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Date: May 9, 2014

Subject: Data Validation for Lab Report L14031621
Radford Army Ammunition Plant

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OVERVIEW

Microbac Laboratories Inc., Marietta, Ohio, received 10 field samples associated with the project work described in the *Radford Army Ammunition Plant Final SWMU 40 (RAAP-009) Landfill Nitro Area IMWP (August 2011)* (project QAPP) on March 28, 2014. The field samples were assigned laboratory sample delivery group (SDG) number L14031621 and included four normal water samples, one field duplicate water sample, one matrix spike pair, one equipment blank, one field blank, and one trip blank. The samples were analyzed for volatile organic compounds (VOCs) by EPA method 8260B, polynuclear aromatic hydrocarbons (PAHs) by EPA method 8270C SIM, perchlorates by EPA method 6850, and total metals by EPA methods 6010B and 6020 as detailed in *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846)*, Third Edition, Final Update III.

SUMMARY

The samples were analyzed according to the quality control (QC) criteria of the applicable analytical method. The data for these samples were found to be compliant with the requirements of the project QAPP and/or EPA Region III's *Innovative Approaches to Data Validation* (June 1995) and *EPA Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994) or *EPA Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (April 1993) (Region III NFG, collectively), as applicable, and the results for all target analytes are considered usable.

MAJOR PROBLEMS

(Refer to Appendix B – Data Qualifier Summary)

- There were no major problems associated with the samples in this data package.

MINOR PROBLEMS

(Refer to Appendix B – Data Qualifier Summary)

- 40MW7GW32714: Acetone (UJ)
Manganese, total 0.00188 (B)
Iron, total 0.213 (J)
- 40EQR32714: Acetone (UJ)
Iron, total (UJ)
- 40FB32714: Acetone (UJ)
Iron, total (UJ)
- 40MW5GW32714: Acetone (UJ)
Manganese, total 0.00106 (B)
Iron, total 0.125 (J)

- 40DUPGW32714: Acetone (UJ)
  Manganese, total 0.00157 (B)
  Iron, total 0.339 (J)

- 40MW6GW32714: Acetone (UJ)
  Sodium, total 7.74 (B)
  Manganese, total 0.00166 (B)
  Iron, total 0.292 (J)

- LFMW01GW32714: Acetone (UJ)
  Manganese, total 0.00275 (B)
  Iron, total 0.172 (J)

- 40TB32714: Acetone (UJ)

NOTES

(Refer to Appendix D – Support Documentation)

Sample Chain of Custody (COC) Records

- The samples were listed on COC #A5625. Data were reported for all required analytes (refer to the Table 5 Year 3 LTM Analytes attachment).

Preservation and Holding Times

- The samples were correctly preserved and analyzed within the holding times specified in the project QAPP and the Region III NFG with the following exception.

  - The samples were not preserved for VOC analysis. The samples were analyzed within the holding time for unpreserved samples and, therefore, no sample data were qualified.

Instrument Tune

- The instrument tunes for all applicable analyses were within the criteria specified in the project QAPP and the Region III NFG with the following exception.

  - The perchlorate tune data were not included in the data package. The laboratory previously stated that the instrument was tuned after maintenance was performed and that the ion ratio was verified with every sample reported to demonstrate that the instrument was working properly. No sample data were qualified based on professional judgment.

Initial Calibration (ICAL)

- The ICAL percent relative standard deviations (%RSDs) and/or correlation coefficients, as applicable, for all analyses were within the criteria specified in the project QAPP and the Region III NFG with the following exceptions.

  - The ICAL relative response factors (RRFs) were <0.05 for acetone. Because acetone is considered to be a poor responder and the RRFs were >0.01, the associated non-detect sample results were **qualified UJ** based on professional judgment**.**

Initial Calibration Verification (ICV)/Continuing Calibration Verification (CCV)

- The ICV and/or CCV RRFs percent differences (%Ds) and/or recoveries, as applicable, for all analyses were within the criteria specified in the project QAPP and the Region III NFG with the following exceptions.

  - The ICV/CCV RRFs were <0.05 for acetone. Because acetone is considered to be a poor responder and the RRFs were >0.01, the associated non-detect sample results were **qualified UJ** based on professional judgment**.**

Contract Required Detection Limit (CRDL)

- The perchlorate CRDL was analyzed at the reporting limit (RL) and not at 2X the RL. No sample data were qualified as a result.

- A CRDL standard was not analyzed for methods 6010B and 6020. The laboratory calibration curve was linear with a standard at or near the RL and, therefore, no sample results were qualified. The laboratory analyzed an LLICV. However the results were not reported in the data package and it was not possible to recalculate the results due to insufficient information available.

Inductively Coupled Plasma (ICP) Interference Check Sample

- ICP/ICP-MS interference check sample recoveries were not applicable because the results for interferents aluminum, calcium, magnesium, and iron were < the ICS spike amounts for all samples.

- Perchlorate interference check samples were not analyzed or reported in the data package. The laboratory analyzed and reported an MCT sample that met the criteria for the ICS.

Field Blanks

- Sodium was detected in equipment blank 40EQR32714. The total sodium result for sample 40MW6GW32714 was a detect <5X the equipment blank concentration and, therefore, was **qualified B**. The remaining associated sample results were either detects >5X the equipment blank concentration or non-detects and, therefore, were not qualified.

- Manganese was detected in field blank 40FB32714. The total manganese results for samples 40MW7GW32714, 40MW5GW32714, 40DUPGW32714, 40MW6GW32714, and LFMW01GW32714 were detects <5X the equipment blank concentration and, therefore, were **qualified B**. The remaining associated sample results were either detects >5X the equipment blank concentration or non-detects and, therefore, were not qualified.

- No other target analytes were detected in the field blank, equipment blank, or trip blank.

Laboratory Method Blanks

- No target analytes were detected in the method blanks.

Laboratory Calibration Blanks

- No target analytes were detected in the calibration blanks.

Laboratory Control Samples (LCSs)

- The LCS recoveries met project QAPP- and Region III-specified QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

- One MS/MSD pair was analyzed on sample LFMW01GW32714 for all analyses and met project QAPP- and Region III-specified QC acceptance criteria with the following exceptions.

  The MSD recovery was < the lower acceptance limit for perchlorate. The parent sample result was >4X the spike amount and, therefore, no sample results were qualified.

  The MS/MSD relative percent differences (RPDs) were > the acceptance limit for all PAHs. The parent sample results were non-detects and the similar surrogate and MSD recoveries indicated that the high RPDs were due to a technical error and not due to matrix; therefore no sample data were qualified based on professional judgment.

  The MS recovery was > the upper acceptance limit for iron. The associated sample results that were detects were **qualified K**.

  The MS recovery was < the lower acceptance limit for calcium. The parent sample result was >4X the spike amount and, therefore, no sample results were qualified.

ICP Serial Dilution Analyses

- The serial dilution %Ds met project QAPP- and Region III-specified QC acceptance criteria.

Laboratory Sample Duplicate

- MSDs were analyzed as the laboratory duplicates for all analyses and met project QAPP- and Region III-specified QC acceptance criteria for precision with the exceptions previously noted.

Field Sample Duplicate

- Sample 40MW5GW32714 was collected and analyzed in duplicate (sample 40DUPGW32714) for all analyses. The relative percent differences (RPDs) between the sample and duplicate results were within the project QAPP-specified control limits with the following exceptions.

  - The total aluminum results were > the method detection limit (MDL) but < the reporting limit (RL) for sample 40MW5GW32714 and > the RL for its duplicate. The absolute difference between the two results was < the RL and, therefore, no sample data were qualified based on professional judgment.

  - The total iron results were > the RL for sample 40MW5GW32714 and its duplicate, and the associated RPD was >25. The associated sample results were **qualified J**.

	40MW5GW32714		**40DUPGW32714**			
Analyte	**Result**	**RL**	**Result**	**RL**	**RPD**	**>25%**
Perchlorate	0.721	0.2	0.717	0.2	0.56	
Al, total	0.169	0.2	.366	0.2	73.64	Yes
Ca, total (10X)	68.3	5	72.7	5	6.24	
Fe, total	.125	0.1	.339	0.1	92.24	Yes
Mg, total	19	0.5	19.5	0.5	2.6	
K, total	.946	1	1.02	1	7.53	
Na, total	5.37	0.5	5.64	0.5	4.9	
Ba, total	.0341	0.003	.0332	0.003	2.67	
Mn, total	.00106	0.002	.00157	0.002	0.56	

NOTE: All results not listed in the table were non-detects.

Sample Surrogate Spikes

- Surrogate spikes added to all field samples analyzed for VOCs and PAHs were within the project QAPP-specified control limits with the following exception.

  - The p-terphenyl-d14 recovery was slightly < the lower acceptance limit for the MSD. Because only one surrogate was out of criteria and the sample was a QC sample, no data were qualified.

Sample Internal Standard Recoveries

- The internal standard recoveries for VOCs, PAHs, and perchlorates were within the project QAPP- and Region III-specified control limits.

- The internal standard recoveries for metals by method 6020 were within the 60-125% limits provided in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (NFG) (October 2004).

Sample Results

- The samples were analyzed for the methods requested on the COC. MDLs and RLs were reported for all analyses and met project-specified MDLs and RLs with the following exceptions.

  - The MDLs and RLs for aluminum, calcium, and iron were > the MDLs/RLs specified in the project QAPP.

  - The MDLs for arsenic, barium, cobalt, lead, manganese, and selenium were > the MDLs specified in the project QAPP; however, their associated RLs were ≤ the RLs specified in the project QAPP.

Action Level Notification

- No results were above the action levels specified in the EPA Region III's *Innovative Approaches to Data Validation* (June 1995).

Usability Statement

- There were 175 field sample data points associated with the data package for SDG L14031621. Of these field sample data points, 171 (97.71% of the total) were assessed and left unqualified, 2 (1.14% of the total) were assessed and qualified UJ, and 2 (1.14% of the total) were assessed and qualified J.

- The field sample data points that were qualified UJ can be categorized as definitive data with non-detectable analyte concentrations that are only estimates due to QC deficiencies.

- The field sample data points that were qualified J can be categorized as definitive data with positively identified analyte concentrations that are only estimates due to QC deficiencies.

- The unqualified field sample data points can be categorized as definitive data with no associated QC deficiencies. Based on the number of unqualified data points, the percent completeness is 97.71%.

Report Content Statement

This report has been formatted for consistency with Appendix B, Region III Standard Operating Procedures for Data Validation Reports, contained in the guidance *EPA Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). The laboratory data were reviewed in accordance with the EPA Region III's *Innovative Approaches to Data Validation* (June 1995) and *EPA Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994) or *EPA Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (April 1993) (Region III NFG, collectively), as applicable; and the *Radford Army Ammunition Plant Final SWMU 40 (RAAP-009) Landfill Nitro Area IMWP* (August 2011) (project QAPP); and the applicable SW-846 methods. This report only addresses those problems and issues that may affect data usability.

Attachments

Appendix A – Glossary of Data Qualifiers

Appendix B – Data Qualifier Summary

Appendix C – Laboratory Report Results/Data Summary

Appendix D – Support Documentation

Appendix A – Glossary of Data Qualifiers

Data Qualifier Codes

Codes Related to Identification

U Not detected. The associated number indicates the approximate sample concentration necessary to be detected.

B Not detected substantially above the level reported in laboratory or field blanks.

R Unusable result. Analyte may or may not be present in the sample.

Codes Related to Quantitation

J Analyte present. Reported value may or may not be accurate or precise.

K Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ Not detected. Quantitation limit may be inaccurate or imprecise.

UL The analyte was not detected, and the reported quantitation limit is probably higher than reported.

Appendix B – Data Qualifier Summary

Data Qualifier Summary

Note: The results listed in this table are detects and qualified non-detects only. Unqualified non-detects are not listed.

FIELD SAMPLE ID/ LAB SAMPLE ID	ANALYTE	FINAL VALIDATION QUALIFIER	INITIAL LAB QUALIFIER	REASON
40MW7GW32714 L14031621-01	Acetone	UJ	U	ICAL/ICV/CCV RRFs <0.05
	Manganese, total	B	J	Blank contamination; >MDL, <RL
	Iron, total	J		High FD RPD; high MS recovery
40EQR32714 L14031621-02	Acetone	UJ	U	ICAL/ICV/CCV RRFs <0.05
	Iron, total	UJ		High FD RPD
	Manganese, total		J	>MDL, <RL
40FB32714 L14031621-03	Acetone	UJ	U	ICAL/ICV/CCV RRFs <0.05
	Iron, total	UJ		High FD RPD
40MW5GW32714 L14031621-04	Acetone	UJ	U	ICAL/ICV/CCV RRFs <0.05
	Aluminum, total		J	>MDL, <RL
	Potassium, total		J	>MDL, <RL
	Manganese, total	B	J	Blank contamination; >MDL, <RL
	Iron, total	J		High FD RPD; high MS recovery
40DUPGW32714 L14031621-05	Acetone	UJ	U	ICAL/ICV/CCV RRFs <0.05
	Manganese, total	B	J	Blank contamination; >MDL, <RL
	Iron, total	J		High FD RPD; high MS recovery
40MW6GW32714 L14031621-06	Acetone	UJ	U	ICAL/ICV/CCV RRFs <0.05
	Potassium, total		J	>MDL, <RL
	Sodium, total	B		Blank contamination
	Manganese, total	B	J	Blank contamination; >MDL, <RL
	Iron, total	J		High FD RPD; high MS recovery

Data Qualifier Summary (Cont.)

FIELD SAMPLE ID/ LAB SAMPLE ID	ANALYTE	FINAL VALIDATION QUALIFIER	INITIAL LAB QUALIFIER	REASON
LFMW01GW32714 L14031621-07	Acetone	UJ	U	ICAL/ICV/CCV RRFs <0.05
	Aluminum, total		J	>MDL, <RL
	Manganese, total	B	J	Blank contamination; >MDL, <RL
	Iron, total	J		High FD RPD; high MS recovery
40TB32714 L14031621-10	Acetone	UJ	U	ICAL/ICV/CCV RRFs <0.05

Appendix C – Laboratory Report Results/Data Summary

Certificate of Analysis

Sample #:	L14031621-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	40MW7GW32714	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	03/28/2014 13:48
Workgroup #:	WG469134	**Analyst:**	MES	**Run Date:**	03/29/2014 15:05
Collect Date:	03/27/2014 09:57	**Dilution:**	1	**File ID:**	8M395982
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	104	70	120	
4-Bromofluorobenzene	92.8	75	120	
Dibromofluoromethane	104	85	115	
Toluene-d8	99.2	85	120	

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

Sample #:	L14031621-01	**PrePrep Method:**	N/A	**Instrument:**	HPMS7
Client ID:	40MW7GW32714	**Prep Method:**	3510C	**Prep Date:**	03/31/2014 11:16
Matrix:	Water	**Analytical Method:**	8270C	**Cal Date:**	03/05/2014 15:52
Workgroup #:	WG469379	**Analyst:**	CAA	**Run Date:**	04/01/2014 12:32
Collect Date:	03/27/2014 09:57	**Dilution:**	1	**File ID:**	7M60732
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0521	0.0260
Benzo(a)pyrene	50-32-8		U	0.0521	0.0260
Benzo(b)fluoranthene	205-99-2		U	0.0521	0.0260
Benzo(k)fluoranthene	207-08-9		U	0.0521	0.0260
Chrysene	218-01-9		U	0.0521	0.0260

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	83.3	40	110	
2-Fluorobiphenyl	76.5	50	110	
p-Terphenyl-d14	81.7	50	135	

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

Certificate of Analysis

Sample #:	L14031621-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	40MW7GW32714	**Prep Method:**	6850	**Prep Date:**	04/02/2014 13:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/18/2013 19:20
Workgroup #:	WG469638	**Analyst:**	JWR	**Run Date:**	04/02/2014 17:27
Collect Date:	03/27/2014 09:57	**Dilution:**	1	**File ID:**	1LM.LM24174
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	3.74		0.200	0.100

Sample #:	L14031621-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO2
Client ID:	40MW7GW32714	**Prep Method:**	3015	**Prep Date:**	04/02/2014 08:21
Matrix:	Water	**Analytical Method:**	6010B	**Cal Date:**	04/03/2014 09:11
Workgroup #:	WG469838	**Analyst:**	QX	**Run Date:**	04/03/2014 22:49
Collect Date:	03/27/2014 09:57	**Dilution:**	1	**File ID:**	T2.040314.224943
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5		U	0.200	0.100
Iron, Total	7439-89-6	0.213		0.100	0.0500
Potassium, Total	7440-09-7	1.57		1.00	0.500
Sodium, Total	7440-23-5	3.66		0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500

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

Sample #:	L14031621-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO2
Client ID:	40MW7GW32714	**Prep Method:**	3015	**Prep Date:**	04/02/2014 08:21
Matrix:	Water	**Analytical Method:**	6010B	**Cal Date:**	04/07/2014 10:08
Workgroup #:	WG469838	**Analyst:**	JYH	**Run Date:**	04/07/2014 15:21
Collect Date:	03/27/2014 09:57	**Dilution:**	10	**File ID:**	T2.040714.152107
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Calcium, Total	7440-70-2	81.5		5.00	2.50
Magnesium, Total	7439-95-4	32.6		5.00	2.50

Certificate of Analysis

Sample #:	L14031621-01	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	40MW7GW32714	**Prep Method:**	3015	**Prep Date:**	03/31/2014 09:29
Matrix:	Water	**Analytical Method:**	6020	**Cal Date:**	04/04/2014 10:40
Workgroup #:	WG469374	**Analyst:**	JYH	**Run Date:**	04/04/2014 11:41
Collect Date:	03/27/2014 09:57	**Dilution:**	1	**File ID:**	NI.040414.114146
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.118		0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00188	J	0.00200	0.00100
Selenium, Total	7782-49-2		U	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.

