-01
Prep Date: 05/26/17 16:46
Instrument ID: HPMS11
Analyzed Date: 05/26/17 16:46
Method: 8260B
Analyst: JDS

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615792-02	11M18673	05/26/17 18:14	01
LCS2	WG615792-03	11M18674	05/26/17 18:43	01
LH18/24-SP650-6442-GRAB	L17051391-01	11M18676	05/26/17 19:41	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 5313675
Report generated 06/06/2017 09:46

METHOD BLANK SUMMARY

Login Number:	L17051391	**Work Group:**	WG615867
Blank File ID:	6M147637	**Blank Sample ID:**	WG615867-01
Prep Date:	05/30/17 11:49	**Instrument ID:**	HPMS6
Analyzed Date:	05/30/17 11:49	**Method:**	8260B
Analyst:	TMB		

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG615867-02	6M147638	05/30/17 12:19	01
TRIP BLANK	L17051391-02	6M147646	05/30/17 16:17	02
QCMRL	WG615867-06	6M147657	05/30/17 21:46	01

Report Name: BLANK_SUMMARY
PDF File ID: 5313675
Report generated 06/06/2017 09:46

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051391 Prep Date: 05/25/17 16:14 Sample ID: WG615570-01
Instrument ID: HPMS11 Run Date: 05/25/17 16:14 Prep Method: 5030B/5030C/503
File ID: 11M18634 Analyst: ADC Method: 8260B
Workgroup (AAB#): WG615570 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS11-16-MAY-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
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	109	70 - 120	PASS
4-Bromofluorobenzene	117	75 - 120	PASS
Dibromofluoromethane	98.8	85 - 115	PASS
Toluene-d8	109	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: 5313676
06-JUN-2017 09:46

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051391 Prep Date: 05/26/17 16:46 Sample ID: WG615792-01
Instrument ID: HPMS11 Run Date: 05/26/17 16:46 Prep Method: 5030B/5030C/503
File ID: 11M18670 Analyst: JDS Method: 8260B
Workgroup (AAB#): WG615792 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS11-16-MAY-17

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Acetone	2.50	10.0	2.50	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	110	70 - 120	PASS
4-Bromofluorobenzene	115	75 - 120	PASS
Dibromofluoromethane	104	85 - 115	PASS
Toluene-d8	110	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: 5313676
06-JUN-2017 09:46

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L17051391 Prep Date: 05/30/17 11:49 Sample ID: WG615867-01
Instrument ID: HPMS6 Run Date: 05/30/17 11:49 Prep Method: 5030B/5030C/503
File ID: 6M147637 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG615867 Matrix: Water Units: ug/L
Contract #: Cal ID: HPMS6-25-MAY-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	98.2	70	-	120	PASS
4-Bromofluorobenzene	99.6	75	-	120	PASS
Dibromofluoromethane	101	85	-	115	PASS
Toluene-d8	99.2	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: 5313676
06-JUN-2017 09:46

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051391 Run Date: 05/30/2017 Sample ID: WG615867-02
Instrument ID: HPMS6 Run Time: 12:19 Prep Method: 5030B/5030C/503
File ID: 6M147638 Analyst: TMB Method: 8260B
Workgroup (AAB#): WG615867 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD82078 Cal ID: HPMS6-25-MAY-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
1,1,1-Trichloroethane	20.0	21.5	107	65 - 130	
1,1,2-Trichloroethane	20.0	20.9	105	75 - 125	
1,1-Dichloroethane	20.0	20.4	102	70 - 135	
1,1-Dichloroethene	20.0	21.5	108	70 - 130	
1,2-Dichloroethane	20.0	21.0	105	70 - 130	
Acetone	20.0	14.5	72.4	40 - 140	
Benzene	20.0	20.5	102	80 - 120	
Carbon tetrachloride	20.0	23.3	117	65 - 140	
Chloroform	20.0	19.4	97.0	65 - 135	
Ethylbenzene	20.0	20.5	102	75 - 125	
Methylene chloride	20.0	20.3	102	55 - 140	
m,p-Xylene	40.0	41.3	103	75 - 130	
o-Xylene	20.0	21.0	105	80 - 120	
Styrene	20.0	20.9	105	65 - 135	
Tetrachloroethene	20.0	20.1	100	45 - 150	
Trichloroethene	20.0	21.2	106	70 - 125	
Toluene	20.0	20.0	100	75 - 120	
Vinyl chloride	20.0	23.5	118	50 - 145	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	97.6	70 - 120	PASS
4-Bromofluorobenzene	96.7	75 - 120	PASS
Dibromofluoromethane	103	85 - 115	PASS
Toluene-d8	99.1	85 - 120	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 5315520
Report generated: 06/06/2017 09:47

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051391 Analyst: JDS Prep Method: 5030B/5030C/503
Instrument ID: HPMS11 Matrix: Water Method: 8260B
Workgroup (AAB#): WG615792 Units: ug/L
QC Key: DOD4 Lot #: STD82009

Sample ID: WG615792-02 LCS File ID: 11M18673 Run Date: 05/26/2017 18:14
Sample ID: WG615792-03 LCS2 File ID: 11M18674 Run Date: 05/26/2017 18:43

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Acetone	20.0	20.7	103	20.0	20.3	102	1.58	40 - 140	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,2-Dichloroethane-d4	109	108	70 - 120	PASS
Dibromofluoromethane	104	104	85 - 115	PASS
4-Bromofluorobenzene	114	113	75 - 120	PASS
Toluene-d8	110	110	85 - 120	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5313677
Report generated: 06/06/2017 09:47

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051391 Analyst: ADC Prep Method: 5030B/5030C/503
Instrument ID: HPMS11 Matrix: Water Method: 8260B
Workgroup (AAB#): WG615570 Units: ug/L
QC Key: DOD4 Lot #: STD82009

Sample ID: WG615570-02 LCS File ID: 11M18635 Run Date: 05/25/2017 16:43
Sample ID: WG615570-03 LCS2 File ID: 11M18636 Run Date: 05/25/2017 17:12

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	23.8	119	20.0	22.2	111	6.76	65 - 130	30	
1,1,2-Trichloroethane	20.0	23.7	118	20.0	23.5	117	1.01	75 - 125	30	
1,1-Dichloroethane	20.0	23.2	116	20.0	21.9	109	5.97	70 - 135	30	
1,1-Dichloroethene	20.0	23.8	119	20.0	22.1	110	7.55	70 - 130	30	
1,2-Dichloroethane	20.0	23.7	119	20.0	22.9	114	3.82	70 - 130	30	
Benzene	20.0	24.0	120	20.0	22.6	113	5.83	80 - 120	30	
Carbon tetrachloride	20.0	24.0	120	20.0	22.9	114	5.00	65 - 140	30	
Chloroform	20.0	21.4	107	20.0	20.3	102	5.18	65 - 135	30	
Ethylbenzene	20.0	24.0	120	20.0	22.9	114	4.73	75 - 125	30	
m,p-Xylene	40.0	50.5	126	40.0	48.0	120	5.07	75 - 130	30	
Methylene chloride	20.0	21.4	107	20.0	20.5	102	4.22	55 - 140	30	
o-Xylene	20.0	25.3	126	20.0	23.8	119	6.12	80 - 120	30	*
Styrene	20.0	25.4	127	20.0	24.4	122	3.81	65 - 135	30	
Tetrachloroethene	20.0	25.1	125	20.0	23.6	118	5.96	45 - 150	30	
Toluene	20.0	25.0	125	20.0	24.0	120	4.35	75 - 120	30	*
Trichloroethene	20.0	23.6	118	20.0	22.8	114	3.72	70 - 125	30	
Vinyl chloride	20.0	24.8	124	20.0	25.6	128	3.19	50 - 145	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
1,2-Dichloroethane-d4	108	106	70 - 120	PASS
Dibromofluoromethane	104	102	85 - 115	PASS
4-Bromofluorobenzene	108	106	75 - 120	PASS
Toluene-d8	109	108	85 - 120	PASS

* EXCEEDS %REC LIMIT

\# EXCEEDS RPD LIMIT

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 5313677
Report generated: 06/06/2017 09:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051391
Instrument: HPMS11
Analyst: FJB
Workgroup: WG612759

Tune ID: WG612759-01
Run Date: 05/03/2017
Run Time: 19:14
File ID: 11M18001
Cal ID: HPMS11-03-MAY-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	22.7	10582	PASS
75.0	95.0	30.0	60.0	49.6	23133	PASS
95.0	95.0	100	100	100	46626	PASS
96.0	95.0	5.00	9.00	6.81	3175	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	87.5	40784	PASS
175	174	5.00	9.00	8.19	3340	PASS
176	174	95.0	101	98.0	39952	PASS
177	176	5.00	9.00	6.40	2555	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG612759-02	STD	01	05/03/2017 19:42	
WG612759-03	STD	01	05/03/2017 20:10	
WG612759-04	STD	01	05/03/2017 20:39	
WG612759-05	STD-CCV	01	05/03/2017 21:08	
WG612759-06	STD	01	05/03/2017 21:36	
WG612759-07	STD	01	05/03/2017 22:05	
WG612759-08	STD	01	05/03/2017 22:34	
WG612759-09	STD	01	05/03/2017 23:02	
WG612759-10	SSCV	01	05/04/2017 00:00	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313679
Report generated 06/06/2017 09:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051391
Instrument: HPMS11
Analyst: ADC
Workgroup: WG614378

Tune ID: WG614378-01
Run Date: 05/16/2017
Run Time: 12:01
File ID: 11M18429
Cal ID: HPMS11-16-MAY-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	24.1	5305	PASS
75.0	95.0	30.0	60.0	51.3	11296	PASS
95.0	95.0	100	100	100	22034	PASS
96.0	95.0	5.00	9.00	6.88	1516	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	87.2	19224	PASS
175	174	5.00	9.00	7.97	1532	PASS
176	174	95.0	101	97.2	18686	PASS
177	176	5.00	9.00	6.15	1149	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG614378-02	STD	01	05/16/2017 12:54	
WG614378-03	STD	01	05/16/2017 13:23	
WG614378-04	STD	01	05/16/2017 13:52	
WG614378-05	STD	01	05/16/2017 14:21	
WG614378-06	STD	01	05/16/2017 14:50	
WG614378-07	STD	01	05/16/2017 15:20	
WG614378-08	STD-CCV	01	05/16/2017 15:49	
WG614378-09	STD	01	05/16/2017 16:18	
WG614378-10	STD	01	05/16/2017 16:47	
WG614378-11	STD	01	05/16/2017 17:16	
WG614378-12	SSCV	01	05/16/2017 18:14	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313679
Report generated 06/06/2017 09:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051391
Instrument: HPMS11
Analyst: ADC
Workgroup: WG615569

Tune ID: WG615569-01
Run Date: 05/25/2017
Run Time: 14:46
File ID: 11M18631
Cal ID: HPMS11-16-MAY-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	26.0	6073	PASS
75.0	95.0	30.0	60.0	52.8	12346	PASS
95.0	95.0	100	100	100	23389	PASS
96.0	95.0	5.00	9.00	6.96	1629	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	78.0	18236	PASS
175	174	5.00	9.00	7.94	1448	PASS
176	174	95.0	101	96.6	17610	PASS
177	176	5.00	9.00	6.50	1145	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG615569-02	CCV	01	05/25/2017 15:15	
WG615570-01	BLANK	01	05/25/2017 16:14	
WG615570-02	LCS	01	05/25/2017 16:43	
WG615570-03	LCS2	01	05/25/2017 17:12	
L17051391-01	LH18/24-SP650-6442-GRAB	01	05/26/2017 01:56	
WG615570-04	BLANK2	01	05/26/2017 02:54	*
WG615410-01	FBLK1	DL01	05/26/2017 05:51	*

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313679
Report generated 06/06/2017 09:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051391
Instrument: HPMS11
Analyst: JDS
Workgroup: WG615791

Tune ID: WG615791-01
Run Date: 05/26/2017
Run Time: 14:49
File ID: 11M18666
Cal ID: HPMS11-16-MAY-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	25.0	10921	PASS
75.0	95.0	30.0	60.0	50.2	21888	PASS
95.0	95.0	100	100	100	43621	PASS
96.0	95.0	5.00	9.00	6.79	2961	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	80.9	35301	PASS
175	174	5.00	9.00	7.66	2705	PASS
176	174	95.0	101	97.8	34520	PASS
177	176	5.00	9.00	6.40	2209	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG615791-02	CCV	01	05/26/2017 15:48	
WG615792-01	BLANK	01	05/26/2017 16:46	
WG615792-02	LCS	01	05/26/2017 18:14	
WG615792-03	LCS2	01	05/26/2017 18:43	
L17051391-01	LH18/24-SP650-6442-GRAB	DL01	05/26/2017 19:41	
WG615792-04	BLANK2	01	05/27/2017 04:24	*

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313679
Report generated 06/06/2017 09:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051391
Instrument: HPMS6
Analyst: TMB
Workgroup: WG598323

Tune ID: WG598323-01
Run Date: 01/12/2017
Run Time: 08:36
File ID: 6M144707
Cal ID: HPMS6-12-JAN-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	19.2	7923	PASS
75.0	95.0	30.0	60.0	54.8	22651	PASS
95.0	95.0	100	100	100	41304	PASS
96.0	95.0	5.00	9.00	7.28	3007	PASS
173	174	0	2.00	0.352	116	PASS
174	95.0	50.0	100	79.8	32963	PASS
175	174	5.00	9.00	8.22	2709	PASS
176	174	95.0	101	97.3	32071	PASS
177	176	5.00	9.00	6.69	2147	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG598323-02	STD	01	01/12/2017 09:02	
WG598323-03	STD	01	01/12/2017 09:37	
WG598323-04	STD	01	01/12/2017 10:10	
WG598323-05	STD-CCV	01	01/12/2017 10:42	
WG598323-06	STD	01	01/12/2017 11:14	
WG598323-07	STD	01	01/12/2017 11:47	
WG598323-08	STD	01	01/12/2017 12:19	
WG598323-09	STD	01	01/12/2017 12:52	
WG598323-10	SSCV	01	01/12/2017 13:56	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313679
Report generated 06/06/2017 09:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051391
Instrument: HPMS6
Analyst: TMB
Workgroup: WG615531

Tune ID: WG615531-01
Run Date: 05/25/2017
Run Time: 09:59
File ID: 6M147585
Cal ID: HPMS6-25-MAY-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	18.3	5863	PASS
75.0	95.0	30.0	60.0	48.2	15474	PASS
95.0	95.0	100	100	100	32082	PASS
96.0	95.0	5.00	9.00	6.88	2208	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	68.1	21858	PASS
175	174	5.00	9.00	7.28	1592	PASS
176	174	95.0	101	96.6	21117	PASS
177	176	5.00	9.00	6.63	1400	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG615531-02	STD	01	05/25/2017 10:54	
WG615531-03	STD	01	05/25/2017 11:24	
WG615531-05	STD	01	05/25/2017 12:24	
WG615531-06	STD	01	05/25/2017 12:54	
WG615531-04	STD	01	05/25/2017 13:23	
WG615531-07	STD	01	05/25/2017 13:53	
WG615531-08	STD-CCV	01	05/25/2017 14:23	
WG615531-09	STD	01	05/25/2017 14:53	
WG615531-10	STD	01	05/25/2017 15:22	
WG615531-11	STD	01	05/25/2017 15:51	
WG615531-12	SSCV	01	05/25/2017 17:43	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313679
Report generated 06/06/2017 09:47

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L17051391
Instrument: HPMS6
Analyst: TMB
Workgroup: WG615866

Tune ID: WG615866-01
Run Date: 05/30/2017
Run Time: 09:46
File ID: 6M147633
Cal ID: HPMS6-25-MAY-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	18.5	5672	PASS
75.0	95.0	30.0	60.0	48.4	14819	PASS
95.0	95.0	100	100	100	30605	PASS
96.0	95.0	5.00	9.00	6.56	2008	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	67.2	20570	PASS
175	174	5.00	9.00	7.35	1512	PASS
176	174	95.0	101	96.9	19934	PASS
177	176	5.00	9.00	7.24	1444	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG615866-02	CCV	01	05/30/2017 10:49	
WG615867-01	BLANK	01	05/30/2017 11:49	
WG615867-02	LCS	01	05/30/2017 12:19	
L17051391-02	TRIP BLANK	02	05/30/2017 16:17	
WG615867-06	QCMRL	01	05/30/2017 21:46	
WG615867-07	BLANK2	01	05/30/2017 22:45	*

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 5313679
Report generated 06/06/2017 09:47

Calibration Table Report
Method: A9FOOWTR.M
Title: Appendix IX (SOP:OVL MSV01) Water 050317 HPMS11
Last Calibration: Thu May 04 07:07:15 2017
Curve: WG612759
Calibration Files

	Compound	5 11M18002.D	20 11M18003.D	50 11M18004.D	100 11M18005.D	200 11M18006.D	300 11M18007.D	400 11M18008.D	500 11M18009.D	Avg	%RSD	Linear	Quadratic
I	Fluorobenzene	ISTD											
T	Acetonitrile	0.028	0.032	0.033	0.032	0.034	0.033	0.034	0.035	0.033	6.933		
T	3-Chloro-1-propene	0.480	0.493	0.499	0.481	0.462	0.420	0.394	0.364	0.449	11.191		
T	2-Chloro-1,3-butadiene	0.439	0.462	0.480	0.471	0.458	0.418	0.395	0.364	0.436	9.323		
T	Methacrylonitrile	0.149	0.176	0.191	0.188	0.193	0.186	0.185	0.178	0.181	7.820		
T	Isobutyl Alcohol		0.009	0.012	0.011	0.012	0.013	0.014	0.014	0.012	13.767		
T	1-Butanol				0.005	0.006	0.006	0.007	0.007	0.006	11.655		
T	Cyclohexanone			0.008	0.008	0.010	0.010	0.011	0.011	0.010	12.441		
T	2-Nitropropane			0.066	0.071	0.076	0.078	0.081	0.080	0.075	7.608		
T	Ethyl Acetate	0.229	0.253	0.260	0.255	0.254	0.241	0.233	0.221	0.243	5.885		
T	Methyl methacrylate	0.186	0.234	0.248	0.249	0.251	0.240	0.233	0.220	0.233	9.226		
I	Chlorobenzene-d5	ISTD											
I	1,4-Dichlorobenzene-d4	ISTD											

Mon May 08 16:08:06 2017

Calibration Table Report
Method: 8260WT.M
Title: 8260B/624 (SOP: OVL MSV01) Water 051617 HPMS11
Last Calibration: Wed May 17 12:46:08 2017
Curve: WG614378
Calibration Files