Sample #:	L14031621-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	40EQR32714	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	03/28/2014 13:48
Workgroup #:	WG469134	**Analyst:**	MES	**Run Date:**	03/29/2014 15:35
Collect Date:	03/27/2014 10:45	**Dilution:**	1	**File ID:**	8M395983
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	106	70	120	
4-Bromofluorobenzene	95.3	75	120	
Dibromofluoromethane	108	85	115	
Toluene-d8	102	85	120	

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

Sample #:	L14031621-02	**PrePrep Method:**	N/A	**Instrument:**	HPMS7
Client ID:	40EQR32714	**Prep Method:**	3510C	**Prep Date:**	03/31/2014 11:16
Matrix:	Water	**Analytical Method:**	8270C	**Cal Date:**	03/05/2014 15:52
Workgroup #:	WG469379	**Analyst:**	CAA	**Run Date:**	04/01/2014 12:57
Collect Date:	03/27/2014 10:45	**Dilution:**	1	**File ID:**	7M60733
Sample Tag:	01	**Units:**	ug/L		

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0515	0.0258
Benzo(a)pyrene	50-32-8		U	0.0515	0.0258
Benzo(b)fluoranthene	205-99-2		U	0.0515	0.0258
Benzo(k)fluoranthene	207-08-9		U	0.0515	0.0258
Chrysene	218-01-9		U	0.0515	0.0258

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	79.6	40	110	
2-Fluorobiphenyl	69.5	50	110	
p-Terphenyl-d14	71.1	50	135	

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

Sample #: L14031621-02 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: 40EQR32714 **Prep Method:** 6850 **Prep Date:** 04/02/2014 13:30
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/18/2013 19:20
Workgroup #: WG469638 **Analyst:** JWR **Run Date:** 04/02/2014 17:46
Collect Date: 03/27/2014 10:45 **Dilution:** 1 **File ID:** 1LM.LM24175
Sample Tag: 01 **Units:** ug/L

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

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

Sample #: L14031621-02 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: 40EQR32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/03/2014 09:11
Workgroup #: WG469838 **Analyst:** QX **Run Date:** 04/03/2014 22:53
Collect Date: 03/27/2014 10:45 **Dilution:** 1 **File ID:** T2.040314.225317
Sample Tag: 01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2		U	0.500	0.250
Iron, Total	7439-89-6		U	0.100	0.0500
Magnesium, Total	7439-95-4		U	0.500	0.250
Potassium, Total	7440-09-7		U	1.00	0.500
Sodium, Total	7440-23-5	0.803		0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500

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

Certificate of Analysis

Sample #:	L14031621-02	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	40EQR32714	**Prep Method:**	3015	**Prep Date:**	03/31/2014 09:29
Matrix:	Water	**Analytical Method:**	6020	**Cal Date:**	04/04/2014 10:40
Workgroup #:	WG469374	**Analyst:**	JYH	**Run Date:**	04/04/2014 11:44
Collect Date:	03/27/2014 10:45	**Dilution:**	1	**File ID:**	NI.040414.114448
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3		U	0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00166	J	0.00200	0.00100
Selenium, Total	7782-49-2		U	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.

Sample #:	L14031621-03	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	40FB32714	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	03/28/2014 13:48
Workgroup #:	WG469134	**Analyst:**	MES	**Run Date:**	03/29/2014 16:04
Collect Date:	03/27/2014 11:00	**Dilution:**	1	**File ID:**	8M395984
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	104	70	120	
4-Bromofluorobenzene	92.8	75	120	
Dibromofluoromethane	106	85	115	
Toluene-d8	100	85	120	

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

Sample #:	L14031621-03	**PrePrep Method:**	N/A	**Instrument:**	HPMS7
Client ID:	40FB32714	**Prep Method:**	3510C	**Prep Date:**	03/31/2014 11:16
Matrix:	Water	**Analytical Method:**	8270C	**Cal Date:**	03/05/2014 15:52
Workgroup #:	WG469379	**Analyst:**	CAA	**Run Date:**	04/01/2014 13:23
Collect Date:	03/27/2014 11:00	**Dilution:**	1	**File ID:**	7M60734
Sample Tag:	01	**Units:**	ug/L		

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0510	0.0255
Benzo(a)pyrene	50-32-8		U	0.0510	0.0255
Benzo(b)fluoranthene	205-99-2		U	0.0510	0.0255
Benzo(k)fluoranthene	207-08-9		U	0.0510	0.0255
Chrysene	218-01-9		U	0.0510	0.0255

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	78.5	40	110	
2-Fluorobiphenyl	71.5	50	110	
p-Terphenyl-d14	83.9	50	135	

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

Sample #: L14031621-03 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: 40FB32714 **Prep Method:** 6850 **Prep Date:** 04/02/2014 13:30
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/18/2013 19:20
Workgroup #: WG469638 **Analyst:** JWR **Run Date:** 04/02/2014 18:05
Collect Date: 03/27/2014 11:00 **Dilution:** 1 **File ID:** 1LM.LM24176
Sample Tag: 01 **Units:** ug/L

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

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

Sample #: L14031621-03 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: 40FB32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/03/2014 09:11
Workgroup #: WG469838 **Analyst:** QX **Run Date:** 04/03/2014 22:56
Collect Date: 03/27/2014 11:00 **Dilution:** 1 **File ID:** T2.040314.225652
Sample Tag: 01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2		U	0.500	0.250
Iron, Total	7439-89-6		U	0.100	0.0500
Magnesium, Total	7439-95-4		U	0.500	0.250
Potassium, Total	7440-09-7		U	1.00	0.500
Sodium, Total	7440-23-5		U	0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500

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

Certificate of Analysis

Sample #:	L14031621-03	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	40FB32714	**Prep Method:**	3015	**Prep Date:**	03/31/2014 09:29
Matrix:	Water	**Analytical Method:**	6020	**Cal Date:**	04/04/2014 10:40
Workgroup #:	WG469374	**Analyst:**	JYH	**Run Date:**	04/04/2014 13:40
Collect Date:	03/27/2014 11:00	**Dilution:**	1	**File ID:**	NI.040414.134019
Sample Tag:	02	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Manganese, Total	7439-96-5		U	0.00200	0.00100
Selenium, Total	7782-49-2		U	0.00100	0.000500

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

Sample #:	L14031621-03	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	40FB32714	**Prep Method:**	3015	**Prep Date:**	03/31/2014 09:29
Matrix:	Water	**Analytical Method:**	6020	**Cal Date:**	04/04/2014 10:40
Workgroup #:	WG469374	**Analyst:**	JYH	**Run Date:**	04/04/2014 12:18
Collect Date:	03/27/2014 11:00	**Dilution:**	1	**File ID:**	NI.040414.121810
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Barium, Total	7440-39-3		U	0.00300	0.00150
Lead, Total	7439-92-1		U	0.00100	0.000500

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

Sample #:	L14031621-04	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	40MW5GW32714	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	03/28/2014 13:48
Workgroup #:	WG469134	**Analyst:**	MES	**Run Date:**	03/29/2014 16:33
Collect Date:	03/27/2014 14:02	**Dilution:**	1	**File ID:**	8M395985
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	103	70	120	
4-Bromofluorobenzene	92.0	75	120	
Dibromofluoromethane	104	85	115	
Toluene-d8	99.4	85	120	

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

Sample #: L14031621-04 **PrePrep Method:** N/A **Instrument:** HPMS7
Client ID: 40MW5GW32714 **Prep Method:** 3510C **Prep Date:** 03/31/2014 11:16
Matrix: Water **Analytical Method:** 8270C **Cal Date:** 03/05/2014 15:52
Workgroup #: WG469379 **Analyst:** CAA **Run Date:** 04/01/2014 13:48
Collect Date: 03/27/2014 14:02 **Dilution:** 1 **File ID:** 7M60735
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0521	0.0260
Benzo(a)pyrene	50-32-8		U	0.0521	0.0260
Benzo(b)fluoranthene	205-99-2		U	0.0521	0.0260
Benzo(k)fluoranthene	207-08-9		U	0.0521	0.0260
Chrysene	218-01-9		U	0.0521	0.0260

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	74.8	40	110	
2-Fluorobiphenyl	67.4	50	110	
p-Terphenyl-d14	72.3	50	135	

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

Sample #: L14031621-04 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: 40MW5GW32714 **Prep Method:** 6850 **Prep Date:** 04/02/2014 13:30
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/18/2013 19:20
Workgroup #: WG469638 **Analyst:** JWR **Run Date:** 04/02/2014 18:24
Collect Date: 03/27/2014 14:02 **Dilution:** 1 **File ID:** 1LM.LM24177
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	0.721		0.200	0.100

Sample #: L14031621-04 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: 40MW5GW32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/03/2014 09:11
Workgroup #: WG469838 **Analyst:** QX **Run Date:** 04/03/2014 23:00
Collect Date: 03/27/2014 14:02 **Dilution:** 1 **File ID:** T2.040314.230027
Sample Tag: 01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	0.169	J	0.200	0.100
Iron, Total	7439-89-6	0.125		0.100	0.0500

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Magnesium, Total	7439-95-4	19.0		0.500	0.250
Potassium, Total	7440-09-7	0.946	J	1.00	0.500
Sodium, Total	7440-23-5	5.37		0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Sample #: L14031621-04 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: 40MW5GW32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/07/2014 10:08
Workgroup #: WG469838 **Analyst:** JYH **Run Date:** 04/07/2014 15:24
Collect Date: 03/27/2014 14:02 **Dilution:** 10 **File ID:** T2.040714.152442
Sample Tag: DL01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Calcium, Total	7440-70-2	68.3		5.00	2.50

Sample #: L14031621-04 **PrePrep Method:** N/A **Instrument:** ICP-MS2
Client ID: 40MW5GW32714 **Prep Method:** 3015 **Prep Date:** 03/31/2014 09:29
Matrix: Water **Analytical Method:** 6020 **Cal Date:** 04/04/2014 10:40
Workgroup #: WG469374 **Analyst:** JYH **Run Date:** 04/04/2014 13:43
Collect Date: 03/27/2014 14:02 **Dilution:** 1 **File ID:** NI.040414.134330
Sample Tag: 02 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00106	J	0.00200	0.00100
Selenium, Total	7782-49-2		U	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.

Sample #: L14031621-04 **PrePrep Method:** N/A **Instrument:** ICP-MS2
Client ID: 40MW5GW32714 **Prep Method:** 3015 **Prep Date:** 03/31/2014 09:29
Matrix: Water **Analytical Method:** 6020 **Cal Date:** 04/04/2014 10:40
Workgroup #: WG469374 **Analyst:** JYH **Run Date:** 04/04/2014 12:21
Collect Date: 03/27/2014 14:02 **Dilution:** 1 **File ID:** NI.040414.122113
Sample Tag: 01 **Units:** mg/L

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Analyte	CAS #	Result	Qual	LOQ	LOD
Barium, Total	7440-39-3	0.0341		0.00300	0.00150
Lead, Total	7439-92-1		U	0.00100	0.000500

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

Sample #: L14031621-05 **PrePrep Method:** N/A **Instrument:** HPMS8
Client ID: 40DUPGW32714 **Prep Method:** 5030B/5030C/5035A **Prep Date:** N/A
Matrix: Water **Analytical Method:** 8260B **Cal Date:** 03/28/2014 13:48
Workgroup #: WG469134 **Analyst:** MES **Run Date:** 03/29/2014 17:02
Collect Date: 03/27/2014 14:02 **Dilution:** 1 **File ID:** 8M395986
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	105	70	120	
4-Bromofluorobenzene	95.1	75	120	
Dibromofluoromethane	107	85	115	
Toluene-d8	99.9	85	120	

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

Sample #: L14031621-05 **PrePrep Method:** N/A **Instrument:** HPMS7
Client ID: 40DUPGW32714 **Prep Method:** 3510C **Prep Date:** 03/31/2014 11:16
Matrix: Water **Analytical Method:** 8270C **Cal Date:** 03/05/2014 15:52
Workgroup #: WG469379 **Analyst:** CAA **Run Date:** 04/01/2014 14:13
Collect Date: 03/27/2014 14:02 **Dilution:** 1 **File ID:** 7M60736
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0521	0.0260
Benzo(a)pyrene	50-32-8		U	0.0521	0.0260
Benzo(b)fluoranthene	205-99-2		U	0.0521	0.0260
Benzo(k)fluoranthene	207-08-9		U	0.0521	0.0260
Chrysene	218-01-9		U	0.0521	0.0260

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	71.9	40	110	
2-Fluorobiphenyl	62.8	50	110	
p-Terphenyl-d14	74.5	50	135	

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

Certificate of Analysis

Sample #:	L14031621-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	40DUPGW32714	**Prep Method:**	6850	**Prep Date:**	04/02/2014 13:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/18/2013 19:20
Workgroup #:	WG469638	**Analyst:**	JWR	**Run Date:**	04/02/2014 18:43
Collect Date:	03/27/2014 14:02	**Dilution:**	1	**File ID:**	1LM.LM24178
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	0.717		0.200	0.100

Sample #:	L14031621-05	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO2
Client ID:	40DUPGW32714	**Prep Method:**	3015	**Prep Date:**	04/02/2014 08:21
Matrix:	Water	**Analytical Method:**	6010B	**Cal Date:**	04/03/2014 09:11
Workgroup #:	WG469838	**Analyst:**	QX	**Run Date:**	04/03/2014 23:03
Collect Date:	03/27/2014 14:02	**Dilution:**	1	**File ID:**	T2.040314.230358
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	0.366		0.200	0.100
Iron, Total	7439-89-6	0.339		0.100	0.0500
Magnesium, Total	7439-95-4	19.5		0.500	0.250
Potassium, Total	7440-09-7	1.02		1.00	0.500
Sodium, Total	7440-23-5	5.64		0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500

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

Sample #:	L14031621-05	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO2
Client ID:	40DUPGW32714	**Prep Method:**	3015	**Prep Date:**	04/02/2014 08:21
Matrix:	Water	**Analytical Method:**	6010B	**Cal Date:**	04/07/2014 10:08
Workgroup #:	WG469838	**Analyst:**	JYH	**Run Date:**	04/07/2014 15:28
Collect Date:	03/27/2014 14:02	**Dilution:**	10	**File ID:**	T2.040714.152817
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Calcium, Total	7440-70-2	72.7		5.00	2.50

Certificate of Analysis

Sample #:	L14031621-05	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	40DUPGW32714	**Prep Method:**	3015	**Prep Date:**	03/31/2014 09:29
Matrix:	Water	**Analytical Method:**	6020	**Cal Date:**	04/04/2014 10:40
Workgroup #:	WG469374	**Analyst:**	JYH	**Run Date:**	04/04/2014 13:46
Collect Date:	03/27/2014 14:02	**Dilution:**	1	**File ID:**	NI.040414.134631
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.0332		0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00157	J	0.00200	0.00100
Selenium, Total	7782-49-2		U	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.