Compound	0.3 11M18431.D	0.4 11M18432.D	1 11M18433.D	2 11M18434.D	5 11M18435.D	20 11M18436.D	50 11M18437.D	100 11M18438.D	200 11M18439.D	300 11M18440.D	Avg	%RSD	R^2 Linear	 Quadratic
Fluorobenzene	ISTD													
Dichlorodifluoromethane			0.317	0.353	0.357	0.424	0.407	0.378	0.368		0.372	9.541		
Chloromethane			0.560	0.639	0.584	0.630	0.536	0.486	0.439		0.553	13.227		
Vinyl Chloride		0.498	0.417	0.470	0.439	0.478	0.442	0.375	0.336		0.432	12.564		
1,3-Butadiene				0.343	0.282	0.295	0.228	0.162	0.153	0.130	0.227	36.032		1.002
Bromomethane			0.207	0.210	0.206	0.193	0.198	0.204	0.219		0.205	4.082		
Chloroethane			0.219	0.239	0.241	0.249	0.245	0.237	0.248		0.240	4.259		
Trichlorofluoromethane		0.441	0.417	0.471	0.462	0.480	0.472	0.439	0.448		0.454	4.729		
Diethyl ether			0.273	0.297	0.290	0.286	0.284	0.278		0.284	0.285	2.761		
Isoprene		0.305	0.365	0.389	0.401	0.441	0.443	0.441	0.439		0.403	12.220		
Acrolein			0.029	0.040	0.038	0.039	0.040	0.042		0.042	0.039	11.129		
1,1,2-Trichloro-1,2,2-Trifluoroet			0.195	0.234	0.242	0.249	0.253	0.241	0.255		0.239	8.688		
Acetone				0.089	0.093	0.091	0.092	0.093	0.097	0.090	0.092	2.806		
1,1-Dichloroethene		0.473	0.457	0.486	0.517	0.521	0.518	0.495	0.494		0.495	4.648		
Tert-Butyl Alcohol			0.023	0.027	0.027	0.028	0.031	0.032			0.028	11.816		
Dimethyl Sulfide		0.287	0.297	0.340	0.336	0.357	0.356	0.352	0.351		0.334	8.216		
Iodomethane			0.013	0.079	0.141	0.251	0.276	0.290	0.298		0.192	59.519	0.998	
Methyl acetate				0.215	0.241	0.249	0.254	0.256	0.266		0.247	7.124		
Methylene Chloride			0.335	0.334	0.310	0.314	0.305	0.293	0.302		0.313	5.038		
Carbon Disulfide			0.710	0.770	0.789	0.834	0.806	0.757	0.688		0.765	6.757		
Acrylonitrile			0.094	0.114	0.118	0.119	0.129	0.131		0.126	0.119	10.729		
Methyl Tert Butyl Ether		0.745	0.695	0.766	0.793	0.821	0.803	0.773	0.768		0.771	5.035		
trans-1,2-Dichloroethene		0.246	0.236	0.270	0.276	0.288	0.287	0.276	0.287		0.271	7.185		
n-Hexane				0.407	0.430	0.467	0.476	0.471	0.467		0.453	6.165		
Diisopropyl ether			1.117	1.264	1.233	1.203	1.164	1.017		0.915	1.130	11.071		
Vinyl Acetate				0.479	0.533	0.487	0.517	0.535	0.472	0.424	0.492	8.019		
1,1-Dichloroethane		0.640	0.593	0.611	0.604	0.645	0.631	0.596	0.577		0.612	3.958		
Ethyl-Tert-Butyl ether			0.964	1.097	1.071	1.046	1.027	0.914		0.834	0.993	9.488		
2-Butanone				0.137	0.139	0.143	0.147	0.152	0.157	0.155	0.147	5.313		
Propionitrile			0.034	0.041	0.043	0.044	0.045	0.047		0.050	0.043	11.768		
2,2-Dichloropropane		0.423	0.369	0.405	0.392	0.420	0.417	0.395	0.398		0.402	4.470		
cis-1,2-Dichloroethene		0.316	0.262	0.294	0.319	0.332	0.328	0.315	0.320		0.311	7.292		
Chloroform	0.668	0.681	0.536	0.542	0.526	0.550	0.525	0.494	0.481		0.556	12.730		
1-Bromopropane				0.040	0.054	0.061	0.060	0.058	0.061	0.059	0.056	13.246		
Bromochloromethane		0.129	0.172	0.187	0.196	0.199	0.196	0.192	0.198		0.184	12.931		
Tetrahydrofuran			0.158	0.115	0.106	0.104	0.106	0.106		0.108	0.115	16.890	0.999	
Dibromofluoromethane					0.280	0.262	0.272	0.271	0.260		0.269	3.091		
1,1,1-Trichloroethane		0.415	0.399	0.423	0.462	0.483	0.485	0.463	0.464		0.449	7.243		
Cyclohexane		0.581	0.524	0.578	0.607	0.650	0.644	0.623	0.599	0.540	0.594	7.282		
1,1-Dichloropropene		0.331	0.335	0.357	0.372	0.408	0.407	0.386	0.387		0.373	7.978		
Carbon Tetrachloride		0.304	0.349	0.379	0.396	0.420	0.430	0.409	0.410		0.387	10.874		
Tert-Amyl-Methyl ether			0.714	0.837	0.823	0.816	0.803	0.73		0.677	0.77142	8.15202		
1,2-Dichloroethane-d4					0.363	0.317	0.338	0.335	0.317		0.33379	5.69157		
1,2-Dichloroethane		0.442	0.419	0.47	0.476	0.478	0.468	0.436	0.423		0.45135	5.33453		
Benzene		1.156	1.084	1.179	1.185	1.199	1.141	1.011	0.878		1.104	10.0158		
Trichloroethene		0.226	0.251	0.301	0.301	0.325	0.317	0.301	0.309		0.29146	11.7841		
Methylcyclohexane		0.477	0.383	0.443	0.467	0.507	0.501	0.477	0.464	0.423	0.46019	8.49006		
1,2-Dichloropropane		0.313	0.286	0.342	0.342	0.369	0.363	0.345	0.352		0.33917	8.04796		
1,4-Dioxane				0.002	0.003	0.003	0.003	0.003		0.003	0.00293	13.9596		
Bromodichloromethane		0.343	0.298	0.345	0.37	0.408	0.403	0.393	0.389		0.36867	10.1709		
Dibromomethane		0.12	0.153	0.171	0.163	0.188	0.182	0.176	0.183		0.16712	13.2633		
2-Chloroethyl Vinyl Ether			0.14	0.162	0.18	0.202	0.21	0.215	0.22	0.208	0.19218	14.9182		
4-Methyl-2-Pentanone					0.099	0.116	0.122	0.127	0.138	0.133	0.12257	11.2898		
cis-1,3-Dichloropropene		0.334	0.303	0.37	0.402	0.455	0.472	0.45	0.443		0.40378	15.4416	0.999	
Dimethyl Disulfide				0.147	0.173	0.237	0.271	0.28	0.288	0.269	0.23782	23.5484	0.999	
Chlorobenzene-d5	ISTD													
Toluene-d8					1.507	1.348	1.404	1.335	1.146		1.34813	9.77146		
Toluene		2.389	1.827	1.753	1.819	1.767	1.658	1.41			1.80307	16.3818	0.991	
Ethyl Methacrylate			0.303	0.369	0.419	0.482	0.512	0.503	0.484	0.461	0.44178	16.5839	0.998	
trans-1,3-Dichloropropene			0.496	0.468	0.517	0.577	0.593	0.574	0.53		0.53644	8.70041		
1,1,2-Trichloroethane		0.319	0.306	0.337	0.349	0.367	0.361	0.35	0.342		0.34131	5.95867		
2-Hexanone					0.257	0.302	0.314	0.319	0.323	0.318	0.30532	8.13831		
1,3-Dichloropropane		0.632	0.563	0.598	0.616	0.627	0.611	0.573	0.539		0.59471	5.61804		
Tetrachloroethene		0.237	0.276	0.301	0.34	0.35	0.354	0.336	0.331		0.31574	13.0405		
Dibromochloromethane		0.302	0.303	0.328	0.364	0.422	0.438	0.419	0.416		0.37379	15.2048	0.999	
1,2-Dibromoethane		0.218	0.277	0.297	0.323	0.336	0.338	0.324	0.324		0.30457	13.3219		
1-Chlorohexane		0.435	0.368	0.42	0.471	0.528	0.54	0.528	0.493	0.454	0.47077	12.2378		
Chlorobenzene		1.06	1.029	1.093	1.095	1.14	1.091	0.982	0.852		1.04267	8.68375		
1,1,1,2-Tetrachloroethane		0.333	0.343	0.376	0.375	0.422	0.428	0.418	0.412		0.38822	9.55907		
Ethylbenzene			0.49	0.553	0.573	0.617	0.631	0.597	0.568		0.5756	8.15775		
m-,p-Xylene		0.624	0.61	0.662	0.73	0.738	0.723	0.635	0.52		0.6552	11.3677		
o-Xylene		0.611	0.542	0.601	0.714	0.734	0.742	0.699	0.654		0.66201	10.9201		
Styrene		0.915	0.841	0.944	1.039	1.186	1.213	1.116	0.962		1.02697	13.0703		
Bromoform			0.169	0.221	0.229	0.278	0.299	0.304	0.316		0.25955	20.9192	0.999	
Isopropylbenzene		1.54	1.47	1.654	1.773	1.858	1.79	1.534	1.228		1.60558	12.8593		
1,4-Dichlorobenzene-d4	ISTD													
1,1,2,2-Tetrachloroethane		0.602	0.603	0.738	0.784	0.799	0.755	0.759	0.712		0.71899	10.6759		
p-Bromofluorobenzene					0.94	0.932	0.941	0.959	0.874		0.92914	3.499		
1,2,3-Trichloropropane			0.192	0.203	0.227	0.25	0.237	0.238	0.241		0.22684	9.47455		
trans-1,4-Dichloro-2-Butene			0.145	0.197	0.252	0.276	0.273	0.283	0.283	0.259	0.24598	20.0146	0.998	

n-Propylbenzene		3.443	3.25	3.731	4.084	4.255	3.72	3.078			3.6516	11.7041	
Bromobenzene	0.765	0.798	0.769	0.857	0.913	0.978	0.915	0.884	0.825		0.85586	8.52037	
1,3,5-Trimethylbenzene		2.528	2.343	2.64	2.841	3.025	2.723	2.375	1.866		2.54273	14.0286	
2-Chlorotoluene		2.677	2.489	2.82	2.937	3.017	2.639	2.322	1.813		2.58925	14.9669	
4-Chlorotoluene		1.945	1.885	2.066	2.17	2.308	2.123	1.844	1.421		1.97015	13.7289	
a-Methylstyrene					1.273	1.545	1.523	1.47	1.247	1.119	1.36309	12.7744	
tert-Butylbenzene			0.452	0.537	0.622	0.676	0.646	0.63	0.606		0.59568	12.8233	
1,2,4-Trimethylbenzene			2.375	2.721	2.996	3.128	2.834	2.449			2.75056	10.8088	
sec-Butylbenzene			2.835	3.307	3.628	3.804	3.444	2.938			3.32593	11.4512	
p-Isopropyltoluene			2.257	2.755	2.988	3.212	2.941	2.558			2.7853	12.2258	
1,3-Dichlorobenzene		1.381	1.452	1.581	1.675	1.801	1.669	1.574	1.332		1.5582	10.2657	
1,4-Dichlorobenzene		1.654	1.501	1.619	1.747	1.774	1.655	1.555	1.316		1.60264	9.16319	
n-Butylbenzene			2.011	2.347	2.567	2.939	2.747	2.426			2.50625	12.9532	
1,2-Dichlorobenzene	1.749	1.667	1.454	1.685	1.649	1.757	1.617	1.532	1.299		1.60101	9.3155	
1,2-Dibromo-3-Chloropropane				0.092	0.133	0.151	0.154	0.157	0.168		0.14243	19.0803	0.999
1,2,4-Trichlorobenzene		0.9	0.961	1.064	1.102	1.251	1.175	1.143	1.07		1.08325	10.4409	
Hexachlorobutadiene		0.336	0.503	0.513	0.584	0.642	0.617	0.623	0.616		0.55426	18.444	1
Naphthalene		2.035	1.958	2.204	2.525	2.772	2.535	2.227	1.831		2.26105	14.3669	
1,2,3-Trichlorobenzene	0.922	0.878	0.94	1.027	1.136	1.237	1.159	1.103	1.065		1.05185	11.4386	