Sample #:	L14031621-06	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	40MW6GW32714	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	03/28/2014 13:48
Workgroup #:	WG469134	**Analyst:**	MES	**Run Date:**	03/29/2014 18:57
Collect Date:	03/27/2014 15:42	**Dilution:**	1	**File ID:**	8M395990
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	104	70	120	
4-Bromofluorobenzene	93.5	75	120	
Dibromofluoromethane	106	85	115	
Toluene-d8	98.6	85	120	

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

Sample #:	L14031621-06	**PrePrep Method:**	N/A	**Instrument:**	HPMS7
Client ID:	40MW6GW32714	**Prep Method:**	3510C	**Prep Date:**	03/31/2014 11:16
Matrix:	Water	**Analytical Method:**	8270C	**Cal Date:**	03/05/2014 15:52
Workgroup #:	WG469379	**Analyst:**	CAA	**Run Date:**	04/01/2014 14:39
Collect Date:	03/27/2014 15:42	**Dilution:**	1	**File ID:**	7M60737
Sample Tag:	01	**Units:**	ug/L		

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0521	0.0260
Benzo(a)pyrene	50-32-8		U	0.0521	0.0260
Benzo(b)fluoranthene	205-99-2		U	0.0521	0.0260
Benzo(k)fluoranthene	207-08-9		U	0.0521	0.0260
Chrysene	218-01-9		U	0.0521	0.0260

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	67.0	40	110	
2-Fluorobiphenyl	61.2	50	110	
p-Terphenyl-d14	67.0	50	135	

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

Sample #: L14031621-06 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: 40MW6GW32714 **Prep Method:** 6850 **Prep Date:** 04/02/2014 13:30
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/18/2013 19:20
Workgroup #: WG469638 **Analyst:** JWR **Run Date:** 04/02/2014 19:58
Collect Date: 03/27/2014 15:42 **Dilution:** 1 **File ID:** 1LM.LM24182
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	0.506		0.200	0.100

Sample #: L14031621-06 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: 40MW6GW32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/03/2014 09:11
Workgroup #: WG469838 **Analyst:** QX **Run Date:** 04/03/2014 23:07
Collect Date: 03/27/2014 15:42 **Dilution:** 1 **File ID:** T2.040314.230731
Sample Tag: 01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	0.288		0.200	0.100
Calcium, Total	7440-70-2	23.5		0.500	0.250
Iron, Total	7439-89-6	0.292		0.100	0.0500
Magnesium, Total	7439-95-4	7.56		0.500	0.250
Potassium, Total	7440-09-7	0.738	J	1.00	0.500
Sodium, Total	7440-23-5	7.74		0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Certificate of Analysis

Sample #:	L14031621-06	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	40MW6GW32714	**Prep Method:**	3015	**Prep Date:**	03/31/2014 09:29
Matrix:	Water	**Analytical Method:**	6020	**Cal Date:**	04/04/2014 10:40
Workgroup #:	WG469374	**Analyst:**	JYH	**Run Date:**	04/04/2014 13:49
Collect Date:	03/27/2014 15:42	**Dilution:**	1	**File ID:**	NI.040414.134953
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.0127		0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00166	J	0.00200	0.00100
Selenium, Total	7782-49-2		U	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.

Sample #:	L14031621-07	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	LFMW01GW32714	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	03/28/2014 13:48
Workgroup #:	WG469134	**Analyst:**	MES	**Run Date:**	03/29/2014 17:31
Collect Date:	03/27/2014 17:50	**Dilution:**	1	**File ID:**	8M395987
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	103	70	120	
4-Bromofluorobenzene	92.7	75	120	
Dibromofluoromethane	105	85	115	
Toluene-d8	101	85	120	

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

Sample #:	L14031621-07	**PrePrep Method:**	N/A	**Instrument:**	HPMS7
Client ID:	LFMW01GW32714	**Prep Method:**	3510C	**Prep Date:**	03/31/2014 11:16
Matrix:	Water	**Analytical Method:**	8270C	**Cal Date:**	03/05/2014 15:52
Workgroup #:	WG469379	**Analyst:**	CAA	**Run Date:**	04/01/2014 15:04
Collect Date:	03/27/2014 17:50	**Dilution:**	1	**File ID:**	7M60738
Sample Tag:	01	**Units:**	ug/L		

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0500	0.0250
Benzo(a)pyrene	50-32-8		U	0.0500	0.0250
Benzo(b)fluoranthene	205-99-2		U	0.0500	0.0250
Benzo(k)fluoranthene	207-08-9		U	0.0500	0.0250
Chrysene	218-01-9		U	0.0500	0.0250

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	91.7	40	110	
2-Fluorobiphenyl	81.4	50	110	
p-Terphenyl-d14	77.7	50	135	

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

Sample #: L14031621-07 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: LFMW01GW32714 **Prep Method:** 6850 **Prep Date:** 04/02/2014 13:30
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/18/2013 19:20
Workgroup #: WG469638 **Analyst:** JWR **Run Date:** 04/02/2014 20:17
Collect Date: 03/27/2014 17:50 **Dilution:** 1 **File ID:** 1LM.LM24183
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	7.47		0.200	0.100

Sample #: L14031621-07 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: LFMW01GW32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/03/2014 09:11
Workgroup #: WG469838 **Analyst:** QX **Run Date:** 04/03/2014 23:36
Collect Date: 03/27/2014 17:50 **Dilution:** 1 **File ID:** T2.040314.233648
Sample Tag: 01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	0.124	J	0.200	0.100
Iron, Total	7439-89-6	0.172		0.100	0.0500
Potassium, Total	7440-09-7	1.73		1.00	0.500
Sodium, Total	7440-23-5	5.26		0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500

J	Estimated value ; the analyte concentration was less than the LOQ.
U	Analyte was not detected. The concentration is below the reported LOD.

Certificate of Analysis

Sample #:	L14031621-07	**PrePrep Method:**	N/A	**Instrument:**	ICP-THERMO2
Client ID:	LFMW01GW32714	**Prep Method:**	3015	**Prep Date:**	04/02/2014 08:21
Matrix:	Water	**Analytical Method:**	6010B	**Cal Date:**	04/07/2014 10:08
Workgroup #:	WG469838	**Analyst:**	JYH	**Run Date:**	04/07/2014 15:42
Collect Date:	03/27/2014 17:50	**Dilution:**	10	**File ID:**	T2.040714.154227
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Calcium, Total	7440-70-2	92.4		5.00	2.50
Magnesium, Total	7439-95-4	34.6		5.00	2.50

Sample #:	L14031621-07	**PrePrep Method:**	N/A	**Instrument:**	ICP-MS2
Client ID:	LFMW01GW32714	**Prep Method:**	3015	**Prep Date:**	03/31/2014 09:29
Matrix:	Water	**Analytical Method:**	6020	**Cal Date:**	04/04/2014 10:40
Workgroup #:	WG469374	**Analyst:**	JYH	**Run Date:**	04/04/2014 11:32
Collect Date:	03/27/2014 17:50	**Dilution:**	1	**File ID:**	NI.040414.113240
Sample Tag:	01	**Units:**	mg/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.0698		0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00275		0.00200	0.00100
Selenium, Total	7782-49-2	0.00149		0.00100	0.000500

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

Sample #:	L14031621-08	**PrePrep Method:**	N/A	**Instrument:**	HPMS8
Client ID:	LFMW01MSGW32714	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	Water	**Analytical Method:**	8260B	**Cal Date:**	03/28/2014 13:48
Workgroup #:	WG469134	**Analyst:**	MES	**Run Date:**	03/29/2014 17:59
Collect Date:	03/27/2014 18:15	**Dilution:**	1	**File ID:**	8M395988
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8	20.0		10.0	2.00
Acetone	67-64-1	18.3		10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	102	70	120	
4-Bromofluorobenzene	94.2	75	120	
Dibromofluoromethane	102	85	115	

Toluene-d8	102	85	120	

Sample #: L14031621-08 **PrePrep Method:** N/A **Instrument:** HPMS7
Client ID: LFMW01MSGW32714 **Prep Method:** 3510C **Prep Date:** 03/31/2014 11:16
Matrix: Water **Analytical Method:** 8270C **Cal Date:** 03/05/2014 15:52
Workgroup #: WG469379 **Analyst:** CAA **Run Date:** 04/01/2014 15:29
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** 7M60739
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3	0.847		0.0521	0.0260
Benzo(a)pyrene	50-32-8	0.913		0.0521	0.0260
Benzo(b)fluoranthene	205-99-2	0.878		0.0521	0.0260
Benzo(k)fluoranthene	207-08-9	0.860		0.0521	0.0260
Chrysene	218-01-9	0.996		0.0521	0.0260

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	83.5	40	110	
2-Fluorobiphenyl	82.6	50	110	
p-Terphenyl-d14	74.6	50	135	

Sample #: L14031621-08 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: LFMW01MSGW32714 **Prep Method:** 6850 **Prep Date:** 04/02/2014 13:30
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/18/2013 19:20
Workgroup #: WG469638 **Analyst:** JWR **Run Date:** 04/02/2014 20:36
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** 1LM.LM24184
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	7.69		0.200	0.100

Sample #: L14031621-08 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: LFMW01MSGW32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/03/2014 09:11
Workgroup #: WG469838 **Analyst:** QX **Run Date:** 04/03/2014 23:40
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** T2.040314.234022
Sample Tag: 01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	7.26		0.200	0.100
Iron, Total	7439-89-6	3.37		0.100	0.0500
Potassium, Total	7440-09-7	33.3		1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Sodium, Total	7440-23-5	34.9		0.500	0.250
Vanadium, Total	7440-62-2	0.618		0.0100	0.00500

Sample #: L14031621-08 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: LFMW01MSGW32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/07/2014 10:08
Workgroup #: WG469838 **Analyst:** JYH **Run Date:** 04/07/2014 15:46
Collect Date: 03/27/2014 18:15 **Dilution:** 10 **File ID:** T2.040714.154602
Sample Tag: DL01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Calcium, Total	7440-70-2	93.8		5.00	2.50
Magnesium, Total	7439-95-4	39.6		5.00	2.50

Sample #: L14031621-08 **PrePrep Method:** N/A **Instrument:** ICP-MS2
Client ID: LFMW01MSGW32714 **Prep Method:** 3015 **Prep Date:** 03/31/2014 09:29
Matrix: Water **Analytical Method:** 6020 **Cal Date:** 04/04/2014 10:40
Workgroup #: WG469374 **Analyst:** JYH **Run Date:** 04/04/2014 11:35
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** NI.040414.113542
Sample Tag: 01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2	0.0617		0.00100	0.000500
Barium, Total	7440-39-3	0.124		0.00300	0.00150
Cobalt, Total	7440-48-4	0.0620		0.00100	0.000500
Lead, Total	7439-92-1	0.0628		0.00100	0.000500
Manganese, Total	7439-96-5	0.0683		0.00200	0.00100
Selenium, Total	7782-49-2	0.0610		0.00100	0.000500

Sample #: L14031621-09 **PrePrep Method:** N/A **Instrument:** HPMS8
Client ID: LFMW01MSDGW32714 **Prep Method:** 5030B/5030C/5035A **Prep Date:** N/A
Matrix: Water **Analytical Method:** 8260B **Cal Date:** 03/28/2014 13:48
Workgroup #: WG469134 **Analyst:** MES **Run Date:** 03/29/2014 18:28
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** 8M395989
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8	20.8		10.0	2.00
Acetone	67-64-1	18.8		10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q

1,2-Dichloroethane-d4	99.7	70	120	
4-Bromofluorobenzene	96.1	75	120	
Dibromofluoromethane	102	85	115	
Toluene-d8	101	85	120	

Sample #: L14031621-09 **PrePrep Method:** N/A **Instrument:** HPMS7
Client ID: LFMW01MSDGW32714 **Prep Method:** 3510C **Prep Date:** 03/31/2014 11:16
Matrix: Water **Analytical Method:** 8270C **Cal Date:** 03/05/2014 15:52
Workgroup #: WG469379 **Analyst:** CAA **Run Date:** 04/01/2014 15:54
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** 7M60740
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3	0.601	J	0.0538	0.0269
Benzo(a)pyrene	50-32-8	0.626	J	0.0538	0.0269
Benzo(b)fluoranthene	205-99-2	0.582	J	0.0538	0.0269
Benzo(k)fluoranthene	207-08-9	0.597	J	0.0538	0.0269
Chrysene	218-01-9	0.700	J	0.0538	0.0269

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Nitrobenzene-d5	59.2	40	110	
2-Fluorobiphenyl	55.5	50	110	
p-Terphenyl-d14	49.1	50	135	*

J	The reported result is an estimated value.

Sample #: L14031621-09 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: LFMW01MSDGW32714 **Prep Method:** 6850 **Prep Date:** 04/02/2014 13:30
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/18/2013 19:20
Workgroup #: WG469638 **Analyst:** JWR **Run Date:** 04/02/2014 20:55
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** 1LM.LM24185
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	7.54		0.200	0.100

Sample #: L14031621-09 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: LFMW01MSDGW32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/03/2014 09:11
Workgroup #: WG469838 **Analyst:** QX **Run Date:** 04/03/2014 23:43
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** T2.040314.234340
Sample Tag: 01 **Units:** mg/L

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	6.89		0.200	0.100
Iron, Total	7439-89-6	3.10		0.100	0.0500
Potassium, Total	7440-09-7	33.2		1.00	0.500
Sodium, Total	7440-23-5	34.6		0.500	0.250
Vanadium, Total	7440-62-2	0.633		0.0100	0.00500

Sample #: L14031621-09 **PrePrep Method:** N/A **Instrument:** ICP-THERMO2
Client ID: LFMW01MSDGW32714 **Prep Method:** 3015 **Prep Date:** 04/02/2014 08:21
Matrix: Water **Analytical Method:** 6010B **Cal Date:** 04/07/2014 10:08
Workgroup #: WG469838 **Analyst:** JYH **Run Date:** 04/07/2014 15:49
Collect Date: 03/27/2014 18:15 **Dilution:** 10 **File ID:** T2.040714.154933
Sample Tag: DL01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Calcium, Total	7440-70-2	97.6		5.00	2.50
Magnesium, Total	7439-95-4	41.0		5.00	2.50

Sample #: L14031621-09 **PrePrep Method:** N/A **Instrument:** ICP-MS2
Client ID: LFMW01MSDGW32714 **Prep Method:** 3015 **Prep Date:** 03/31/2014 09:29
Matrix: Water **Analytical Method:** 6020 **Cal Date:** 04/04/2014 10:40
Workgroup #: WG469374 **Analyst:** JYH **Run Date:** 04/04/2014 11:38
Collect Date: 03/27/2014 18:15 **Dilution:** 1 **File ID:** NI.040414.113844
Sample Tag: 01 **Units:** mg/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2	0.0629		0.00100	0.000500
Barium, Total	7440-39-3	0.124		0.00300	0.00150
Cobalt, Total	7440-48-4	0.0623		0.00100	0.000500
Lead, Total	7439-92-1	0.0626		0.00100	0.000500
Manganese, Total	7439-96-5	0.0671		0.00200	0.00100
Selenium, Total	7782-49-2	0.0627		0.00100	0.000500

Sample #: L14031621-10 **PrePrep Method:** N/A **Instrument:** HPMS8
Client ID: 40TB32714 **Prep Method:** 5030B/5030C/5035A **Prep Date:** N/A
Matrix: Water **Analytical Method:** 8260B **Cal Date:** 03/28/2014 13:48
Workgroup #: WG469134 **Analyst:** MES **Run Date:** 03/29/2014 13:37
Collect Date: 03/27/2014 00:01 **Dilution:** 1 **File ID:** 8M395979
Sample Tag: 01 **Units:** ug/L

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50

Surrogate	Recovery	Lower Limit	Upper Limit	Q
1,2-Dichloroethane-d4	98.4	70	120	
4-Bromofluorobenzene	93.9	75	120	
Dibromofluoromethane	102	85	115	
Toluene-d8	99.5	85	120	

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

Appendix D – Support Documentation

Microbac

Laboratory Report Number: L14031621

Mary Lou Rochette
Kemron Environmental Services
2343-A State Rt 821
Marietta, OH 45750

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:
Stephanie Mossburg – Team Chemist/Data Specialist
(740) 373-4071
Stephanie.Mossburg@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 April 08 2014

David E. Vandenberg

David Vandenberg – Managing Director

State of Origin: VA
Accrediting Authority: N/A ID:N/A
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L14031621
Lab Project #: 2820.216
Project Name: Radford AAP
Lab Contact: Stephanie Mossburg

Record of Sample Receipt and Inspection

Comments/Discrepancies

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

The following discrepancies were noted:

Discrepancy	Resolution
40EQR32714: no time sampled listed on the VOAs CLS 40FB32714: no time sampled listed on the VOAs	Please log per the time stated on COC.

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0018509	I	2.0			X
0018590	I	1.0			X
00110906	I	2.0			X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	NA
2	Were custody seals intact?	NA
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?	No
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 Laboratories ● Ohio Valley Division
158 Starlite Drive, Marietta, OH 45750 ● T: (740)373-4071 F: (740)373-4835
www.microbac.com

Microbac

Lab Report #: L14031621
Lab Project #: 2820.216
Project Name: Radford AAP
Lab Contact: Stephanie Mossburg

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
40MW7GW32714	L14031621-01	03/27/2014 09:57	03/28/2014 13:24
40EQR32714	L14031621-02	03/27/2014 10:45	03/28/2014 13:24
40FB32714	L14031621-03	03/27/2014 11:00	03/28/2014 13:24
40MW5GW32714	L14031621-04	03/27/2014 14:02	03/28/2014 13:24
40DUPGW32714	L14031621-05	03/27/2014 14:02	03/28/2014 13:24
40MW6GW32714	L14031621-06	03/27/2014 15:42	03/28/2014 13:24
LFMW01GW32714	L14031621-07	03/27/2014 17:50	03/28/2014 13:24
LFMW01MSGW32714	L14031621-08	03/27/2014 18:15	03/28/2014 13:24
LFMW01MSDGW32714	L14031621-09	03/27/2014 18:15	03/28/2014 13:24
40TB32714	L14031621-10	03/27/2014 00:01	03/28/2014 15:03

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

COC No. A 5625

2343-A State Route 821
Marietta, OH 45750

KEMRON
ENVIRONMENTAL SERVICES

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4308
Fax: 740-376-2536

Company Name: UXB - KEMRON

Project Contact: MARY LOU ROCHOTTE
Contact Phone #: 740 - 373 - 4308

Turn Around Requirements: 14 - DAY
Location: RADFORD, VA

Project ID: MR01669 - 300 - 003 SWMU 40 (RFAAP) LTM YR 3

Sampler (print): JONAH ANDERSON
Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	VOC-8260* UNPRESERVED	SVOC - PAH	PERCHLORATE	METALS - (TOTAL)	TOTAL # (LAB USE)
40TB32714			3-27-14		W	2		2				
40MW76W32714		X	3-27-14	957	W	7		3	2	1	1	
40EQR32714		X	3-27-14	1045	W	7		3	2	1	1	
40FB32714		X	3-27-14	1100	W	7		3	2	1	1	
40MW56W32714		X	3-27-14	1402	W	7		3	2	1	1	
40DUPGW32714		X	3-27-14	1402	W	7		3	2	1	1	
40MW64GW32714		X	3-27-14	1542	W	7		3	2	1	1	
LFMW01GW32714		X	3-27-14	1750	W	7		3	2	1	1	
LFMW01MSGW32714		X	3-27-14	1815	W	7		3	2	1	1	
LFMW01MSDGW32714		X	3-27-14	1815	W	7		3	2	1	1	

ADDITIONAL REQUIREMENTS

★ PER QAPP SWMU 40 RFAAP ★

SEE ATTACHED LIST FOR SPECIFIC ANALYTE LIST

Microbac OVD
Received: 03/28/2014 13:24
By: BOB BUCHANAN
221000051728
RF Buchanan

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	3-28-14	1259			

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:
			Cara Stricklen	3/28/14	1258	

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page _____ of _____

3.0 CONCLUSIONS

The following Table 5 represents the remaining analytes for Year 3 long term monitoring at RFAAP SWMU 40. All screening of the data was completed in accordance with the approved IMWP, Section 9.1.

Table 5 Year 3 LTM Analytes

Constituent	LTM Plan	Note
Volatile Organic Compounds		
2-Chloroethyl Vinyl Ether	Continue Monitoring	Continue monitoring to confirm validated Non detect data.
Acetone	Continue Monitoring	Continue monitoring to confirm validated Non detect data.
Metals		
Aluminum	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Arsenic	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Barium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Calcium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Cobalt	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Iron	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Lead	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Magnesium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Manganese	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Potassium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Selenium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Sodium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Vanadium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
SVOC PAHs		
Benzo(a)anthracene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Benzo(a)pyrene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Benzo(b)fluoranthene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Benzo(k)fluoranthene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Chrysene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Other		
Perchlorate	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.

Login Number: L14031621
Department: Volatiles
Analyst: Mary Schilling

METHOD

Preparation SW-846 5030C/5035A

Analysis SW-846 8260B

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

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

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration and Tune: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Internal Standards: All acceptance criteria were met.

Surrogates: All acceptance criteria were met.

Other: None.

Manual Integration Reason Codes

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

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

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

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

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

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

Narrative ID: 80487
Approved By: Michael Albertson

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L14031621
Instrument Id: HPMS8
Workgroup (AAB#): WG469134

Method: 8260
CAL ID: HPMS8-28-MAR-14
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L14031621-01	1.00	01	104	104	92.8	99.2
L14031621-02	1.00	01	106	108	95.3	102
L14031621-03	1.00	01	104	106	92.8	100
L14031621-04	1.00	01	103	104	92.0	99.4
L14031621-05	1.00	01	105	107	95.1	99.9
L14031621-06	1.00	01	104	106	93.5	98.6
L14031621-07	1.00	01	103	105	92.7	101
L14031621-08	1.00	01	102	102	94.2	102
L14031621-09	1.00	01	99.7	102	96.1	101
L14031621-10	1.00	01	98.4	102	93.9	99.5
WG469134-01	1.00	01	100	105	92.1	98.4
WG469134-02	1.00	01	102	101	96.7	101

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	70	-	120
2 - Dibromofluoromethane	85	-	115
3 - 4-Bromofluorobenzene	75	-	120
4 - Toluene-d8	85	-	120

Underline = Result out of surrogate limits

DL = surrogate diluted out

ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 3448431
Report generated: 03/31/2014 14:34

Microbac Laboratories Inc.

METHOD BLANK SUMMARY

Login Number: L14031621 Work Group: WG469134
Blank File ID: 8M395977 Blank Sample ID: WG469134-01
Prep Date: 03/29/14 12:38 Instrument ID: HPMS8
Analyzed Date: 03/29/14 12:38 Method: 8260B
Analyst: MES

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG469134-02	8M395978	03/29/14 13:08	01
40TB32714	L14031621-10	8M395979	03/29/14 13:37	01
40MW7GW32714	L14031621-01	8M395982	03/29/14 15:05	01
40EQR32714	L14031621-02	8M395983	03/29/14 15:35	01
40FB32714	L14031621-03	8M395984	03/29/14 16:04	01
40MW5GW32714	L14031621-04	8M395985	03/29/14 16:33	01
40DUPGW32714	L14031621-05	8M395986	03/29/14 17:02	01
LFMW01GW32714	L14031621-07	8M395987	03/29/14 17:31	01
LFMW01MSGW32714	L14031621-08	8M395988	03/29/14 17:59	01
LFMW01MSDGW32714	L14031621-09	8M395989	03/29/14 18:28	01
40MW6GW32714	L14031621-06	8M395990	03/29/14 18:57	01

Report Name: BLANK_SUMMARY
PDF File ID: 3450473
Report generated 03/31/2014 14:34

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L14031621 Prep Date:03/29/14 12:38 Sample ID:WG469134-01
Instrument ID:HPMS8 Run Date:03/29/14 12:38 Prep Method:5030B/5030C/503
File ID:8M395977 Analyst:MES Method:8260B
Workgroup (AAB#):WG469134 Matrix:Water Units:ug/L
Contract #: Cal ID: HPMS8-28-MAR-14

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
2-Chloroethyl vinyl ether	2.00	10.0	2.00	1	U
Acetone	2.50	10.0	2.50	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	100	70 - 120	PASS
4-Bromofluorobenzene	92.1	75 - 120	PASS
Dibromofluoromethane	105	85 - 115	PASS
Toluene-d8	98.4	85 - 120	PASS

LOD 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: 3450474
31-MAR-2014 14:34

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L14031621 Run Date: 03/29/2014 Sample ID: WG469134-02
Instrument ID: HPMS8 Run Time: 13:08 Prep Method: 5030B/5030C/503
File ID: 8M395978 Analyst: MES Method: 8260B
Workgroup (AAB#): WG469134 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD63597 Cal ID: HPMS8-28-MAR-14

Analytes	Expected	Found	% Rec	LCS Limits	Q
2-Chloroethyl vinyl ether	20.0	21.1	106	45 - 160	
Acetone	20.0	20.5	103	40 - 140	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	102	70 - 120	PASS
4-Bromofluorobenzene	96.7	75 - 120	PASS
Dibromofluoromethane	101	85 - 115	PASS
Toluene-d8	101	85 - 120	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 3448427
Report generated: 03/31/2014 14:34

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L14031621 Cal ID:HPMS8- 28-MAR-14 Worknum:WG469134

Instrument ID:HPMS8 Contract #: Prep Method:5030B/5030C/

Parent ID:L14031621-07 File ID:8M395987 Dil:1 Method:5035A

Sample ID:L14031621-08 MS File ID:8M395988 Dil:1 Matrix:8260B

Sample ID:L14031621-09 MSD File ID:8M395989 Dil:1 Units:Water

ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
2-Chloroethyl vinyl ether	U	20.0	20.0	100	20.0	20.8	104	3.84	58 - 160	20	
Acetone	U	20.0	18.3	91.5	20.0	18.8	94.1	2.78	40 - 140	30	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008

PDF File ID: 3448428

Report generated 03/31/2014 14:34

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L14031621
Instrument: HPMS8
Analyst: TMB
Workgroup: WG468975

Tune ID: WG468975-01
Run Date: 03/28/2014
Run Time: 08:58
File ID: 8M395951
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	20.7	5852	PASS
75.0	95.0	30.0	60.0	42.8	12123	PASS
95.0	95.0	100	100	100	28312	PASS
96.0	95.0	5.00	9.00	6.99	1980	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	89.2	25266	PASS
175	174	5.00	9.00	7.00	1768	PASS
176	174	95.0	101	96.6	24400	PASS
177	176	5.00	9.00	7.06	1722	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG468975-02	STD	01	03/28/2014 09:23	
WG468975-03	STD	01	03/28/2014 09:52	
WG468975-04	STD	01	03/28/2014 10:22	
WG468975-05	STD	01	03/28/2014 10:51	
WG468975-06	STD	01	03/28/2014 11:20	
WG468975-07	STD	01	03/28/2014 11:50	
WG468975-08	STD-CCV	01	03/28/2014 12:19	
WG468975-09	STD	01	03/28/2014 12:49	
WG468975-10	STD	01	03/28/2014 13:18	
WG468975-11	STD	01	03/28/2014 13:48	
WG468975-12	SSCV	01	03/28/2014 15:48	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 3450475
Report generated 03/31/2014 14:34

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L14031621
Instrument: HPMS8
Analyst: MES
Workgroup: WG469133

Tune ID: WG469133-01
Run Date: 03/29/2014
Run Time: 11:17
File ID: 8M395974
Cal ID: HPMS8-28-MAR-14

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50.0	95.0	15.0	40.0	20.8	5210	PASS
75.0	95.0	30.0	60.0	44.9	11237	PASS
95.0	95.0	100	100	100	25052	PASS
96.0	95.0	5.00	9.00	6.67	1671	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	87.1	21812	PASS
175	174	5.00	9.00	7.92	1728	PASS
176	174	95.0	101	96.5	21044	PASS
177	176	5.00	9.00	5.98	1259	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG469133-02	CCV	01	03/29/2014 11:40	
WG469134-01	BLANK	01	03/29/2014 12:38	
WG469134-02	LCS	01	03/29/2014 13:08	
L14031621-10	40TB32714	01	03/29/2014 13:37	
L14031621-01	40MW7GW32714	01	03/29/2014 15:05	
L14031621-02	40EQR32714	01	03/29/2014 15:35	
L14031621-03	40FB32714	01	03/29/2014 16:04	
L14031621-04	40MW5GW32714	01	03/29/2014 16:33	
L14031621-05	40DUPGW32714	01	03/29/2014 17:02	
L14031621-07	LFMW01GW32714	01	03/29/2014 17:31	
L14031621-08	LFMW01MSGW32714	01	03/29/2014 17:59	
L14031621-09	LFMW01MSDGW32714	01	03/29/2014 18:28	
L14031621-06	40MW6GW32714	01	03/29/2014 18:57	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 3450475
Report generated 03/31/2014 14:34

Calibration Table Report
Method: 8260WTR.M
Title: Method 8260B/624 WTR-SOP:OVLMSV01 03-28-14 HPMS 8
Last Calibration: Fri Mar 28 14:25:01 2014
Curve: WG468975
Calibration Files

	Compound	0.3 8M395952.D	0.4 8M395953.D	1 8M395954.D	2 8M395955.D	5 8M395956.D	20 8M395957.D	50 8M395958.D	100 8M395959.D	200 8M395960.D	300 8M395961.D	Avg	%RSD	Linear	Quad
I	Fluorobenzene	ISTD													
T	Dichlorodifluoromethane			0.228	0.198	0.188	0.238	0.241	0.221	0.225	0.225	0.221	8.358		
P	Chloromethane			0.528	0.482	0.410	0.456	0.435	0.401	0.376	0.337	0.428	14.151		
C	Vinyl Chloride		0.297	0.325	0.299	0.269	0.315	0.291	0.272	0.267	0.243	0.286	9.035		
T	1,3-Butadiene					0.229	0.246	0.178	0.131	0.132	0.122	0.173	31.040		0.998
T	Bromomethane			0.188	0.176	0.167	0.182	0.176	0.178	0.183	0.198	0.181	5.168		
T	Chloroethane			0.180	0.178	0.166	0.195	0.185	0.178	0.177	0.193	0.182	5.100		
T	Trichlorofluoromethane		0.318	0.351	0.345	0.314	0.357	0.340	0.324	0.345	0.367	0.340	5.316		
T	Diethyl ether			0.153	0.157	0.148	0.152	0.145	0.147		0.148	0.150	2.718		
T	Isoprene					0.272	0.282	0.304	0.301	0.309	0.291	0.293	4.765		
T	Acrolein				0.003	0.004	0.004	0.004	0.005		0.007	0.004	31.181		0.999
T	1,1,2-Trichloro-1,2,2-Trifluoroethane			0.226	0.224	0.206	0.227	0.229	0.211	0.219	0.217	0.220	3.765		
T	Acetone					0.032	0.034	0.037	0.035	0.036	0.037	0.035	5.728		
C	1,1-Dichloroethene		0.321	0.352	0.328	0.310	0.351	0.335	0.325	0.331	0.334	0.332	4.041		
T	Tert-Butyl Alcohol				0.010	0.010	0.010	0.010	0.010		0.011	0.010	3.681		
T	Dimethyl Sulfide					0.165	0.185	0.186	0.189	0.190	0.183	0.183	5.024		
T	Iodomethane			0.158	0.171	0.182	0.213	0.226	0.227	0.223	0.213	0.202	13.506		
T	Methyl acetate					0.103	0.100	0.099	0.097	0.099	0.104	0.100	2.720		
T	Methylene Chloride			0.241	0.234	0.213	0.236	0.223	0.217	0.215	0.207	0.223	5.615		
T	Carbon Disulfide			0.760	0.715	0.676	0.708	0.746	0.745	0.733	0.676	0.720	4.408		
T	Acrylonitrile			0.045	0.049	0.046	0.050	0.052	0.054		0.061	0.051	10.605		
T	Methyl Tert Butyl Ether			0.360	0.387	0.372	0.441	0.437	0.432	0.439	0.434	0.413	8.199		
T	trans-1,2-Dichloroethene		0.325	0.345	0.324	0.313	0.347	0.331	0.331	0.334	0.321	0.330	3.345		
T	n-Hexane					0.318	0.315	0.344	0.323	0.323	0.311	0.322	3.602		
T	Diisopropyl ether			0.857	0.891	0.843	0.857	0.855	0.839		0.791	0.848	3.528		
T	Vinyl Acetate					0.345	0.331	0.328	0.323	0.296	0.315	0.323	5.110		
P	1,1-Dichloroethane		0.420	0.411	0.402	0.388	0.431	0.410	0.409	0.411	0.393	0.408	3.155		
T	Ethyl-Tert-Butyl ether			0.669	0.696	0.656	0.682	0.684	0.680		0.669	0.677	1.921		
T	2-Butanone					0.054	0.060	0.065	0.062	0.063	0.063	0.061	5.868		
T	Propionitrile				0.019	0.017	0.018	0.019	0.019		0.021	0.019	6.352		
T	2,2-Dichloropropane		0.323	0.386	0.345	0.330	0.351	0.342	0.334	0.334	0.317	0.340	5.938		
T	cis-1,2-Dichloroethene		0.216	0.233	0.246	0.239	0.269	0.254	0.257	0.258	0.251	0.247	6.410		
C	Chloroform	0.406	0.385	0.438	0.377	0.372	0.403	0.388	0.385	0.385	0.374	0.391	5.027		
T	1-Bromopropane			0.039	0.044	0.043	0.047	0.049	0.049	0.049	0.049	0.046	8.399		
T	Bromochloromethane		0.127	0.136	0.151	0.136	0.150	0.144	0.144	0.147	0.145	0.142	5.449		
T	Tetrahydrofuran			0.033	0.036	0.034	0.037	0.036	0.036		0.038	0.036	4.897		
S	Dibromofluoromethane			0.207	0.235	0.236	0.227	0.232	0.230	0.235	0.233	0.229	4.061		
T	1,1,1-Trichloroethane		0.345	0.380	0.363	0.355	0.396	0.385	0.377	0.380	0.363	0.371	4.280		
T	Cyclohexane			0.449	0.442	0.418	0.428	0.472	0.445	0.449	0.422	0.440	3.968		
T	1,1-Dichloropropene			0.313	0.292	0.279	0.328	0.324	0.314	0.313	0.297	0.307	5.384		
T	Tert-Amyl-Methyl ether			0.474	0.504	0.473	0.492	0.490	0.488		0.485	0.487	2.184		
T	Carbon Tetrachloride		0.309	0.334	0.331	0.305	0.357	0.35	0.345	0.35	0.334	0.3349	5.43737		
S	1,2-Dichloroethane-d4			0.184	0.189	0.19	0.188	0.187	0.185	0.189	0.185	0.187	1.16809		
T	Heptane											0	0		
T	1,2-Dichloroethane		0.248	0.262	0.257	0.245	0.265	0.259	0.254	0.254	0.246	0.2545	2.75397		
T	Benzene		0.943	0.993	0.935	0.893	0.966	0.945	0.91	0.868	0.802	0.9173	6.2586		
T	Trichloroethene		0.239	0.28	0.258	0.243	0.288	0.283	0.28	0.28	0.268	0.2687	6.79173		
T	Methylcyclohexane					0.311	0.326	0.36	0.338	0.341	0.334	0.3352	4.85953		
C	1,2-Dichloropropane		0.213	0.25	0.233	0.23	0.259	0.252	0.248	0.242	0.231	0.2398	5.91603		
T	Bromodichloromethane		0.254	0.267	0.276	0.277	0.309	0.311	0.305	0.303	0.292	0.2882	7.12113		
T	1,4-Dioxane				0.001	0.001	0.001	0.001	0.001		0.001	0.0011	10.9241		
T	Dibromomethane		0.112	0.099	0.111	0.108	0.12	0.121	0.117	0.119	0.116	0.1135	6.23009		
T	2-Chloroethyl Vinyl Ether				0.087	0.088	0.109	0.118	0.113	0.113	0.111	0.1057	11.9365		
T	4-Methyl-2-Pentanone					0.048	0.056	0.063	0.057	0.057	0.057	0.0564	8.84497		
T	cis-1,3-Dichloropropene		0.311	0.304	0.317	0.314	0.366	0.364	0.355	0.351	0.338	0.3356	7.24636		