Thu May 18 10:46:55 2017

Calibration Table Report
Method: A9FOOWT.M
Title: A9-FOO Water - IC: 011217 - HPMS6
Last Calibration: Thu Jan 12 13:53:06 2017
Curve: WG598323
Calibration Files

	Compound	5 6M144708.D	20 6M144709.D	50 6M144710.D	100 6M144711.D	200 6M144712.D	300 6M144713.D	400 6M144714.D	500 6M144715.D	Avg	%RSD
I	Fluorobenzene	ISTD									
T	Acetonitrile	0.021	0.019	0.018	0.017	0.018	0.016	0.017	0.017	0.018	8.729
T	3-Chloro-1-propene	0.301	0.305	0.307	0.308	0.306	0.295	0.287	0.289	0.300	2.763
T	2-Chloro-1,3-butadiene	0.348	0.368	0.380	0.385	0.382	0.371	0.361	0.364	0.370	3.335
T	Ethyl Acetate	0.144	0.163	0.169	0.166	0.171	0.152	0.159	0.159	0.160	5.700
T	Methacrylonitrile	0.076	0.087	0.089	0.088	0.089	0.080	0.083	0.083	0.084	5.535
T	Isobutyl Alcohol	0.004	0.006	0.006	0.005	0.005	0.004	0.005	0.006	0.005	13.176
T	1-Butanol									0.000	0.000
T	Methyl methacrylate	0.146	0.173	0.185	0.185	0.188	0.171	0.177	0.178	0.175	7.640
T	2-Nitropropane		0.063	0.071	0.071	0.076	0.070	0.075	0.074	0.071	6.228
I	Chlorobenzene-d5	ISTD									
I	1,4-Dichlorobenzene-d4	ISTD									
T	Cyclohexanone		0.008	0.009	0.008	0.010	0.009	0.011	0.012	0.009	14.808

Fri Jan 13 10:37:15 2017

Calibration Table Report
Method: 8260BWT.M
Title: 8260B/624_WATER SOP:MSV01 05-25-17 - HPMS6
Last Calibration: Fri May 26 13:13:14 2017
Curve: WG615531
Calibration Files

	Compound	0.3 6M147587.D	0.4 6M147588.D	1 6M147592.D	2 6M147590.D	5 6M147591.D	20 6M147593.D	50 6M147594.D	100 6M147595.D	200 6M147596.D	300 6M147597.D	Avg	%RSD	Linear	Quad
I	Fluorobenzene	ISTD													
T	Dichlorodifluoromethane			0.343	0.339	0.326	0.409	0.403	0.378	0.368		0.367	8.748		
P	Chloromethane			0.494	0.422	0.382	0.388	0.430	0.375	0.368		0.408	10.885		
C	Vinyl Chloride		0.308	0.303	0.276	0.253	0.285	0.276	0.258	0.247		0.276	8.183		
T	1,3-Butadiene					0.149	0.166	0.119	0.108	0.100	0.097	0.123	22.810		1.000
T	Bromomethane			0.236	0.215	0.187	0.193	0.203	0.205	0.209		0.207	7.814		
T	Chloroethane			0.233	0.230	0.221	0.237	0.234	0.226	0.223		0.229	2.607		
T	Trichlorofluoromethane		0.440	0.452	0.427	0.415	0.450	0.442	0.423	0.417		0.433	3.387		
T	Diethyl ether			0.244	0.245	0.241	0.243	0.238	0.232		0.224	0.238	3.252		
T	Isoprene					0.392	0.448	0.434	0.420	0.409	0.393	0.416	5.442		
T	Acrolein				0.037	0.037	0.038	0.037	0.037		0.037	0.037	1.114		
T	1,1,2-Trichloro-1,2,2-Trifluoroet			0.232	0.236	0.232	0.247	0.244	0.232	0.232		0.236	2.683		
T	Acetone					0.061	0.059	0.064	0.060	0.059	0.055	0.060	4.880		
C	1,1-Dichloroethene		0.384	0.435	0.433	0.413	0.442	0.436	0.418	0.416		0.422	4.475		
T	Tert-Butyl Alcohol				0.021	0.022	0.022	0.022	0.022		0.023	0.022	2.122		
T	Dimethyl Sulfide					0.301	0.327	0.319	0.310	0.300	0.292	0.308	4.300		
T	Iodomethane			0.122	0.138	0.192	0.271	0.263	0.255	0.243	0.212	0.212	26.942		0.998
T	Methyl acetate					0.175	0.178	0.173	0.171	0.167	0.168	0.172	2.502		
T	Methylene Chloride			0.320	0.313	0.289	0.298	0.290	0.279	0.272		0.294	5.867		
T	Carbon Disulfide			0.977	0.942	0.877	0.951	0.915	0.883	0.851	0.810	0.901	6.201		
T	Acrylonitrile			0.088	0.087	0.084	0.088	0.090	0.089		0.083	0.087	3.038		
T	Methyl Tert Butyl Ether			0.691	0.691	0.714	0.712	0.707	0.681	0.669		0.695	2.409		
T	trans-1,2-Dichloroethene		0.252	0.261	0.262	0.253	0.273	0.266	0.256	0.253		0.260	2.831		
T	n-Hexane					0.361	0.395	0.381	0.365	0.363	0.351	0.369	4.297		
T	Diisopropyl ether			1.090	1.036	1.002	1.019	0.989	0.969		0.922	1.004	5.277		
T	Vinyl Acetate					0.451	0.449	0.475	0.447	0.460	0.441	0.454	2.671		
P	1,1-Dichloroethane		0.517	0.562	0.546	0.528	0.548	0.538	0.515	0.510		0.533	3.498		
T	Ethyl-Tert-Butyl ether			0.959	0.917	0.893	0.904	0.883	0.862		0.830	0.892	4.619		
T	2-Butanone					0.093	0.095	0.098	0.094	0.094	0.095	0.095	2.038		
T	Propionitrile			0.033	0.030	0.031	0.032	0.032	0.031		0.032	0.032	2.509		
T	2,2-Dichloropropane		0.445	0.457	0.436	0.422	0.430	0.419	0.406	0.415		0.429	3.946		
T	cis-1,2-Dichloroethene		0.276	0.287	0.296	0.285	0.301	0.295	0.285	0.280		0.288	2.995		
C	Chloroform	0.701	0.638	0.516	0.525	0.501	0.506	0.493	0.475	0.465		0.536	14.901		
T	1-Bromopropane			0.032	0.041	0.046	0.051	0.050	0.049	0.048	0.047	0.046	13.549		
T	Bromochloromethane		0.145	0.143	0.150	0.156	0.158	0.157	0.151	0.148		0.151	3.772		
T	Tetrahydrofuran				0.070	0.069	0.067	0.067	0.065		0.065	0.067	3.571		
S	Dibromofluoromethane			0.228	0.253	0.234	0.260	0.247	0.249	0.242	0.236	0.244	4.416		
T	1,1,1-Trichloroethane		0.413	0.425	0.426	0.398	0.425	0.419	0.403	0.398		0.413	2.934		
T	Cyclohexane			0.514	0.484	0.468	0.525	0.505	0.496	0.485	0.470	0.493	4.132		
T	1,1-Dichloropropene			0.407	0.386	0.369	0.391	0.383	0.372	0.370		0.383	3.584		
T	Tert-Amyl-Methyl ether			0.806	0.780	0.766	0.781	0.749	0.737		0.717	0.762	3.969		
T	Carbon Tetrachloride		0.238	0.304	0.314	0.313	0.342	0.345	0.334	0.336		0.3158	11.046		
S	1,2-Dichloroethane-d4				0.304	0.287	0.305	0.284	0.286	0.277	0.269	0.2873	4.5659		
T	Heptane											0	0		
T	1,2-Dichloroethane		0.348	0.36	0.364	0.356	0.364	0.361	0.347	0.34		0.3549	2.4958		
T	Benzene		1.319	1.24	1.208	1.134	1.146	1.124	1.076	1.041		1.1609	7.7977		
T	Trichloroethene		0.246	0.258	0.245	0.246	0.26	0.257	0.248	0.242		0.2505	2.6962		
T	Methylcyclohexane					0.394	0.436	0.424	0.414	0.4	0.392	0.4101	4.3232		
C	1,2-Dichloropropane		0.296	0.298	0.312	0.302	0.315	0.314	0.303	0.299		0.305	2.5267		
T	1,4-Dioxane					0.002	0.002	0.002	0.002		0.002	0.0022	7.3711		
T	Bromodichloromethane		0.351	0.368	0.374	0.373	0.393	0.386	0.377	0.371		0.374	3.2888		
T	Dibromomethane		0.105	0.143	0.15	0.148	0.155	0.154	0.15	0.147		0.1438	11.18		
T	2-Chloroethyl Vinyl Ether				0.151	0.151	0.158	0.165	0.161	0.159	0.159	0.1577	3.2559		
T	4-Methyl-2-Pentanone					0.077	0.082	0.087	0.086	0.085	0.085	0.0839	4.2794		
T	cis-1,3-Dichloropropene		0.429	0.44	0.456	0.454	0.475	0.474	0.46	0.456		0.4554	3.3602		
T	Dimethyl Disulfide					0.241	0.27	0.269	0.269	0.264	0.26	0.262	4.2783		
I	Chlorobenzene-d5	ISTD													
S	Toluene-d8			1.447	1.38	1.318	1.406	1.313	1.314	1.255	1.243	1.3346	5.3509		
C	Toluene		1.748	1.755	1.682	1.605	1.647	1.598	1.537	1.456		1.6286	6.2624		
T	Ethyl Methacrylate			0.4	0.431	0.448	0.486	0.478	0.475	0.466	0.472	0.4569	6.3602		
T	Paraldehyde											0	0		
T	trans-1,3-Dichloropropene			0.606	0.59	0.578	0.6	0.593	0.584	0.571		0.5889	2.0698		
T	1,1,2-Trichloroethane		0.218	0.3	0.313	0.31	0.311	0.306	0.297	0.288		0.293	10.685		
T	2-Hexanone					0.201	0.201	0.213	0.214	0.21	0.214	0.2088	3.0183		
T	1,3-Dichloropropane		0.547	0.584	0.584	0.584	0.592	0.575	0.56	0.546		0.5714	3.1649		
T	Tetrachloroethene		0.341	0.369	0.347	0.333	0.346	0.338	0.324	0.315		0.3391	4.7877		
T	Dibromochloromethane		0.285	0.33	0.342	0.344	0.367	0.366	0.358	0.35		0.3427	7.7338		
T	1,2-Dibromoethane		0.243	0.274	0.271	0.295	0.299	0.294	0.29	0.282		0.281	6.5194		
T	1-Chlorohexane		0.526	0.548	0.521	0.502	0.552	0.54	0.531	0.51	0.494	0.5248	3.8211		
P	Chlorobenzene		1.072	1.075	1.066	1.015	1.038	1.005	0.969	0.904		1.0181	5.8162		
T	1,1,1,2-Tetrachloroethane		0.334	0.347	0.359	0.359	0.367	0.362	0.351	0.329		0.351	3.8586		
C	Ethylbenzene		0.536	0.573	0.546	0.534	0.564	0.549	0.532	0.504		0.5422	3.9304		
T	m-,p-Xylene		0.71	0.705	0.69	0.661	0.678	0.665	0.637	0.592		0.6671	5.8117		
T	o-Xylene			0.669	0.658	0.642	0.676	0.671	0.653	0.619		0.6555	3.0196		
T	Styrene		1.044	1.061	1.111	1.093	1.163	1.162	1.147	1.079		1.1075	4.1609		
P	Bromoform			0.179	0.195	0.193	0.208	0.216	0.219	0.217		0.2038	7.4964		
T	Isopropylbenzene		1.733	1.748	1.684	1.623	1.705	1.696	1.655	1.55		1.6742	3.8395		
I	1,4-Dichlorobenzene-d4	ISTD													
P	1,1,2,2-Tetrachloroethane		0.71	0.764	0.762	0.809	0.792	0.773	0.749	0.758		0.7647	3.8484		
S	p-Bromofluorobenzene			1.167	1.134	1.062	1.155	1.058	1.065	1.063	1.031	1.0919	4.7275		