T	Dimethyl Disulfide					0.278	0.358	0.409	0.406	0.41	0.402	0.377	13.8333	
I	Chlorobenzene-d5	ISTD												
S	Toluene-d8			0.98	1.023	1.045	1.007	1.025	1	0.999	0.933	1.0015	3.3714	
C	Toluene		1.153	1.26	1.23	1.229	1.319	1.268	1.225	1.171	1.044	1.2109	6.60695	
T	Ethyl Methacrylate			0.189	0.198	0.198	0.239	0.275	0.248	0.251	0.242	0.2301	13.5396	
T	Paraldehyde											0	0	
T	trans-1,3-Dichloropropene			0.315	0.342	0.335	0.368	0.37	0.363	0.364	0.343	0.3499	5.54834	
T	1,1,2-Trichloroethane		0.165	0.183	0.201	0.187	0.207	0.209	0.202	0.203	0.195	0.1946	7.21144	
T	2-Hexanone					0.049	0.065	0.072	0.066	0.066	0.063	0.0632	12.1565	
T	1,3-Dichloropropane		0.27	0.31	0.319	0.318	0.338	0.34	0.327	0.327	0.309	0.3177	6.54976	
T	Tetrachloroethene		0.246	0.289	0.283	0.27	0.295	0.289	0.283	0.286	0.27	0.2789	5.34454	
T	Dibromochloromethane		0.193	0.221	0.23	0.236	0.278	0.279	0.276	0.282	0.27	0.2517	12.9119	
T	1,2-Dibromoethane		0.173	0.185	0.197	0.183	0.211	0.208	0.205	0.209	0.2	0.1967	6.79795	
T	1-Chlorohexane		0.333	0.342	0.37	0.365	0.394	0.426	0.406	0.41	0.381	0.3806	8.24256	
P	Chlorobenzene		0.912	0.899	0.893	0.855	0.906	0.877	0.856	0.829	0.758	0.8651	5.60232	
T	1,1,1,2-Tetrachloroethane		0.276	0.298	0.296	0.29	0.327	0.322	0.32	0.325	0.303	0.3064	5.89123	
C	Ethylbenzene		0.417	0.464	0.443	0.45	0.48	0.468	0.46	0.449	0.413	0.4492	4.96575	
T	m-,p-Xylene		0.506	0.573	0.565	0.536	0.577	0.556	0.541	0.512	0.456	0.5358	7.28959	
T	o-Xylene			0.521	0.495	0.513	0.573	0.562	0.546	0.536	0.5	0.5308	5.35161	
T	Styrene		0.735	0.804	0.824	0.839	0.952	0.942	0.915	0.885	0.81	0.8563	8.40717	
P	Bromoform			0.138	0.159	0.156	0.187	0.194	0.19	0.197	0.195	0.1768	12.7698	
T	Isopropylbenzene		1.102	1.286	1.269	1.274	1.405	1.384	1.323	1.254	1.129	1.2696	8.00202	
I	1,4-Dichlorobenzene-d4	ISTD												
P	1,1,2,2-Tetrachloroethane		0.362	0.347	0.36	0.344	0.372	0.376	0.358	0.358	0.34	0.3573	3.37907	
S	p-Bromofluorobenzene			0.629	0.724	0.702	0.698	0.727	0.71	0.725	0.668	0.6979	4.86511	
T	1,2,3-Trichloropropane			0.089	0.092	0.101	0.112	0.113	0.11	0.113	0.103	0.104	9.11845	
T	trans-1,4-Dichloro-2-Butene			0.074	0.096	0.097	0.11	0.145	0.124	0.116	0.102	0.1077	19.6371	0.998
T	n-Propylbenzene		2.482	2.655	2.685	2.683	2.937	2.894	2.723	2.529	2.03	2.6243	10.1835	
T	Bromobenzene	0.717	0.562	0.688	0.694	0.657	0.711	0.709	0.686	0.687	0.604	0.6715	7.55704	
T	1,3,5-Trimethylbenzene		1.628	1.767	1.85	1.848	2.035	2.036	1.953	1.875	1.579	1.8413	8.77237	
T	2-Chlorotoluene		1.719	1.856	1.811	1.808	1.903	1.884	1.793	1.622	1.335	1.7479	10.1356	
T	4-Chlorotoluene		1.653	1.612	1.708	1.606	1.719	1.678	1.636	1.673	1.408	1.6327	5.68579	
T	a-Methylstyrene					1.004	1.099	1.258	1.165	1.134	0.976	1.106	9.44453	
T	tert-Butylbenzene			0.405	0.417	0.42	0.454	0.456	0.442	0.445	0.388	0.4284	5.73932	
T	1,2,4-Trimethylbenzene			1.848	1.938	1.945	2.07	2.071	1.984	1.891	1.588	1.9169	8.03915	
T	sec-Butylbenzene			2.23	2.214	2.184	2.397	2.374	2.246	2.121	1.921	2.211	6.75024	
T	p-Isopropyltoluene			1.867	1.917	1.905	2.098	2.09	1.995	1.902	1.711	1.9357	6.52244	
T	1,3-Dichlorobenzene		1.214	1.295	1.288	1.193	1.289	1.282	1.235	1.199	1.121	1.2351	4.79751	
T	1,4-Dichlorobenzene	1.46	1.29	1.303	1.31	1.233	1.303	1.285	1.235	1.192	1.129	1.274	6.85721	
T	n-Butylbenzene			1.678	1.642	1.653	1.774	1.769	1.68	1.598	1.499	1.6615	5.36845	
T	1,2-Dichlorobenzene	1.209	1.223	1.145	1.111	1.091	1.171	1.159	1.108	1.082	1.014	1.1312	5.563	
T	1,2-Dibromo-3-Chloropropane				0.053	0.049	0.057	0.062	0.059	0.06	0.061	0.0573	8.25003	
T	1,2,4-Trichlorobenzene		0.815	0.806	0.78	0.752	0.823	0.843	0.81	0.798	0.759	0.7985	3.72689	
T	Hexachlorobutadiene		0.307	0.328	0.314	0.295	0.333	0.328	0.317	0.319	0.298	0.3157	4.25432	
T	Naphthalene		0.927	0.979	1.016	1.004	1.187	1.232	1.176	1.171	1.123	1.0907	10.0642	
T	1,2,3-Trichlorobenzene	0.745	0.658	0.678	0.715	0.653	0.714	0.72	0.687	0.679	0.653	0.6901	4.65069	

Fri Mar 28 14:37:06 2014

Microbac Laboratories Inc.

ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L14031621 Run Date: 03/28/2014 Sample ID: WG468975-12

Instrument ID: HPMS8 Run Time: 15:48 Method: 8260B

File ID: 8M395964 Analyst: TMB QC Key: DOD4

ICal Workgroup: WG468975 Cal ID: HPMS8 - 28-MAR-14

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Chloromethane	SPCC	50.0	44.6	ug/L	0.382	10.8	20	
1,1-Dichloroethane	SPCC	50.0	49.9	ug/L	0.408	0.100	20	
Chlorobenzene	SPCC	50.0	47.4	ug/L	0.819	5.30	20	
Bromoform	SPCC	50.0	52.1	ug/L	0.184	4.10	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	50.3	ug/L	0.359	0.500	20	
2-Chloroethyl Vinyl Ether		50.0	51.7	ug/L	0.109	3.30	30	
Acetone		50.0	50.7	ug/L	0.0357	1.40	20	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 3448429
Report generated 03/31/2014 14:34

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 03/29/2014 Sample ID: WG469133-02

Instrument ID: HPMS8 Run Time: 11:40 Method: 8260B

File ID: 8M395975 Analyst: MES QC Key: DOD4

Workgroup (AAB#): WG469134 Cal ID: HPMS8 - 28-MAR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	55.0	ug/L	0.365	9.91	20	
1,2-Dichloropropane	CCC	50.0	53.7	ug/L	0.258	7.43	20	
Chloroform	CCC	50.0	51.9	ug/L	0.406	3.85	20	
Ethylbenzene	CCC	50.0	55.8	ug/L	0.502	11.7	20	
Toluene	CCC	50.0	56.1	ug/L	1.36	12.1	20	
Vinyl Chloride	CCC	50.0	54.7	ug/L	0.314	9.50	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	50.2	ug/L	0.359	0.344	20	
1,1-Dichloroethane	SPCC	50.0	53.1	ug/L	0.433	6.14	20	
Bromoform	SPCC	50.0	50.2	ug/L	0.178	0.458	20	
Chlorobenzene	SPCC	50.0	53.7	ug/L	0.928	7.33	20	
Chloromethane	SPCC	50.0	52.8	ug/L	0.453	5.69	20	
2-Chloroethyl Vinyl Ether		50.0	48.7	ug/L	0.103	2.53	40	
Acetone		50.0	43.2	ug/L	0.0305	13.5	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 3448430
Report generated 03/31/2014 14:34

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number:L14031621
Instrument ID:HPMS8
Workgroup (AAB#):WG469134

ICAL CCV Number:WG468975-08
CAL ID: HPMS8-28-MAR-14
Matrix:WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG468975-08	NA	NA	385818	668923	798177
Upper Limit	NA	NA	771636	1337846	1596354
Lower Limit	NA	NA	192909	334462	399089
L14031621-01	1.00	01	355976	607090	690241
L14031621-02	1.00	01	348107	594895	674452
L14031621-03	1.00	01	349665	597822	681012
L14031621-04	1.00	01	349066	594439	676612
L14031621-05	1.00	01	339266	584888	660317
L14031621-06	1.00	01	352946	605339	685605
L14031621-07	1.00	01	340170	581647	651905
L14031621-08	1.00	01	354112	603535	689695
L14031621-09	1.00	01	358979	615782	692799
L14031621-10	1.00	01	359608	619123	703480
WG469134-01	1.00	01	372224	629220	705375
WG469134-02	1.00	01	381110	660574	767445

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: 3450476
Report generated 03/31/2014 14:34

Microbac Laboratories Inc.

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

Login Number:L14031621 ICAL CCV Number:WG468975-08

Instrument ID:HPMS8 CAL ID: HPMS8-28-MAR-14

Workgroup (AAB#):WG469134 Matrix:WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG468975-08	NA	NA	17.9	14.87	11
Upper Limit	NA	NA	18.4	15.37	11.5
Lower Limit	NA	NA	17.4	14.37	10.5
L14031621-01	1.00	01	17.91	14.88	11
L14031621-02	1.00	01	17.9	14.87	11
L14031621-03	1.00	01	17.9	14.87	11
L14031621-04	1.00	01	17.9	14.88	11
L14031621-05	1.00	01	17.9	14.88	11
L14031621-06	1.00	01	17.91	14.88	11
L14031621-07	1.00	01	17.91	14.88	11
L14031621-08	1.00	01	17.9	14.88	11
L14031621-09	1.00	01	17.9	14.88	11
L14031621-10	1.00	01	17.91	14.88	11
WG469134-01	1.00	01	17.91	14.88	11
WG469134-02	1.00	01	17.91	14.88	11

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: 3450477
Report generated: 03/31/2014 14:34

Login Number: L14031621
Department: Semivolatiles
Analyst: Cassie A. Augenstein

METHOD

Preparation 3510C

Analysis SW-846 8270 SIM

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

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

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration and Tune: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: The MS/MSD pair exceeded % RPD criteria for all analytes, however the recoveries for both the MS and MSD are within specified limits. Please see the applicable QC report for a detailed presentation of the failures.

SAMPLES

Samples: All acceptance criteria were met.

Internal Standards: All acceptance criteria were met.

Surrogates: Samples 07REF, 08MS and 09MSD were not re-extracted per TSR instructions (marginal failure).

Sample #	Analyte	Date	Result	Lower	Upper	Type
L14031621-09	p-Terphenyl-d14	2014-04-01 15:54:00	49.1	50	135	Recovery

Manual Integration Reason Codes

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

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

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

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

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

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

Narrative ID: 80632
Approved By: Eric Lawson

Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L14031621
Instrument Id: HPMS7
Workgroup (AAB#): WG469379

Method: 8270L
CAL ID: HPMS7-05-MAR-14
Matrix: Water

Sample Number	Dilution	Tag	1	2	3
L14031621-01	1.00	01	76.5	83.3	81.7
L14031621-02	1.00	01	69.5	79.6	71.1
L14031621-03	1.00	01	71.5	78.5	83.9
L14031621-04	1.00	01	67.4	74.8	72.3
L14031621-05	1.00	01	62.8	71.9	74.5
L14031621-06	1.00	01	61.2	67.0	67.0
L14031621-07	1.00	01	81.4	91.7	77.7
L14031621-08	1.00	01	82.6	83.5	74.6
L14031621-09	1.00	01	55.5	59.2	49.1
WG469212-01	1.00	01	72.0	79.5	75.7
WG469212-02	1.00	01	61.8	68.0	68.2

Surrogates	Surrogate Limits
1 - 2-Fluorobiphenyl	50 - 110
2 - Nitrobenzene-d5	40 - 110
3 - p-Terphenyl-d14	50 - 135

Underline = Result out of surrogate limits

DL = surrogate diluted out

ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 3454703
Report generated: 04/03/2014 08:49

Microbac Laboratories Inc.