T	1,2,3-Trichloropropane			0.159	0.184	0.214	0.219	0.207	0.203	0.203		0.1983	10.286
T	trans-1,4-Dichloro-2-Butene			0.158	0.186	0.206	0.226	0.216	0.216	0.222	0.216	0.2057	11.014
T	n-Propylbenzene		4.512	4.368	4.202	4.141	4.29	4.092	3.904	3.715		4.1531	6.1343
T	Bromobenzene	0.731	0.746	0.865	0.838	0.838	0.841	0.795	0.766	0.751		0.7971	6.2596
T	1,3,5-Trimethylbenzene		2.971	2.915	2.816	2.751	2.892	2.79	2.694	2.616		2.8057	4.226
T	2-Chlorotoluene		3.148	3.108	2.942	2.882	3.046	2.675	2.588	2.548		2.8671	8.2441
T	4-Chlorotoluene		2.827	2.515	2.528	2.44	2.358	2.492	2.39	2.276		2.4782	6.6453
T	a-Methylstyrene					1.423	1.572	1.527	1.499	1.446	1.327	1.4656	5.9171
T	tert-Butylbenzene			0.527	0.521	0.518	0.542	0.524	0.508	0.495		0.5192	2.8616
T	1,2,4-Trimethylbenzene			2.963	2.948	2.903	3.022	2.892	2.79	2.689		2.8866	3.9156
T	sec-Butylbenzene			3.579	3.497	3.312	3.468	3.333	3.189	3.067		3.3494	5.39
T	p-Isopropyltoluene			2.93	2.761	2.705	2.82	2.744	2.633	2.552		2.7352	4.5004
T	1,3-Dichlorobenzene		1.768	1.634	1.586	1.576	1.591	1.552	1.482	1.43		1.5772	6.4005
T	1,4-Dichlorobenzene	1.708	1.642	1.622	1.62	1.599	1.6	1.546	1.483	1.426		1.583	5.4062
T	n-Butylbenzene			2.894	2.749	2.675	2.775	2.73	2.613	2.529		2.7091	4.3506
T	1,2-Dichlorobenzene	1.468	1.534	1.524	1.504	1.501	1.505	1.469	1.398	1.342		1.4717	4.2873
T	1,2-Dibromo-3-Chloropropane				0.12	0.144	0.146	0.15	0.147	0.147		0.1424	7.7877
T	1,2,4-Trichlorobenzene		1.195	1.131	1.102	1.04	1.053	1.042	0.984	0.945		1.0615	7.5424
T	Hexachlorobutadiene		0.394	0.37	0.365	0.336	0.355	0.337	0.322	0.313		0.3491	7.7311
T	Naphthalene		2.574	2.48	2.443	2.43	2.428	2.392	2.268	2.152		2.396	5.4371
T	1,2,3-Trichlorobenzene	1.012	1.188	1.009	0.987	0.983	0.979	0.947	0.896	0.858		0.9844	9.3675

Tue May 30 12:32:10 2017

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051391 Run Date: 05/16/2017 Sample ID: WG614378-12
Instrument ID: HPMS11 Run Time: 18:14 Method: 8260B
File ID: 11M18442 Analyst: ADC QC Key: DOD4
ICal Workgroup: WG614378 Cal ID: HPMS11 - 16-MAY-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	18.4	ug/L	0.455	8.00	20	
Chloroform	CCC	20.0	18.3	ug/L	0.508	8.60	20	
Ethylbenzene	CCC	20.0	20.8	ug/L	0.599	4.10	20	
Toluene	CCC	20.0	21.7	ug/L	1.68	8.60	20	
Vinyl Chloride	CCC	20.0	21.6	ug/L	0.467	8.20	20	
1,1,2,2-Tetrachloroethane	SPCC	20.0	19.6	ug/L	0.704	2.10	20	
Chloromethane	SPCC	20.0	22.3	ug/L	0.617	11.5	20	
Bromoform	SPCC	20.0	16.5	ug/L	0.246	17.6	20	
Chlorobenzene	SPCC	20.0	20.9	ug/L	1.09	4.40	20	
1,1-Dichloroethane	SPCC	20.0	19.1	ug/L	0.586	4.30	20	
1,1,1-Trichloroethane		20.0	20.4	ug/L	0.459	2.10	20	
1,1,2-Trichloroethane		20.0	20.4	ug/L	0.348	2.00	20	
1,2-Dichloroethane		20.0	19.6	ug/L	0.443	1.90	20	
Acetone		20.0	19.5	ug/L	0.0897	2.60	20	
Benzene		20.0	20.5	ug/L	1.13	2.30	20	
Carbon Tetrachloride		20.0	20.2	ug/L	0.392	1.20	20	
Methylene Chloride		20.0	18.3	ug/L	0.286	8.60	20	
m-,p-Xylene		40.0	43.6	ug/L	0.715	9.10	20	
o-Xylene		20.0	22.2	ug/L	0.733	10.8	20	
Styrene		20.0	22.5	ug/L	1.16	12.6	20	
Tetrachloroethene		20.0	21.4	ug/L	0.338	6.90	20	
Trichloroethene		20.0	21.9	ug/L	0.319	9.30	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5313678
Report generated 06/06/2017 09:47

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051391 Run Date: 05/25/2017 Sample ID: WG615531-12
Instrument ID: HPMS6 Run Time: 17:43 Method: 8260B
File ID: 6M147600 Analyst: TMB QC Key: DOD4
ICal Workgroup: WG615531 Cal ID: HPMS6 - 25-MAY-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	20.7	ug/L	0.437	3.40	20	
Chloroform	CCC	20.0	18.4	ug/L	0.494	7.80	20	
Ethylbenzene	CCC	20.0	20.4	ug/L	0.553	2.00	20	
Toluene	CCC	20.0	19.8	ug/L	1.61	1.20	20	
Vinyl Chloride	CCC	20.0	21.8	ug/L	0.300	8.90	20	
1,1,2,2-Tetrachloroethane	SPCC	20.0	20.0	ug/L	0.766	0.100	20	
Chloromethane	SPCC	20.0	21.0	ug/L	0.429	5.10	20	
Bromoform	SPCC	20.0	18.9	ug/L	0.192	5.70	20	
Chlorobenzene	SPCC	20.0	20.1	ug/L	1.02	0.500	20	
1,1-Dichloroethane	SPCC	20.0	19.8	ug/L	0.529	0.800	20	
1,1,1-Trichloroethane		20.0	20.3	ug/L	0.419	1.30	20	
1,1,2-Trichloroethane		20.0	20.5	ug/L	0.300	2.40	20	
1,2-Dichloroethane		20.0	20.0	ug/L	0.355	0	20	
Acetone		20.0	18.6	ug/L	0.0555	6.80	20	
Benzene		20.0	19.7	ug/L	1.14	1.40	20	
Carbon Tetrachloride		20.0	21.3	ug/L	0.337	6.50	20	
Methylene Chloride		20.0	19.8	ug/L	0.291	1.20	20	
m-,p-Xylene		40.0	40.2	ug/L	0.670	0.400	20	
o-Xylene		20.0	20.7	ug/L	0.678	3.50	20	
Styrene		20.0	20.9	ug/L	1.16	4.50	20	
Tetrachloroethene		20.0	19.9	ug/L	0.337	0.600	20	
Trichloroethene		20.0	20.4	ug/L	0.256	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: 5313678
Report generated 06/06/2017 09:47