METHOD BLANK SUMMARY

Login Number: L14031621
Work Group: WG469379
Blank File ID: 7M60725
Blank Sample ID: WG469212-01
Prep Date: 03/31/14 11:16
Instrument ID: HPMS7
Analyzed Date: 04/01/14 09:35
Method: 8270C
Analyst: CAA

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG469212-02	7M60726	04/01/14 10:00	01
40MW7GW32714	L14031621-01	7M60732	04/01/14 12:32	01
40EQR32714	L14031621-02	7M60733	04/01/14 12:57	01
40FB32714	L14031621-03	7M60734	04/01/14 13:23	01
40MW5GW32714	L14031621-04	7M60735	04/01/14 13:48	01
40DUPGW32714	L14031621-05	7M60736	04/01/14 14:13	01
40MW6GW32714	L14031621-06	7M60737	04/01/14 14:39	01
LFMW01GW32714	L14031621-07	7M60738	04/01/14 15:04	01
LFMW01MSGW32714	L14031621-08	7M60739	04/01/14 15:29	01
LFMW01MSDGW32714	L14031621-09	7M60740	04/01/14 15:54	01

Report Name: BLANK_SUMMARY
PDF File ID: 3454694
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L14031621 Prep Date:03/31/14 11:16 Sample ID:WG469212-01
Instrument ID:HPMS7 Run Date:04/01/14 09:35 Prep Method:3510C
File ID:7M60725 Analyst:CAA Method:8270C
Workgroup (AAB#):WG469379 Matrix:Water Units:ug/L
Contract #: Cal ID: HPMS7-05-MAR-14

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
Benzo(a)anthracene	0.0250	0.0500	0.0250	1	U
Benzo(a)pyrene	0.0250	0.0500	0.0250	1	U
Benzo(b)fluoranthene	0.0250	0.0500	0.0250	1	U
Benzo(k)fluoranthene	0.0250	0.0500	0.0250	1	U
Chrysene	0.0250	0.0500	0.0250	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
Nitrobenzene-d5	79.5	40 - 110	PASS
2-Fluorobiphenyl	72.0	50 - 110	PASS
p-Terphenyl-d14	75.7	50 - 135	PASS

LOD 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: 3454695
03-APR-2014 08:49

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L14031621 Run Date: 04/01/2014 Sample ID: WG469212-02
Instrument ID: HPMS7 Run Time: 10:00 Prep Method: 3510C
File ID: 7M60726 Analyst: CAA Method: 8270C
Workgroup (AAB#): WG469379 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD61199 Cal ID: HPMS7-05-MAR-14

Analytes	Expected	Found	% Rec	LCS Limits	Q
Benzo(a)anthracene	1.00	0.805	80.5	55 - 110	
Benzo(a)pyrene	1.00	0.779	77.9	55 - 110	
Benzo(b)fluoranthene	1.00	0.693	69.3	45 - 120	
Benzo(k)fluoranthene	1.00	0.725	72.5	45 - 125	
Chrysene	1.00	0.901	90.1	55 - 110	

Surrogates	% Recovery	Surrogate Limits	Qualifier
Nitrobenzene-d5	68.0	40 - 110	PASS
2-Fluorobiphenyl	61.8	50 - 110	PASS
p-Terphenyl-d14	68.2	50 - 135	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 3454696
Report generated: 04/03/2014 08:49

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L14031621 Cal ID:HPMS7- 05-MAR-14 Worknum:WG469379

Instrument ID:HPMS7 Contract #: Prep Method:3510C

Parent ID:L14031621-07 File ID:7M60738 Dil:1 Method:8270C

Sample ID:L14031621-08 MS File ID:7M60739 Dil:1 Matrix:Water

Sample ID:L14031621-09 MSD File ID:7M60740 Dil:1 Units:ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Benzo(a)anthracene	U	1.04	0.847	81.3	1.08	0.601	55.9	33.9	55 - 110	30	#
Benzo(a)pyrene	U	1.04	0.913	87.7	1.08	0.626	58.3	37.2	55 - 110	30	#
Benzo(b)fluoranthene	U	1.04	0.878	84.3	1.08	0.582	54.1	40.6	45 - 120	30	#
Benzo(k)fluoranthene	U	1.04	0.860	82.5	1.08	0.597	55.5	36.1	45 - 125	30	#
Chrysene	U	1.04	0.996	95.7	1.08	0.700	65.1	35.0	55 - 110	30	#

* FAILS %REC LIMIT

\# FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
PDF File ID: 3454697
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L14031621
Instrument: HPMS7
Analyst: CAA
Workgroup: WG465525

Tune ID: WG465525-01
Run Date: 03/05/2014
Run Time: 11:43
File ID: 7M60540
Cal ID: HPMS7-05-MAR-14

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	43.3	79118	PASS
68.0	69.0	0	2.00	1.45	948	PASS
69.0	198	0	100	35.8	65494	PASS
70.0	69.0	0	2.00	0.603	395	PASS
127	198	40.0	60.0	46.9	85826	PASS
197	198	0	1.00	0	0	PASS
198	198	100	100	100	182845	PASS
199	198	5.00	9.00	6.45	11797	PASS
275	198	10.0	30.0	26.4	48218	PASS
365	198	1.00	100	2.62	4793	PASS
441	443	0.0100	100	76.8	23912	PASS
442	198	40.0	100	84.2	153997	PASS
443	442	17.0	23.0	20.2	31133	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG465525-02	STD-CCV	01	03/05/2014 13:21	
WG465525-03	STD	01	03/05/2014 13:46	
WG465525-04	STD	01	03/05/2014 14:11	
WG465525-05	STD	01	03/05/2014 14:36	
WG465525-06	STD	01	03/05/2014 15:01	
WG465525-07	STD	01	03/05/2014 15:26	
WG465525-08	STD	01	03/05/2014 15:52	
WG465525-09	SSCV	01	03/05/2014 16:17	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 3454700
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L14031621 Tune ID: WG469371-01
Instrument: HPMS7 Run Date: 04/01/2014
Analyst: CAA Run Time: 08:55
Workgroup: WG469371 File ID: 7M60723
Cal ID: HPMS7-05-MAR-14

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	41.5	43252	PASS
68.0	69.0	0	2.00	0.803	301	PASS
69.0	198	0	100	36.0	37483	PASS
70.0	69.0	0	2.00	0.379	142	PASS
127	198	40.0	60.0	47.7	49632	PASS
197	198	0	1.00	0	0	PASS
198	198	100	100	100	104130	PASS
199	198	5.00	9.00	6.65	6921	PASS
275	198	10.0	30.0	24.6	25576	PASS
365	198	1.00	100	2.39	2492	PASS
441	443	0.0100	100	72.5	13496	PASS
442	198	40.0	100	84.0	87498	PASS
443	442	17.0	23.0	21.3	18627	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG469371-02	CCV	01	04/01/2014 09:10	
WG469212-01	BLANK	01	04/01/2014 09:35	
WG469212-02	LCS	01	04/01/2014 10:00	
L14031621-01	40MW7GW32714	01	04/01/2014 12:32	
L14031621-02	40EQR32714	01	04/01/2014 12:57	
L14031621-03	40FB32714	01	04/01/2014 13:23	
L14031621-04	40MW5GW32714	01	04/01/2014 13:48	
L14031621-05	40DUPGW32714	01	04/01/2014 14:13	
L14031621-06	40MW6GW32714	01	04/01/2014 14:39	
L14031621-07	LFMW01GW32714	01	04/01/2014 15:04	
L14031621-08	LFMW01MSGW32714	01	04/01/2014 15:29	
L14031621-09	LFMW01MSDGW32714	01	04/01/2014 15:54	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 3454700
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

INITIAL CALIBRATION SUMMARY

Login Number: L14031621
Analytical Method: 8270C
ICAL Workgroup: WG465525

Instrument ID: HPMS7
Initial Calibration Date: 05-MAR-14 15:52
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Benzo[a]pyrene	CCC	1.150	4.35		
Benzo[a]anthracene		1.155	1.81		
Benzo[b]fluoranthene		1.311	4.71		
Benzo[k]fluoranthene		1.293	6.89		
Chrysene		1.136	3.16		

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

If the %RSD is greater than the limit specified by the method or project QAP, then linear or quadratic equations will be used.

INT_CAL - Modified 03/06/2008
PDF File ID: 3454698
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number:L14031621 Instrument ID:HPMS7

Analytical Method:8270C Initial Calibration Date:05-MAR-14 15:52

Column ID:F

Analyte	WG465525-02			WG465525-03			WG465525-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Benzo[a]pyrene	1.00	261807.000	1.180	10.0	2508628.00	1.162	5.00	1229906.00	1.224
Benzo[a]anthracene	1.00	296864.000	1.177	10.0	2604554.00	1.129	5.00	1348886.00	1.186
Benzo[b]fluoranthene	1.00	306098.000	1.379	10.0	2705506.00	1.253	5.00	1350582.00	1.345
Benzo[k]fluoranthene	1.00	289450.000	1.304	10.0	2477011.00	1.147	5.00	1405774.00	1.400
Chrysene	1.00	290093.000	1.150	10.0	2458406.00	1.066	5.00	1276780.00	1.122

INT_CAL - Modified 03/06/2008
PDF File ID: 3454698
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number:L14031621 Instrument ID:HPMS7

Analytical Method:8270C Initial Calibration Date:05-MAR-14 15:52

Column ID:F

Analyte	WG465525-05			WG465525-06			WG465525-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Benzo[a]pyrene	2.50	553315.000	1.169	0.500	117366.000	1.146	0.100	20165.0000	1.092
Benzo[a]anthracene	2.50	637999.000	1.160	0.500	133533.000	1.148	0.100	23600.0000	1.134
Benzo[b]fluoranthene	2.50	645408.000	1.364	0.500	138112.000	1.348	0.100	23289.0000	1.262
Benzo[k]fluoranthene	2.50	615749.000	1.301	0.500	134968.000	1.317	0.100	25407.0000	1.376
Chrysene	2.50	618313.000	1.125	0.500	135179.000	1.162	0.100	24168.0000	1.161

INT_CAL - Modified 03/06/2008
PDF File ID: 3454698
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number: L14031621
Analytical Method: 8270C
Instrument ID: HPMS7
Initial Calibration Date: 05-MAR-14 15:52
Column ID: F

Analyte	WG465525-08		
	CONC	RESP	RF
Benzo[a]pyrene	0.0500	9336.00000	1.081
Benzo[a]anthracene	0.0500	10914.0000	1.149
Benzo[b]fluoranthene	0.0500	10600.0000	1.227
Benzo[k]fluoranthene	0.0500	10435.0000	1.208
Chrysene	0.0500	11096.0000	1.168

INT_CAL - Modified 03/06/2008
PDF File ID: 3454698
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L14031621 Run Date: 03/05/2014 Sample ID: WG465525-09

Instrument ID: HPMS7 Run Time: 16:17 Method: 8270C

File ID: 7M60549 Analyst: CAA QC Key: DOD4

ICal Workgroup: WG465525 Cal ID: HPMS7 - 05-MAR-14

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Benzo[a]pyrene	CCC	1000	1130	ug/L	1.30	12.6	30	
Benzo[a]anthracene		1000	1020	ug/L	1.18	2.20	30	
Benzo[b]fluoranthene		1000	1010	ug/L	1.32	0.700	30	
Benzo[k]fluoranthene		1000	1010	ug/L	1.31	1.30	30	
Chrysene		1000	1030	ug/L	1.17	3.00	30	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 3454699
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/01/2014 Sample ID: WG469371-02

Instrument ID: HPMS7 Run Time: 09:10 Method: 8270C

File ID: 7M60724 Analyst: CAA QC Key: DOD4

Workgroup (AAB#): WG469379 Cal ID: HPMS7 - 05-MAR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Acenaphthene	CCC	1000	951	ug/L	1.18	4.94	20	
Fluoranthene	CCC	1000	1000	ug/L	1.34	0.400	20	
Benzo[a]pyrene	CCC	1000	1040	ug/L	1.20	4.02	20	
Benzo[a]anthracene		1000	1050	ug/L	1.21	4.90	20	
Benzo[b]fluoranthene		1000	1030	ug/L	1.36	3.43	20	
Benzo[k]fluoranthene		1000	996	ug/L	1.29	0.420	20	
Chrysene		1000	1040	ug/L	1.18	3.60	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 3454701
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number:L14031621 ICAL CCV Number:WG465525-02

Instrument ID:HPMS7 CAL ID: HPMS7-05-MAR-14

Workgroup (AAB#):WG469379 Matrix:WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3	IS-4	IS-5
WG465525-02	NA	NA	149683	252338	227721	221948	216432
Upper Limit	NA	NA	299366	504676	455442	443896	432864
Lower Limit	NA	NA	74842	126169	113861	110974	108216
L14031621-01	1.00	01	126522	181491	182233	170838	173292
L14031621-02	1.00	01	131384	186665	188484	176408	179010
L14031621-03	1.00	01	138805	199831	199830	204244	188749
L14031621-04	1.00	01	133798	189530	193440	180810	182388
L14031621-05	1.00	01	128669	184928	187881	177271	177197
L14031621-06	1.00	01	134425	192095	194906	181964	184264
L14031621-07	1.00	01	130570	186520	188017	176444	175907
L14031621-08	1.00	01	117292	179479	180333	169728	168850
L14031621-09	1.00	01	129424	187978	190135	178441	175947
WG469212-01	1.00	01	123481	179000	181244	169571	168860
WG469212-02	1.00	01	136734	198447	197802	207876	185663

IS-1 - Acenaphthene-d10
IS-2 - Chrysene-d12
IS-3 - Naphthalene-d8
IS-4 - Perylene-d12
IS-5 - Phenanthrene-d10

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 3454702
Report generated 04/03/2014 08:49

Microbac Laboratories Inc.

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

Login Number:L14031621 ICAL CCV Number:WG465525-02
Instrument ID:HPMS7 CAL ID: HPMS7-05-MAR-14
Workgroup (AAB#):WG469379 Matrix:WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3	IS-4	IS-5
WG465525-02	NA	NA	8.12	13.32	5.94	15.44	9.97
Upper Limit	NA	NA	8.62	13.82	6.44	15.94	10.47
Lower Limit	NA	NA	7.62	12.82	5.44	14.94	9.47
L14031621-01	1.00	01	8.11	13.31	5.93	15.44	9.96
L14031621-02	1.00	01	8.11	13.31	5.93	15.44	9.96
L14031621-03	1.00	01	8.11	13.31	5.93	15.44	9.96
L14031621-04	1.00	01	8.11	13.31	5.93	15.44	9.96
L14031621-05	1.00	01	8.11	13.31	5.93	15.44	9.96
L14031621-06	1.00	01	8.11	13.31	5.93	15.44	9.96
L14031621-07	1.00	01	8.11	13.31	5.93	15.44	9.96
L14031621-08	1.00	01	8.11	13.31	5.93	15.44	9.96
L14031621-09	1.00	01	8.11	13.31	5.93	15.44	9.96
WG469212-01	1.00	01	8.11	13.31	5.93	15.44	9.96
WG469212-02	1.00	01	8.11	13.31	5.93	15.44	9.96

IS-1 - Acenaphthene-d10
IS-2 - Chrysene-d12
IS-3 - Naphthalene-d8
IS-4 - Perylene-d12
IS-5 - Phenanthrene-d10

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 3454704
Report generated: 04/03/2014 08:49

Login Number: L14031621
Department: General Chromatography
Analyst: John W. Richards Jr.

METHOD

Analysis SW-846 6850

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

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

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration and Tune: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: This failure was due to sample matrix interference.

Sample #	Analyte	Date	Result	Lower	Upper	Type
L14031621-09	Perchlorate	2014-04-02 20:55:36	35.0	80	120	Recovery

SAMPLES

Samples: All acceptance criteria were met.

Internal Standards: All acceptance criteria were met.

Manual Integration Reason Codes

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

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

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

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

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

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

Narrative ID: 80678
Approved By: Eric Lawson

Microbac Laboratories Inc.

METHOD BLANK SUMMARY

Login Number: L14031621 | Work Group: WG469638
Blank File ID: 1LM.LM24170 | Blank Sample ID: WG469638-02
Prep Date: 04/02/14 13:30 | Instrument ID: LCMS1
Analyzed Date: 04/02/14 16:11 | Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG469638-07	1LM.LM24168	04/02/14 15:33	01
MCT	WG469638-01	1LM.LM24169	04/02/14 15:52	01
LCS	WG469638-03	1LM.LM24171	04/02/14 16:30	01
40MW7GW32714	L14031621-01	1LM.LM24174	04/02/14 17:27	01
40EQR32714	L14031621-02	1LM.LM24175	04/02/14 17:46	01
40FB32714	L14031621-03	1LM.LM24176	04/02/14 18:05	01
40MW5GW32714	L14031621-04	1LM.LM24177	04/02/14 18:24	01
40DUPGW32714	L14031621-05	1LM.LM24178	04/02/14 18:43	01
QCMRL	WG469638-08	1LM.LM24180	04/02/14 19:20	01
40MW6GW32714	L14031621-06	1LM.LM24182	04/02/14 19:58	01
LFMW01GW32714	L14031621-07	1LM.LM24183	04/02/14 20:17	01
LFMW01MSGW32714	L14031621-08	1LM.LM24184	04/02/14 20:36	01
LFMW01MSDGW32714	L14031621-09	1LM.LM24185	04/02/14 20:55	01
QCMRL	WG469638-09	1LM.LM24190	04/02/14 22:30	01

Report Name: BLANK_SUMMARY
PDF File ID: 3456860
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L14031621 Prep Date:04/02/14 13:30 Sample ID:WG469638-02
Instrument ID:LCMS1 Run Date:04/02/14 16:11 Prep Method:6850
File ID:1LM.LM24170 Analyst:JWR Method:6850
Workgroup (AAB#):WG469638 Matrix:Water Units:ug/L
Contract #: Cal ID: LCMS1-18-DEC-13

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.200	0.100	1	U

LOD 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: 3456861
04-APR-2014 09:08

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469638-03
Instrument ID: LCMS1 Run Time: 16:30 Prep Method: 6850
File ID: 1LM.LM24171 Analyst: JWR Method: 6850
Workgroup (AAB#): WG469638 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD63472 Cal ID: LCMS1-18-DEC-13

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.209	105	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 3456862
Report generated: 04/04/2014 09:08

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L14031621 Cal ID:LCMS1- 18-DEC-13 Worknum:WG469638

Instrument ID:LCMS1 Contract #: Prep Method:6850

Parent ID:L14031621-07 File ID:1LM.LM24183 Dil:1 Method:6850

Sample ID:L14031621-08 MS File ID:1LM.LM24184 Dil:1 Matrix:Water

Sample ID:L14031621-09 MSD File ID:1LM.LM24185 Dil:1 Units:ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	7.47	0.200	7.69	110	0.200	7.54	35	1.97	80 - 120	15	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
PDF File ID: 3456863
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

INITIAL CALIBRATION SUMMARY

Login Number: L14031621
Analytical Method: 6850
ICAL Workgroup: WG456864

Instrument ID: LCMS1
Initial Calibration Date: 18-DEC-13 19:20
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.443	2.71	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: 3458254
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number:L14031621
Analytical Method:6850
Instrument ID:LCMS1
Initial Calibration Date:18-DEC-13 19:20
Column ID:F

Analyte	WG456864-02			WG456864-03			WG456864-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	8410.00000	1.534	0.200	16200.0000	1.465	0.500	39200.0000	1.440

INT_CAL - Modified 03/06/2008
PDF File ID: 3458254
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number:L14031621 Instrument ID:LCMS1

Analytical Method:6850 Initial Calibration Date:18-DEC-13 19:20

Column ID:F

Analyte	WG456864-05			WG456864-06			WG456864-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	78800.0000	1.435	2.00	157000.000	1.414	5.00	393000.000	1.409

INT_CAL - Modified 03/06/2008
PDF File ID: 3458254
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number:L14031621
Analytical Method:6850
Instrument ID:LCMS1
Initial Calibration Date:18-DEC-13 19:20
Column ID:F

Analyte	WG456864-08		
	CONC	RESP	RF
Perchlorate	10.0	784000.000	1.406

INT_CAL - Modified 03/06/2008
PDF File ID: 3458254
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L14031621 Run Date: 12/18/2013 Sample ID: WG456864-09

Instrument ID: LCMS1 Run Time: 19:39 Method: 6850

File ID: 1LM.LM23238 Analyst: JWR QC Key: DOD4

ICal Workgroup: WG456864 Cal ID: LCMS1 - 18-DEC-13

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.978	ug/L	1.39	2.20	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 3458255
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469639-01

Instrument ID: LCMS1 Run Time: 14:55 Method: 6850

File ID: 1LM.LM24166 Analyst: JWR Units: ug/L

Workgroup (AAB#): WG469638 Cal ID: LCMS1 - 18-DEC-13

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.200	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: 3456866
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469639-04

Instrument ID: LCMS1 Run Time: 19:39 Method: 6850

File ID: 1LM.LM24181 Analyst: JWR Units: ug/L

Workgroup (AAB#): WG469638 Cal ID: LCMS1 - 18-DEC-13

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.200	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: 3456866
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469639-06

Instrument ID: LCMS1 Run Time: 22:49 Method: 6850

File ID: 1LM.LM24191 Analyst: JWR Units: ug/L

Workgroup (AAB#): WG469638 Cal ID: LCMS1 - 18-DEC-13

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.200	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: 3456866
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469639-02

Instrument ID: LCMS1 Run Time: 15:14 Method: 6850

File ID: 1LM.LM24167 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG469638 Cal ID: LCMS1 - 18-DEC-13

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.01	ug/L	1.43	1.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 3456865

Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469639-03

Instrument ID: LCMS1 Run Time: 19:01 Method: 6850

File ID: 1LM.LM24179 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG469638 Cal ID: LCMS1 - 18-DEC-13

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.00	ug/L	1.42	0	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 3456865

Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469639-05

Instrument ID: LCMS1 Run Time: 22:11 Method: 6850

File ID: 1LM.LM24189 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG469638 Cal ID: LCMS1 - 18-DEC-13

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.979	ug/L	1.39	2.10	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 3456865

Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

QCMRL SAMPLE

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469638-07

Instrument ID: LCMS1 Run Time: 15:33 Prep Method: 6850

File ID: 1LM.LM24168 Analyst: JWR Method: 6850

Workgroup (AAB#): WG469638 Matrix: Water Units: ug/L

Contract #: Cal ID: LCMS1-18-DEC-13

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.189	94.5	70 - 130	

QCMRL - Modified 03/06/2007

PDF File ID: 3456864

Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

QCMRL SAMPLE

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469638-08

Instrument ID: LCMS1 Run Time: 19:20 Prep Method: 6850

File ID: 1LM.LM24180 Analyst: JWR Method: 6850

Workgroup (AAB#): WG469638 Matrix: Water Units: ug/L

Contract #: Cal ID: LCMS1-18-DEC-13

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.189	94.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 3456864
Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

QCMRL SAMPLE

Login Number: L14031621 Run Date: 04/02/2014 Sample ID: WG469638-09

Instrument ID: LCMS1 Run Time: 22:30 Prep Method: 6850

File ID: 1LM.LM24190 Analyst: JWR Method: 6850

Workgroup (AAB#): WG469638 Matrix: Water Units: ug/L

Contract #: Cal ID: LCMS1-18-DEC-13

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.198	99.0	70 - 130	

QCMRL - Modified 03/06/2007

PDF File ID: 3456864

Report generated 04/04/2014 09:08

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY

(COMPARED TO AVERAGE OF ICAL)

Login Number:L14031621

Instrument ID:LCMS1

Workgroup (AAB#):WG469638

ICAL CCV Number:WG456864-05

CAL ID: LCMS1-18-DEC-13

Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG456864	NA	NA	276000
Upper Limit	NA	NA	414000
Lower Limit	NA	NA	138000
L14031621-01	1.00	01	269000
L14031621-02	1.00	01	267000
L14031621-03	1.00	01	260000
L14031621-04	1.00	01	207000
L14031621-05	1.00	01	251000
L14031621-06	1.00	01	296000
L14031621-07	1.00	01	251000
L14031621-08	1.00	01	240000
L14031621-09	1.00	01	235000
WG469638-02	1.00	01	283000
WG469638-03	1.00	01	261000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010

PDF File ID: 3456867

Report generated 04/04/2014 09:09

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-01
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24174
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 17:27	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	284000	92300	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-02
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24175
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 17:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	221	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-03
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24176
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 18:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	519	97.9	5.30	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-04
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24177
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 18:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	42600	15000	2.84	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-05
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24178
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 18:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	51300	17100	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-06
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24182
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 19:58	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	42900	14700	2.92	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-07
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24183
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 20:17	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	528000	172000	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-08
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24184
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 20:36	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	519000	167000	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	L14031621-09
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24185
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 20:55	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	499000	164000	3.04	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG456864-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM23231
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	12/18/2013 17:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	8410	2790	3.01	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG456864-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM23232
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	12/18/2013 17:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	16200	5210	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG456864-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM23233
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	12/18/2013 18:04	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	39200	12700	3.09	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG456864-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM23234
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	12/18/2013 18:23	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	78800	25700	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG456864-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM23235
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	12/18/2013 18:42	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	157000	51500	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG456864-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM23236
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	12/18/2013 19:01	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	393000	129000	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG456864-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM23237
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	12/18/2013 19:20	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	784000	253000	3.10	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG456864-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM23238
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	12/18/2013 19:39	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	81000	26800	3.02	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	WG469638-01
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24169
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 15:52	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17800	5620	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	WG469638-02
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24170
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 16:11	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	515	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	WG469638-03
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24171
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 16:30	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	16100	4770	3.38	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	WG469638-07
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24168
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 15:33	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	14500	4960	2.92	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	WG469638-08
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24180
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 19:20	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	16800	5400	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**	6850	**Samplenum:**	WG469638-09
Instrument:	LCMS1	**Prep Date:**	04/02/2014 13:30	**File ID:**	1LM.LM24190
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 22:30	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17400	5820	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG469639-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM24166
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 14:55	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	188	123	1.53	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG469639-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM24167
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 15:14	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	75600	24100	3.14	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG469639-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM24179
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 19:01	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	82600	26900	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG469639-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM24181
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 19:39	**Units:**	ug/L

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

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG469639-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM24189
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 22:11	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	83500	27200	3.07	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L14031621	**Prep Method:**		**Samplenum:**	WG469639-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM24191
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG469638	**Analysis Date:**	04/02/2014 22:49	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1020	0.000	0.000	2.3	3.8	*

Login Number: L14031621
Department: Metals
Analyst: Qin Xu
Analyst #2: Ji Hu

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6010

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration Verification: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG469838 - All acceptance criteria were met.

Matrix Spikes: WG469838 - Sample 07 was chosen by the client for MS/MSD analysis. Samples 08(MS) and 09(MSD) yielded noncompliant recoveries for two analytes.

SAMPLES

Samples: WG469838 - Client samples 01, 04, 05, 07, 08 and 09 required dilution analyses in order to obtain results for calcium within the calibration range. Client samples 01, 07, 08 and 09 required dilution analyses in order to obtain results for magnesium within the calibration range.

Narrative ID: 80723
Approved By: Sheri Pfalzgraf

Microbac Laboratories Inc.

METHOD BLANK SUMMARY

Login Number: L14031621
Work Group: WG469838
Blank File ID: T2.040314.224251
Blank Sample ID: WG469555-02
Prep Date: 04/02/14 08:21
Instrument ID: ICP-THERMO2
Analyzed Date: 04/03/14 22:42
Method: 6010B
Analyst: QX

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG469555-03	T2.040314.224626	04/03/14 22:46	01
40MW7GW32714	L14031621-01	T2.040314.224943	04/03/14 22:49	01
40EQR32714	L14031621-02	T2.040314.225317	04/03/14 22:53	01
40FB32714	L14031621-03	T2.040314.225652	04/03/14 22:56	01
40MW5GW32714	L14031621-04	T2.040314.230027	04/03/14 23:00	01
40DUPGW32714	L14031621-05	T2.040314.230358	04/03/14 23:03	01
40MW6GW32714	L14031621-06	T2.040314.230731	04/03/14 23:07	01
LFMW01GW32714	L14031621-07	T2.040314.233648	04/03/14 23:36	01
LFMW01MSGW32714	L14031621-08	T2.040314.234022	04/03/14 23:40	01
LFMW01MSDGW32714	L14031621-09	T2.040314.234340	04/03/14 23:43	01
40MW7GW32714	L14031621-01	T2.040714.152107	04/07/14 15:21	DL01
40MW5GW32714	L14031621-04	T2.040714.152442	04/07/14 15:24	DL01
40DUPGW32714	L14031621-05	T2.040714.152817	04/07/14 15:28	DL01
LFMW01GW32714	L14031621-07	T2.040714.154227	04/07/14 15:42	DL01
LFMW01MSGW32714	L14031621-08	T2.040714.154602	04/07/14 15:46	DL01
LFMW01MSDGW32714	L14031621-09	T2.040714.154933	04/07/14 15:49	DL01

Report Name: BLANK_SUMMARY
PDF File ID: 3459263
Report generated 04/07/2014 16:17

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L14031621 Prep Date:04/02/14 08:21 Sample ID:WG469555-02
Instrument ID:ICP-THERMO2 Run Date:04/03/14 22:42 Prep Method:3015
File ID:T2.040314.224251 Analyst:QX Method:6010B
Workgroup (AAB#):WG469838 Matrix:Water Units:mg/L
Contract #: Cal ID:ICP-TH-03-APR-14

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
Aluminum, Total	0.100	0.200	0.100	1	U
Calcium, Total	0.250	0.500	0.250	1	U
Iron, Total	0.0500	0.100	0.0500	1	U
Magnesium, Total	0.250	0.500	0.250	1	U
Potassium, Total	0.500	1.00	0.500	1	U
Sodium, Total	0.250	0.500	0.250	1	U
Vanadium, Total	0.00500	0.0100	0.00500	1	U

LOD 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: 3459265
07-APR-2014 16:17

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469555-03
Instrument ID: ICP-THERMO2 Run Time: 22:46 Prep Method: 3015
File ID: T2.040314.224626 Analyst: QX Method: 6010B
Workgroup (AAB#): WG469838 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD63274 Cal ID: ICP-TH-03-APR-14

Analytes	Expected	Found	% Rec	LCS Limits	Q
Aluminum, Total	6.25	6.19	99.1	80 - 120	
Calcium, Total	6.25	6.30	101	80 - 120	
Iron, Total	2.50	2.43	97.3	80 - 120	
Magnesium, Total	6.25	6.00	96.1	80 - 120	
Potassium, Total	31.3	31.1	99.7	80 - 120	
Sodium, Total	31.3	29.5	94.2	80 - 120	
Vanadium, Total	0.625	0.630	101	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 3459266
Report generated: 04/07/2014 16:17

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L14031621 Cal ID: ICP-THERMO2- 03-APR-14 Worknum:WG469838

Instrument ID:ICP-THERMO2 Contract #: Prep Method:3015

Parent ID:L14031621-07 File ID:T2.040314.233648 Dil:1 Method:6010B

Sample ID:L14031621-08 MS File ID:T2.040314.234022 Dil:1 Matrix:Water

Sample ID:L14031621-09 MSD File ID:T2.040314.234340 Dil:1 Units:mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum, Total	0.124	6.25	7.26	114	6.25	6.89	108	5.30	80 - 120	20	
Iron, Total	0.172	2.50	3.37	128	2.50	3.10	117	8.14	80 - 120	20	*
Potassium, Total	1.73	31.3	33.3	101	31.3	33.2	101	0.301	80 - 120	20	
Sodium, Total	5.26	31.3	34.9	94.8	31.3	34.6	93.9	0.824	80 - 120	20	
Vanadium, Total	U	0.625	0.618	98.9	0.625	0.633	101	2.35	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
PDF File ID: 3459267
Report generated 04/07/2014 16:29

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L14031621 Cal ID: ICP-THERMO2- 07-APR-14 Worknum:WG469838

Instrument ID:ICP-THERMO2 Contract #: Prep Method:3015

Parent ID:L14031621-07 File ID:T2.040714.154227 Dil:10 Method:6010B

Sample ID:L14031621-08 MS File ID:T2.040714.154602 Dil:10 Matrix:Water

Sample ID:L14031621-09 MSD File ID:T2.040714.154933 Dil:10 Units:mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Calcium, Total	92.4	6.25	93.8	22.5	6.25	97.6	83	3.95	80 - 120	20	*
Magnesium, Total	34.6	6.25	39.6	80.4	6.25	41.0	102	3.41	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
PDF File ID: 3459267
Report generated 04/07/2014 16:29

Microbac Laboratories Inc.

Serial Dilution Report

Login: L14031621 **Worknum:** WG469838

Instrument: ICP-THERMO2 **Method:** 6010B

Serial Dil: WG469838-02 **File ID:** T2.040314.231422 **Dil:** 5 **Units:** mg/L

Sample: L14031621-06 **File ID:** T2.040314.230731 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Aluminum	0.231	X	ND	U		
Calcium	18.8		19.2		2.50	
Iron	0.234	X	0.256	F	9.68	
Magnesium	6.05	X	6.14	X	1.43	
Potassium	0.590	F	ND	U		
Sodium	6.19	X	6.24	X	0.73	
Vanadium	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 50 times the MDL.
E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 50 times the MDL.

SERIAL_DIL - Modified 09/22/2008

PDF File ID: 3459261

04/07/2014 16:17

Microbac Laboratories Inc.