Login Number: L17051391 Run Date: 05/25/2017 Sample ID: WG615569-02
Instrument ID: HPMS11 Run Time: 15:15 Method: 8260B
File ID: 11M18632 Analyst: ADC QC Key: DOD4
Workgroup (AAB#): WG615570 Cal ID: HPMS11 - 16-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	53.1	ug/L	0.360	6.22	20	
1,1-Dichloroethene	CCC	50.0	51.0	ug/L	0.505	1.91	20	
Chloroform	CCC	50.0	45.7	ug/L	0.508	8.59	20	
Ethylbenzene	CCC	50.0	52.8	ug/L	0.608	5.54	20	
Toluene	CCC	50.0	51.3	ug/L	1.57	2.65	20	
Vinyl Chloride	CCC	50.0	52.0	ug/L	0.449	3.92	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	48.6	ug/L	0.699	2.79	20	
Bromoform	SPCC	50.0	44.2	ug/L	0.271	11.5	20	
Chlorobenzene	SPCC	50.0	50.8	ug/L	1.06	1.52	20	
Chloromethane	SPCC	50.0	44.1	ug/L	0.488	11.9	20	
1,1-Dichloroethane	SPCC	50.0	50.8	ug/L	0.622	1.66	20	
Xylenes		150	160	ug/L	0.704	6.83	20	
1,1,1-Trichloroethane		50.0	50.9	ug/L	0.458	1.90	20	
1,1,2-Trichloroethane		50.0	48.5	ug/L	0.331	2.90	20	
1,2-Dichloroethane		50.0	49.5	ug/L	0.447	1.01	20	
Benzene		50.0	49.1	ug/L	1.08	1.86	20	
Carbon Tetrachloride		50.0	54.2	ug/L	0.419	8.31	20	
Methylene Chloride		50.0	45.3	ug/L	0.284	9.47	20	
m-,p-Xylene		100	107	ug/L	0.699	6.62	20	
o-Xylene		50.0	53.6	ug/L	0.710	7.25	20	
Styrene		50.0	56.0	ug/L	1.15	12.1	20	
Tetrachloroethene		50.0	54.9	ug/L	0.347	9.81	20	
Trichloroethene		50.0	51.2	ug/L	0.298	2.39	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5313680
Report generated 06/06/2017 09:47

Login Number: L17051391 Run Date: 05/26/2017 Sample ID: WG615791-02
Instrument ID: HPMS11 Run Time: 15:48 Method: 8260B
File ID: 11M18668 Analyst: JDS QC Key: DOD4
Workgroup (AAB#): WG615792 Cal ID: HPMS11 - 16-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	52.4	ug/L	0.355	4.79	20	
1,1-Dichloroethene	CCC	50.0	49.8	ug/L	0.493	0.492	20	
Chloroform	CCC	50.0	45.1	ug/L	0.501	9.87	20	
Ethylbenzene	CCC	50.0	50.3	ug/L	0.579	0.628	20	
Toluene	CCC	50.0	50.1	ug/L	1.53	0.295	20	
Vinyl Chloride	CCC	50.0	49.3	ug/L	0.426	1.42	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	51.9	ug/L	0.746	3.79	20	
Bromoform	SPCC	50.0	42.5	ug/L	0.260	15.0	20	
Chlorobenzene	SPCC	50.0	49.4	ug/L	1.03	1.17	20	
Chloromethane	SPCC	50.0	41.4	ug/L	0.458	17.2	20	
1,1-Dichloroethane	SPCC	50.0	50.4	ug/L	0.617	0.712	20	
Acetone		50.0	41.8	ug/L	0.0770	16.4	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5313680
Report generated 06/06/2017 09:47

Login Number: L17051391 Run Date: 05/30/2017 Sample ID: WG615866-02
Instrument ID: HPMS6 Run Time: 10:49 Method: 8260B
File ID: 6M147635 Analyst: TMB QC Key: DOD4
Workgroup (AAB#): WG615867 Cal ID: HPMS6 - 25-MAY-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,2-Dichloropropane	CCC	50.0	51.1	ug/L	0.312	2.18	20	
1,1-Dichloroethene	CCC	50.0	51.6	ug/L	0.436	3.28	20	
Chloroform	CCC	50.0	46.1	ug/L	0.494	7.72	20	
Ethylbenzene	CCC	50.0	50.8	ug/L	0.551	1.64	20	
Toluene	CCC	50.0	48.4	ug/L	1.58	3.25	20	
Vinyl Chloride	CCC	50.0	47.1	ug/L	0.260	5.86	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	52.9	ug/L	0.808	5.72	20	
Bromoform	SPCC	50.0	54.2	ug/L	0.221	8.41	20	
Chlorobenzene	SPCC	50.0	48.9	ug/L	0.996	2.22	20	
Chloromethane	SPCC	50.0	40.6	ug/L	0.331	18.9	20	
1,1-Dichloroethane	SPCC	50.0	50.4	ug/L	0.537	0.848	20	
Xylenes		150	149	ug/L	0.660	0.513	20	
1,1,1-Trichloroethane		50.0	51.1	ug/L	0.423	2.29	20	
1,1,2-Trichloroethane		50.0	52.9	ug/L	0.310	5.89	20	
1,2-Dichloroethane		50.0	51.2	ug/L	0.364	2.46	20	
Acetone		50.0	48.2	ug/L	0.0574	3.60	20	
Benzene		50.0	48.3	ug/L	1.12	3.48	20	
Carbon Tetrachloride		50.0	56.7	ug/L	0.358	13.3	20	
Methylene Chloride		50.0	49.6	ug/L	0.292	0.801	20	
m-,p-Xylene		100	98.8	ug/L	0.659	1.17	20	
o-Xylene		50.0	50.4	ug/L	0.661	0.810	20	
Styrene		50.0	52.0	ug/L	1.15	4.05	20	
Tetrachloroethene		50.0	50.0	ug/L	0.339	0.00960	20	
Trichloroethene		50.0	51.0	ug/L	0.256	2.00	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 5313680
Report generated 06/06/2017 09:47

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

Login Number: L17051391
Instrument ID: HPMS11
Workgroup (AAB#): WG615570

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	183063	318734	440982
Upper Limit	NA	NA	366126	637468	881964
Lower Limit	NA	NA	91532	159367	220491
L17051391-01	1.00	01	108486	225256	331990
WG615570-01	1.00	01	121127	247540	369716
WG615570-02	1.00	01	147589	269007	385752
WG615570-03	1.00	01	152720	279011	401718

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: 5313681
Report generated 06/06/2017 09:47

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

Login Number: L17051391
Instrument ID: HPMS11
Workgroup (AAB#): WG615792

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	183063	318734	440982
Upper Limit	NA	NA	366126	637468	881964
Lower Limit	NA	NA	91532	159367	220491
L17051391-01	20.0	DL01	124857	250955	361313
WG615792-01	1.00	01	122385	249061	360009
WG615792-02	1.00	01	137386	263489	374813
WG615792-03	1.00	01	150364	282491	402247

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: 5313681
Report generated 06/06/2017 09:47

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

Login Number: L17051391
Instrument ID: HPMS6
Workgroup (AAB#): WG615867

ICAL CCV Number: WG615531-08
CAL ID: HPMS6-25-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG615531-08	NA	NA	167733	318587	459042
Upper Limit	NA	NA	335466	637174	918084
Lower Limit	NA	NA	83867	159294	229521
L17051391-02	1.00	02	143797	289786	420695
WG615867-01	1.00	01	150728	300024	435801
WG615867-02	1.00	01	159192	306294	433625

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: 5313681
Report generated 06/06/2017 09:47

Microbac Laboratories Inc.

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

Login Number: L17051391
Instrument ID: HPMS11
Workgroup (AAB#): WG615570

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	16.96	14.14	10.52
Upper Limit	NA	NA	17.46	14.64	11.02
Lower Limit	NA	NA	16.46	13.64	10.02
L17051391-01	1.00	01	16.94	14.12	10.49
WG615570-01	1.00	01	16.94	14.12	10.49
WG615570-02	1.00	01	16.94	14.12	10.49
WG615570-03	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: 5313683
Report generated: 06/06/2017 09:47

Microbac Laboratories Inc.

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

Login Number: L17051391
Instrument ID: HPMS11
Workgroup (AAB#): WG615792

ICAL CCV Number: WG614378-08
CAL ID: HPMS11-16-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG614378-08	NA	NA	16.96	14.14	10.52
Upper Limit	NA	NA	17.46	14.64	11.02
Lower Limit	NA	NA	16.46	13.64	10.02
L17051391-01	20.0	DL01	16.94	14.12	10.49
WG615792-01	1.00	01	16.94	14.12	10.49
WG615792-02	1.00	01	16.94	14.12	10.49
WG615792-03	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: 5313683
Report generated: 06/06/2017 09:47

Microbac Laboratories Inc.

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

Login Number: L17051391
Instrument ID: HPMS6
Workgroup (AAB#): WG615867

ICAL CCV Number: WG615531-08
CAL ID: HPMS6-25-MAY-17
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG615531-08	NA	NA	18.16	15.13	11.25
Upper Limit	NA	NA	18.66	15.63	11.75
Lower Limit	NA	NA	17.66	14.63	10.75
L17051391-02	1.00	02	18.16	15.13	11.25
WG615867-01	1.00	01	18.16	15.13	11.25
WG615867-02	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: 5313683
Report generated: 06/06/2017 09:47

2.2 General Chromatography Data

2.2.1 LC/MS Data (6850)

2.2.1.1 Summary Data

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L17051391-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	LH18/24-SP650-6442-GRAB	**Prep Method:**	6850	**Prep Date:**	05/26/2017 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	04/24/2017 15:40
Workgroup #:	WG615781	**Analyst:**	JWR	**Run Date:**	05/26/2017 17:07
Collect Date:	05/24/2017 15:00	**Dilution:**	1	**File ID:**	1LM.LM39707
Sample Tag:	01	**Units:**	ug/L		

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

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L17051391
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

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: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2017)

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

Comments: ICAL WG611288 : Alternate Source STD80234
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39494	WG611288-01 CCB	1	1		04/24/17 13:27
2	1LM.LM39495	WG611288-02 STD (0.1 ug/L)	1	1	STD80232	04/24/17 13:46
3	1LM.LM39496	WG611288-03 STD (0.2 ug/L)	1	1	STD80232	04/24/17 14:05
4	1LM.LM39497	WG611288-04 STD (0.5 ug/L)	1	1	STD80232	04/24/17 14:24
5	1LM.LM39498	WG611288-05 STD (1.0 ug/L)	1	1	STD80232	04/24/17 14:43
6	1LM.LM39499	WG611288-06 STD (2.0 ug/L)	1	1	STD80232	04/24/17 15:02
7	1LM.LM39500	WG611288-07 STD (5.0 ug/L)	1	1	STD80232	04/24/17 15:21
8	1LM.LM39501	WG611288-08 STD (10 ug/L)	1	1	STD80232	04/24/17 15:40
9	1LM.LM39502	WG611288-09 SSCV (1.0 ug/L)	1	1	STD80234	04/24/17 15:59
10	1LM.LM39503	WG611330-01 CCB	1	1		04/24/17 16:18
11	1LM.LM39504	WG611330-02 CCV (1.0ug/L)	1	1	STD80232	04/24/17 16:37
12	1LM.LM39505	WG611327-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 16:56
13	1LM.LM39506	WG611327-01 MCT (0.2ug/L)	1	1	STD80234	04/24/17 17:14
14	1LM.LM39507	WG611327-02 BLANK	1	1		04/24/17 17:34
15	1LM.LM39508	WG611327-03 LCS (0.2ug/L)	1	1	STD80234	04/24/17 17:52
16	1LM.LM39509	L17040713-06 RS	1	1		04/24/17 18:11
17	1LM.LM39510	L17040713-07 MS	1	1	STD80234	04/24/17 18:30
18	1LM.LM39511	L17040713-08 MSD	1	1	STD80234	04/24/17 18:49
19	1LM.LM39512	L17040713-01	1	1		04/24/17 19:08
20	1LM.LM39513	L17040713-02	1	1		04/24/17 19:27
21	1LM.LM39514	L17040713-03	1	1		04/24/17 19:46
22	1LM.LM39515	L17040713-04	1	1		04/24/17 20:05
23	1LM.LM39516	WG611330-03 CCV (1.0ug/L)	1	1	STD80232	04/24/17 20:24
24	1LM.LM39517	WG611327-08 MRL (0.2ug/L)	1	1	STD80232	04/24/17 20:43
25	1LM.LM39518	WG611330-04 CCB	1	1		04/24/17 21:02
26	1LM.LM39519	L17040713-05	1	1		04/24/17 21:21
27	1LM.LM39520	L17040713-09	1	1		04/24/17 21:40
28	1LM.LM39521	L17040713-10	1	1		04/24/17 21:59
29	1LM.LM39522	L17040713-11	1	1		04/24/17 22:17
30	1LM.LM39523	L17040713-12	1	1		04/24/17 22:36
31	1LM.LM39524	L17040713-13	1	1		04/24/17 22:55
32	1LM.LM39525	WG611330-05 CCV (1.0ug/L)	1	1	STD80232	04/24/17 23:14
33	1LM.LM39526	WG611327-09 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:33

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Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 042417_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 WG611327 (waters) Analytical WG611328 (waters)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2017)
CCV STD: STD80232 LCS STD: STD80234 STD80234

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM39527	WG611328-07 MRL (0.2ug/L)	1	1	STD80232	04/24/17 23:52
35	1LM.LM39528	WG611330-06 CCB	1	1		04/25/17 00:11
36	1LM.LM39529	WG611328-01 MCT (0.2ug/L)	1	1	STD80234	04/25/17 00:30
37	1LM.LM39530	WG611328-02 BLANK	1	1		04/25/17 00:49
38	1LM.LM39531	WG611328-03 LCS (0.2ug/L)	1	1	STD80234	04/25/17 01:08
39	1LM.LM39532	L17040841-08 RS	1	1		04/25/17 01:27
40	1LM.LM39533	L17040841-09 MS	1	1	STD80234	04/25/17 01:46
41	1LM.LM39534	L17040841-10 MSD	1	1	STD80234	04/25/17 02:05
42	1LM.LM39535	L17040841-01	1	1		04/25/17 02:23
43	1LM.LM39536	L17040841-02	1	1		04/25/17 02:42
44	1LM.LM39537	L17040841-03	1	1		04/25/17 03:01
45	1LM.LM39538	L17040841-04	1	1		04/25/17 03:20
46	1LM.LM39539	WG611330-07 CCV (1.0ug/L)	1	1	STD80232	04/25/17 03:39
47	1LM.LM39540	WG611328-08 MRL (0.2ug/L)	1	1	STD80232	04/25/17 03:58
48	1LM.LM39541	WG611330-08 CCB	1	1		04/25/17 04:17
49	1LM.LM39542	L17040841-05	1	1		04/25/17 04:36
50	1LM.LM39543	L17040841-06	1	1		04/25/17 04:55
51	1LM.LM39544	L17040841-07	1	1		04/25/17 05:14
52	1LM.LM39545	L17040841-11	1	1		04/25/17 05:33
53	1LM.LM39546	L17040841-12	1	1		04/25/17 05:52
54	1LM.LM39547	L17040841-13	1	1		04/25/17 06:11
55	1LM.LM39548	WG611330-09 CCV (1.0ug/L)	1	1	STD80232	04/25/17 06:30
56	1LM.LM39549	WG611328-09 MRL (0.2ug/L)	1	1	STD80232	04/25/17 06:49
57	1LM.LM39550	WG611330-10 CCB	1	1		04/25/17 07:07

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 25-APR-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 052617_JWR.TXT
Analyst1: JWR Analyst2: WTD
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#:
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
WG615781 (WTD DOC's)
Internal STD: COA19471 Surrogate STD: NA Calibration STD STD80232 (04/24/2014)
CCV STD: STD80232 LCS STD: STD80234 MS/MSD STD: STD80234

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM39696	WG615784-01 CCB	1	1		05/26/17 13:38
2	1LM.LM39697	WG615784-02 CCV (1.0ug/L)	1	1	STD80232	05/26/17 13:57
3	1LM.LM39698	WG615781-07 MRL (0.2ug/L)	1	1	STD80232	05/26/17 14:16
4	1LM.LM39699	WG615781-01 MCT (0.2ug/L)	1	1	STD80234	05/26/17 14:35
5	1LM.LM39700	WG615781-02 BLANK	1	1		05/26/17 14:54
6	1LM.LM39701	WG615781-03 LCS (0.2ug/L)	1	1	STD80234	05/26/17 15:13
7	1LM.LM39702	L17051385-01	1	1	STD80234	05/26/17 15:32
8	1LM.LM39703	L17051385-02	1	1	STD80234	05/26/17 15:51
9	1LM.LM39704	L17051385-03	1	1	STD80234	05/26/17 16:10
10	1LM.LM39705	L17051385-04	1	1	STD80234	05/26/17 16:29
11	1LM.LM39706	L17051389-01 (10,000x)	1	10000	STD80234	05/26/17 16:48
12	1LM.LM39707	L17051391-01	1	1	STD80234	05/26/17 17:07
13	1LM.LM39708	L17051393-01	1	1	STD80234	05/26/17 17:26
14	1LM.LM39709	WG615784-03 CCV (1.0ug/L)	1	1	STD80232	05/26/17 17:45
15	1LM.LM39710	WG615781-08 MRL (0.2ug/L)	1	1	STD80232	05/26/17 18:03
16	1LM.LM39711	WG615784-04 CCB	1	1		05/26/17 18:22
17	1LM.LM39712	L17051395-01 DOC WTD	1	1	STD80234	05/26/17 18:41
18	1LM.LM39713	L17051395-02 DOC WTD	1	1	STD80234	05/26/17 19:00
19	1LM.LM39714	L17051395-03 DOC WTD	1	1	STD80234	05/26/17 19:19
20	1LM.LM39715	L17051395-04 DOC WTD	1	1	STD80234	05/26/17 19:38
30	1LM.LM39716	L17051393-02 REF	1	1	STD80234	05/26/17 19:57
22	1LM.LM39717	L17051393-02 MS	1	1	STD80234	05/26/17 20:16
23	1LM.LM39718	L17051393-02 MSD	1	1	STD80234	05/26/17 20:35
24	1LM.LM39719	L17051393-03	1	1	STD80234	05/26/17 20:54
25	1LM.LM39720	L17051393-04	1	1	STD80234	05/26/17 21:13
26	1LM.LM39721	L17051393-05	1	1	STD80234	05/26/17 21:32
27	1LM.LM39722	WG615784-05 CCV (1.0ug/L)	1	1	STD80232	05/26/17 21:51
28	1LM.LM39723	WG615781-09 MRL (0.2ug/L)	1	1	STD80232	05/26/17 22:10
29	1LM.LM39724	WG615784-06 CCB	1	1		05/26/17 22:29

Comments

Seq.	Rerun	Dil.	Reason	Analytes
11				

Page: 1 Approved: 30-MAY-17

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 052617_JWR.TXT

Analyst1: JWR Analyst2: WTD

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#:

Eluent ID#:

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

WG615781 (WTD DOC's)

Internal STD: COA19471 Surrogate STD: NA STD80232 (04/24/2014)

CCV STD: STD80232 LCS STD: STD80234 STD80234

Comments

Seq.	Rerun	Dil.	Reason	Analytes
	L17051389-01 was analyzed at a dilution based on historical data.			
22				
	L17051393-02 MS failed marginally high due to target analyte being present in the parent sample, but below the MDL.			
23				
	L17051393-03 MS failed marginally high due to target analyte being present in the parent sample, but below the MDL.			

Page: 2 Approved: 30-MAY-17

Microbac Laboratories Inc.

Data Checklist

Date: 24-APR-2017
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG611288
Runlog ID: 81726
Analytical Workgroups: L17040713, L17040841

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	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:
25-APR-2017
John Richards

Secondary Reviewer:
25-APR-2017
Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: APR-25-2017 14:21:32

Microbac Laboratories Inc.

Data Checklist

Date: 26-MAY-2017
Analyst: JWR
Analyst: WTD
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 82452
Analytical Workgroups: L17051385, L17051389, L17051391, L17051393, L17051395

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)	X
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	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	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-MAY-2017

Secondary Reviewer:
30-MAY-2017

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-31-2017 09:03:40

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 AAB#: WG615781

Login Number: L17051391

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-SP650-6442-GRAB	01	05/24/17					05/26/2017	1.9	28		05/26/17	.2	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5315237
Report generated 05/31/2017 09:09

METHOD BLANK SUMMARY

Login Number: L17051391
Work Group: WG615781
Blank File ID: 1LM.LM39700
Blank Sample ID: WG615781-02
Prep Date: 05/26/17 12:00
Instrument ID: LCMS1
Analyzed Date: 05/26/17 14:54
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG615781-07	1LM.LM39698	05/26/17 14:16	01
MCT	WG615781-01	1LM.LM39699	05/26/17 14:35	01
LCS	WG615781-03	1LM.LM39701	05/26/17 15:13	01
LH18/24-SP650-6442-GRAB	L17051391-01	1LM.LM39707	05/26/17 17:07	01
QCMRL	WG615781-08	1LM.LM39710	05/26/17 18:03	01
QCMRL	WG615781-09	1LM.LM39723	05/26/17 22:10	01

Report Name: BLANK_SUMMARY
PDF File ID: 5315238
Report generated 05/31/2017 09:09

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L17051391 Prep Date: 05/26/17 12:00 Sample ID: WG615781-02
Instrument ID: LCMS1 Run Date: 05/26/17 14:54 Prep Method: 6850
File ID: 1LM.LM39700 Analyst: JWR Method: 6850
Workgroup (AAB#): WG615781 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-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: 5315239
31-MAY-2017 09:09

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L17051391 **Run Date:** 05/26/2017 **Sample ID:** WG615781-03
Instrument ID: LCMS1 **Run Time:** 15:13 **Prep Method:** 6850
File ID: 1LM.LM39701 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG615781 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD80234 **Cal ID:** LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.209	105	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5315240
Report generated: 05/31/2017 09:09

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L17051391
Analytical Method: 6850
ICAL Workgroup: WG611288

Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.286	4.98	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: 5315242
Report generated 05/31/2017 09:09

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L17051391
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-02			WG611288-03			WG611288-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	21000.0000	1.332	0.200	38200.0000	1.222	0.500	104000.000	1.335

INT_CAL - Modified 03/06/2008
PDF File ID: 5315242
Report generated 05/31/2017 09:09

Login Number: L17051391
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-05			WG611288-06			WG611288-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	206000.000	1.288	2.00	412000.000	1.312	5.00	955000.000	1.270

INT_CAL - Modified 03/06/2008
PDF File ID: 5315242
Report generated 05/31/2017 09:09

Login Number: L17051391
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 24-APR-17 15:40
Column ID: F

Analyte	WG611288-08		
	CONC	RESP	RF
Perchlorate	10.0	1860000.00	1.244

INT_CAL - Modified 03/06/2008
PDF File ID: 5315242
Report generated 05/31/2017 09:09

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L17051391 Run Date: 04/24/2017 Sample ID: WG611288-09
Instrument ID: LCMS1 Run Time: 15:59 Method: 6850
File ID: 1LM.LM39502 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG611288 Cal ID: LCMS1 - 24-APR-17

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.977	ug/L	1.24	2.30	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5315243
Report generated 05/31/2017 09:10

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17051391	Run Date:	05/26/2017	Sample ID:	WG615784-01
Instrument ID:	LCMS1	Run Time:	13:38	Method:	6850
File ID:	1LM.LM39696	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG615781	Cal ID:	LCMS1 - 24-APR-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: 5315245
Report generated 05/31/2017 09:10

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L17051391 Run Date: 05/26/2017 Sample ID: WG615784-04
Instrument ID: LCMS1 Run Time: 18:22 Method: 6850
File ID: 1LM.LM39711 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-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: 5315245
Report generated 05/31/2017 09:10

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L17051391	Run Date:	05/26/2017	Sample ID:	WG615784-06
Instrument ID:	LCMS1	Run Time:	22:29	Method:	6850
File ID:	1LM.LM39724	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG615781	Cal ID:	LCMS1 - 24-APR-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: 5315245
Report generated 05/31/2017 09:10

Login Number: L17051391 Run Date: 05/26/2017 Sample ID: WG615784-02
Instrument ID: LCMS1 Run Time: 13:57 Method: 6850
File ID: 1LM.LM39697 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.09	ug/L	1.39	9.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5315244
Report generated 05/31/2017 09:10

Login Number: L17051391 Run Date: 05/26/2017 Sample ID: WG615784-03
Instrument ID: LCMS1 Run Time: 17:45 Method: 6850
File ID: 1LM.LM39709 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.08	ug/L	1.37	8.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5315244
Report generated 05/31/2017 09:10

Login Number: L17051391 Run Date: 05/26/2017 Sample ID: WG615784-05
Instrument ID: LCMS1 Run Time: 21:51 Method: 6850
File ID: 1LM.LM39722 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG615781 Cal ID: LCMS1 - 24-APR-17
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.09	ug/L	1.38	9.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5315244
Report generated 05/31/2017 09:10

Login Number: L17051391 Run Date: 05/26/2017 Sample ID: WG615781-07
Instrument ID: LCMS1 Run Time: 14:16 Prep Method: 6850
File ID: 1LM.LM39698 Analyst: JWR Method: 6850
Workgroup (AAB#): WG615781 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.210	105	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5315241
Report generated 05/31/2017 09:09

Login Number: L17051391 Run Date: 05/26/2017 Sample ID: WG615781-08
Instrument ID: LCMS1 Run Time: 18:03 Prep Method: 6850
File ID: 1LM.LM39710 Analyst: JWR Method: 6850
Workgroup (AAB#): WG615781 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.215	108	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5315241
Report generated 05/31/2017 09:09

Login Number: L17051391 Run Date: 05/26/2017 Sample ID: WG615781-09
Instrument ID: LCMS1 Run Time: 22:10 Prep Method: 6850
File ID: 1LM.LM39723 Analyst: JWR Method: 6850
Workgroup (AAB#): WG615781 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-24-APR-17

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.221	111	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5315241
Report generated 05/31/2017 09:09

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

Login Number:L17051391
Instrument ID:LCMS1
Workgroup (AAB#):WG615781

ICAL CCV Number:WG611288-05
CAL ID: LCMS1-24-APR-17
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG611288	NA	NA	777000
Upper Limit	NA	NA	1165500
Lower Limit	NA	NA	388500
L17051391-01	1.00	01	543000
WG615781-02	1.00	01	688000
WG615781-03	1.00	01	676000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5315246
Report generated 05/31/2017 09:10

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**	6850	**Samplenum:**	L17051391-01
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39707
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 17:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	10800	3560	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG611288-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39495
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 13:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21000	6820	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG611288-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39496
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 14:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38200	13500	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG611288-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39497
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 14:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	104000	33400	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG611288-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39498
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 14:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	65300	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG611288-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39499
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 15:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	412000	130000	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Microbac

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG611288-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39500
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 15:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	955000	298000	3.20	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG611288-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39501
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 15:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1860000	603000	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG611288-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39502
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	04/24/2017 15:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	197000	65000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**	6850	**Samplenum:**	WG615781-01
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39699
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 14:35	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	37000	11500	3.22	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**	6850	**Samplenum:**	WG615781-02
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39700
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 14:54	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	925	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**	6850	**Samplenum:**	WG615781-03
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39701
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 15:13	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36900	11100	3.32	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**	6850	**Samplenum:**	WG615781-07
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39698
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 14:16	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	39400	13000	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**	6850	**Samplenum:**	WG615781-08
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39710
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 18:03	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44600	15400	2.90	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**	6850	**Samplenum:**	WG615781-09
Instrument:	LCMS1	**Prep Date:**	05/26/2017 12:00	**File ID:**	1LM.LM39723
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 22:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	47600	16200	2.94	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG615784-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39696
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 13:38	**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 #:	L17051391	**Prep Method:**		**Samplenum:**	WG615784-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39697
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 13:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	198000	61400	3.22	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG615784-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39709
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 17:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	216000	68200	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG615784-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39711
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 18:22	**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 #:	L17051391	**Prep Method:**		**Samplenum:**	WG615784-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39722
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 21:51	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	226000	72200	3.13	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L17051391	**Prep Method:**		**Samplenum:**	WG615784-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM39724
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG615781	**Analysis Date:**	05/26/2017 22:29	**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 Semivolatiles Data

2.2.2 GC/MS Semivolatiles Data (827 Dioxane)