POST SPIKE REPORT

Sample Login ID: L14031621 **Worknum:** WG469838

Instrument ID: ICP-THERMO2 **Method:** 6010B

Post Spike ID: WG469838-01 **File ID:** T2.040314.231103 **Dil:** 1 **Units:** mg/L

Sample ID: L14031621-06 **File ID:** T2.040314.230731 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ALUMINUM	5.28		0.231		5	101.4	75 - 125	
CALCIUM	22.1		18.8		5	104.0	75 - 125	
IRON	2.23		0.234		2	100.7	75 - 125	
MAGNESIUM	10.2		6.05		5	96.1	75 - 125	
POTASSIUM	25.8		0.590	F	25	101.0	75 - 125	
SODIUM	30.3		6.19		25	98.8	75 - 125	
VANADIUM	0.510		0	U	.5	102.1	75 - 125	

N = % Recovery exceeds control limits
F = Result is between MDL and RL
U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 3459262
Report generated: 04/07/2014 16:17

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	L14031621	Workgroup (AAB#):	WG469838
Analytical Method:	6010B	Instrument ID:	ICP-THERMO2
ICAL Worknum:	WG469892	Initial Calibration Date:	03-APR-2014 09:11

	WG469892-01		WG469892-02		WG469892-03		WG469892-04		WG469892-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	0.000830	.1	0.00144	.2	0.00204	10	0.0717	20	0.140	.999948	
CALCIUM	0	-0.00289	.1	-0.000700	.2	0.00130	10	0.245	20	0.486	.999956	
IRON	0	0	.04	0.000530	.08	0.00108	4	0.0648	8	0.125	.999862	
MAGNESIUM	0	0.0000500	.1	0.000400	.2	0.000770	10	0.0434	20	0.0834	.999807	
POTASSIUM	0	-0.000810	.5	0.00438	1	0.00963	50	0.649	100	1.28	.999981	
SODIUM	0	-0.00168	.5	0.0157	1	0.0344	50	2.24	100	4.38	.999938	
VANADIUM	0	0.0000500	.01	0.00593	.02	0.0125	1	0.739	2	1.45	.999947	

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: 3459268
Report generated: 07-APR-2014 16:18

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	L14031621	Workgroup (AAB#):	WG469838
Analytical Method:	6010B	Instrument ID:	ICP-THERMO2
ICAL Worknum:	WG470310	Initial Calibration Date:	07-APR-2014 10:08

	WG470310-01		WG470310-02		WG470310-03		WG470310-04		WG470310-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	0.000870	.1	0.00153	.2	0.00223	10	0.0735	20	0.145	.9999	
CALCIUM	0	-0.00289	.1	-0.000660	.2	0.00142	10	0.254	20	0.508	.99998	
IRON	0	0.0000100	.04	0.000490	.08	0.00106	4	0.0653	8	0.130	.999989	
MAGNESIUM	0	0.000100	.1	0.000400	.2	0.000720	10	0.0437	20	0.0866	.999944	
POTASSIUM	0	-0.000150	.5	0.00463	1	0.0104	50	0.688	100	1.38	.999972	
SODIUM	0	-0.00279	.5	0.0134	1	0.0293	50	2.08	100	4.17	.999995	
VANADIUM	0	0.0000100	.01	0.00636	.02	0.0125	1	0.755	2	1.52	.999991	

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

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 3459268
Report generated: 07-APR-2014 16:18

Microbac Laboratories Inc.

INITIAL CALIBRATION BLANK (ICB)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-07

Instrument ID: ICP-THERMO2 Run Time: 09:18 Method: 6010B

File ID: T2.040314.091810 Analyst: QX Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-THERI - 03-APR-14

Matrix: WATER

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

U = Result is less than 2 x MDL

F = Result is between MDL and 2 x MDL

* = Result is above 2 x MDL

ICB - Modified 07/14/2009

PDF File ID: 3459270

Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

INITIAL CALIBRATION BLANK (ICB)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-07

Instrument ID: ICP-THERMO2 Run Time: 10:14 Method: 6010B

File ID: T2.040714.101450 Analyst: JYH Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-THERI - 07-APR-14

Matrix: WATER

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

U = Result is less than 2 x MDL

F = Result is between MDL and 2 x MDL

* = Result is above 2 x MDL

ICB - Modified 07/14/2009

PDF File ID: 3459270

Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-12

Instrument ID: ICP-THERMO2 Run Time: 09:35 Method: 6010B

File ID: T2.040314.093536 Analyst: QX Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-25

Instrument ID: ICP-THERMO2 Run Time: 14:09 Method: 6010B

File ID: T2.040314.140903 Analyst: QX Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-29

Instrument ID: ICP-THERMO2 Run Time: 14:22 Method: 6010B

File ID: T2.040314.142250 Analyst: QX Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-55

Instrument ID: ICP-THERMO2 Run Time: 22:39 Method: 6010B

File ID: T2.040314.223912 Analyst: QX Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-57

Instrument ID: ICP-THERMO2 Run Time: 23:21 Method: 6010B

File ID: T2.040314.232114 Analyst: QX Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG469892-59

Instrument ID: ICP-THERMO2 Run Time: 00:04 Method: 6010B

File ID: T2.040414.000441 Analyst: QX Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-11

Instrument ID: ICP-THERMO2 Run Time: 10:28 Method: 6010B

File ID: T2.040714.102835 Analyst: JYH Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-26

Instrument ID: ICP-THERMO2 Run Time: 14:57 Method: 6010B

File ID: T2.040714.145747 Analyst: JYH Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-28

Instrument ID: ICP-THERMO2 Run Time: 15:35 Method: 6010B

File ID: T2.040714.153513 Analyst: JYH Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-30

Instrument ID: ICP-THERMO2 Run Time: 15:56 Method: 6010B

File ID: T2.040714.155622 Analyst: JYH Units: mg/L

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14

Matrix: WATER QAPP: DOD4

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

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

CCB - Modified 03/05/2008
PDF File ID: 3459233
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-06
Instrument ID: ICP-THERMO2 Run Time: 09:14 Method: 6010B
File ID: T2.040314.091433 Analyst: QX Units: mg/L
Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Aluminum		10	10.2	102	90 - 110	
Calcium		10	10.2	102	90 - 110	
Iron		4	4.04	101	90 - 110	
Magnesium		10	10.2	102	90 - 110	
Potassium		50	50.4	101	90 - 110	
Sodium		50	49.3	98.6	90 - 110	
Vanadium		1	0.985	98.5	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 3459269
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-06
Instrument ID: ICP-THERMO2 Run Time: 10:11 Method: 6010B
File ID: T2.040714.101134 Analyst: JYH Units: mg/L
Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14
QC Key: DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Aluminum		10	9.94	99.4	90 - 110	
Calcium		10	9.98	99.8	90 - 110	
Iron		4	4.04	101	90 - 110	
Magnesium		10	10.1	101	90 - 110	
Potassium		50	49.9	99.8	90 - 110	
Sodium		50	50.2	100	90 - 110	
Vanadium		1	1.02	102	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 3459269
Report generated 04/07/2014 16:18

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-11

Instrument ID: ICP-THERMO2 Run Time: 09:32 Method: 6010B

File ID: T2.040314.093218 Analyst: QX QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.1	mg/L	101	90 - 110		
Calcium		10.0	9.99	mg/L	99.9	90 - 110		
Iron		4.00	3.95	mg/L	98.7	90 - 110		
Magnesium		10.0	9.94	mg/L	99.4	90 - 110		
Potassium		50.0	49.7	mg/L	99.4	90 - 110		
Sodium		50.0	48.7	mg/L	97.5	90 - 110		
Vanadium		1.00	0.986	mg/L	98.6	90 - 110		

* Exceeds LIMITS Criteria

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-24

Instrument ID: ICP-THERMO2 Run Time: 14:05 Method: 6010B

File ID: T2.040314.140547 Analyst: QX QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	9.93	mg/L	99.3	90 - 110		
Calcium		10.0	9.90	mg/L	99.0	90 - 110		
Iron		4.00	3.96	mg/L	99.1	90 - 110		
Magnesium		10.0	9.84	mg/L	98.4	90 - 110		
Potassium		50.0	49.5	mg/L	98.9	90 - 110		
Sodium		50.0	49.4	mg/L	98.7	90 - 110		
Vanadium		1.00	0.998	mg/L	99.8	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-28

Instrument ID: ICP-THERMO2 Run Time: 14:19 Method: 6010B

File ID: T2.040314.141934 Analyst: QX QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.0	mg/L	100	90 - 110		
Calcium		10.0	10.0	mg/L	100	90 - 110		
Iron		4.00	4.01	mg/L	100	90 - 110		
Magnesium		10.0	10.1	mg/L	101	90 - 110		
Potassium		50.0	50.2	mg/L	100	90 - 110		
Sodium		50.0	49.0	mg/L	98.0	90 - 110		
Vanadium		1.00	1.00	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

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Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-54

Instrument ID: ICP-THERMO2 Run Time: 22:35 Method: 6010B

File ID: T2.040314.223556 Analyst: QX QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.3	mg/L	103	90 - 110		
Calcium		10.0	10.3	mg/L	103	90 - 110		
Iron		4.00	4.09	mg/L	102	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Potassium		50.0	51.6	mg/L	103	90 - 110		
Sodium		50.0	50.5	mg/L	101	90 - 110		
Vanadium		1.00	1.04	mg/L	104	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 3459232

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Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/03/2014 Sample ID: WG469892-56

Instrument ID: ICP-THERMO2 Run Time: 23:17 Method: 6010B

File ID: T2.040314.231758 Analyst: QX QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Calcium		10.0	10.4	mg/L	104	90 - 110		
Iron		4.00	4.04	mg/L	101	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Potassium		50.0	52.1	mg/L	104	90 - 110		
Sodium		50.0	49.4	mg/L	98.7	90 - 110		
Vanadium		1.00	1.01	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 3459232

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Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG469892-58

Instrument ID: ICP-THERMO2 Run Time: 00:01 Method: 6010B

File ID: T2.040414.000126 Analyst: QX QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 03-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Calcium		10.0	10.4	mg/L	104	90 - 110		
Iron		4.00	4.05	mg/L	101	90 - 110		
Magnesium		10.0	10.2	mg/L	102	90 - 110		
Potassium		50.0	52.6	mg/L	105	90 - 110		
Sodium		50.0	49.2	mg/L	98.5	90 - 110		
Vanadium		1.00	1.04	mg/L	104	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-10

Instrument ID: ICP-THERMO2 Run Time: 10:25 Method: 6010B

File ID: T2.040714.102519 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	4.01	mg/L	100	90 - 110		
Magnesium		10.0	10.1	mg/L	101	90 - 110		
Potassium		50.0	50.4	mg/L	101	90 - 110		
Sodium		50.0	49.5	mg/L	99.0	90 - 110		
Vanadium		1.00	0.997	mg/L	99.7	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-25

Instrument ID: ICP-THERMO2 Run Time: 14:54 Method: 6010B

File ID: T2.040714.145430 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	3.97	mg/L	99.2	90 - 110		
Magnesium		10.0	9.95	mg/L	99.5	90 - 110		
Potassium		50.0	51.2	mg/L	102	90 - 110		
Sodium		50.0	51.1	mg/L	102	90 - 110		
Vanadium		1.00	0.986	mg/L	98.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-27

Instrument ID: ICP-THERMO2 Run Time: 15:31 Method: 6010B

File ID: T2.040714.153156 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.2	mg/L	102	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	3.99	mg/L	99.6	90 - 110		
Magnesium		10.0	9.93	mg/L	99.3	90 - 110		
Potassium		50.0	51.0	mg/L	102	90 - 110		
Sodium		50.0	51.5	mg/L	103	90 - 110		
Vanadium		1.00	1.00	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

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CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/07/2014 Sample ID: WG470310-29

Instrument ID: ICP-THERMO2 Run Time: 15:53 Method: 6010B

File ID: T2.040714.155305 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469838 Cal ID: ICP-TH - 07-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	9.74	mg/L	97.4	90 - 110		
Calcium		10.0	9.79	mg/L	97.9	90 - 110		
Iron		4.00	3.86	mg/L	96.6	90 - 110		
Magnesium		10.0	9.55	mg/L	95.5	90 - 110		
Potassium		50.0	49.6	mg/L	99.2	90 - 110		
Sodium		50.0	50.2	mg/L	100	90 - 110		
Vanadium		1.00	0.976	mg/L	97.6	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

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Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L14031621 **Workgroup (AAB#):** WG469838
Instrument ID: ICP-THERMO2 **Method:** 6010B
Sol. A : WG469892-09 **File ID:** T2.040314.092520 **Units:** mg/L
Sol. AB : WG469892-10 **File ID:** T2.040314.092853 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Aluminum	250	251	100	250	254	102	
Calcium	250	251	100	250	252	101	
Iron	100	97.7	97.7	100	98.0	98.0	
Magnesium	250	250	100	250	253	101	
Potassium	NS	0.0258	NS	5.00	5.18	104	
Sodium	NS	0.0227	NS	5.00	5.00	100	
Vanadium	NS	0.000810	NS	0.250	0.249	99.6	

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

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Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L14031621 **Workgroup (AAB#):** WG469838
Instrument ID: ICP-THERMO2 **Method:** 6010B
Sol. A : WG469892-26 **File ID:** T2.040314.141240 **Units:** mg/L
Sol. AB : WG469892-27 **File ID:** T2.040314.141609 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Aluminum	250	245	98.0	250	249	99.6	
Calcium	250	244	97.6	250	249	99.6	
Iron	100	93.6	93.6	100	95.1	95.1	
Magnesium	250	241	96.4	250	245	98.0	
Potassium	NS	0.0516	NS	5.00	5.23	105	
Sodium	NS	0.0199	NS	5.00	5.25	105	
Vanadium	NS	0.00111	NS	0.250	0.249	99.6	

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

ICS - Modified 03/06/2008
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Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L14031621 **Workgroup (AAB#):** WG469838
Instrument ID: ICP-THERMO2 **Method:** 6010B
Sol. A : WG470310-08 **File ID:** T2.040714.101825 **Units:** mg/L
Sol. AB : WG470310-09 **File ID:** T2.040714.102154 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Aluminum	250	253	101	250	254	102	
Calcium	250	252	101	250	253	101	
Iron	100	98.2	98.2	100	98.0	98.0	
Magnesium	250	253	101	250	253	101	
Potassium	NS	-0.0613	NS	5.00	5.02	100	
Sodium	NS	0.0337	NS	5.00	4.90	98.0	
Vanadium	NS	0.00116	NS	0.250	0.247	98.8	

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

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INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L14031621 **Date:** 01/02/2014

Insturment ID: ICP-THERMO2 **Method:** 6010B

Analyte	Wave Length	AL	AS	B	BA	BE
ALUMINUM	308.20	0	0	0	0	0
ANTIMONY	206.80	0.00000200	0	0	0	0
ARSENIC	189.00	0	0	0	0	0
BARIUM	455.40	-0.00000100	0	0	0	0
BERYLLIUM	313.00	0	0	0	0	0
BORON	249.70	0	0	0	0	0
CADMIUM	228.80	0	0.00756	0	-0.0000140	0
CALCIUM	422.70	0	0	0	0	0
CHROMIUM	267.70	0	-0.000660	0	0	0
COBALT	228.60	0	0	0	0	0
COPPER	224.70	0	0	0	0	0
IRON	261.20	0	0	0	0	0
LEAD	220.30	0.000234	0	0	0	0
LITHIUM	670.80	0	0	0	0	0
MAGNESIUM	279.10	0	0	0	0	0
MANGANESE	257.60	0	0	0	0	0
MOLYBDENUM	202.03	0	0	0	0	0
NICKEL	231.60	0	0	0	0	0
PHOSPHORUS	214.90	-0.000690	0	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	-0.0000120	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	0	0	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.80	0	0	0	0	0
THALLIUM	190.80	-0.0000120	0	0	0	0
TIN	189.90	0	0	0	0	0
TITANIUM	337.30	0	0	0	0	0
VANADIUM	292.40	0	0	0	0	0
ZINC	206.20	0.00000100	0	0	0	0
ZIRCONIUM	339.20	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 3459227
Report generated: 04/07/2014 16:18

Microbac Laboratories Inc.

INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L14031621 **Date:** 01/02/2014

Insturment ID: ICP-THERMO2 **Method:** 6010B

Analyte	Wave Length	CA	CD	CO	CR	CU
ALUMINUM	308.20	0	0	-0.000820	0	0
ANTIMONY	206.80	0	0	0	0.00950	0
ARSENIC	189.00	0	0	0	-0.00220	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.00	0	0	0	0	0
BORON	249.70	0	0	0.00343	0	0
CADMIUM	228.80	0	0	-0.00247	0	0
CALCIUM	422.70	0	0	0	0	0
CHROMIUM	267.70	0	0	-0.000160	0	0
COBALT	228.60	0	0	0	-0.000108	0
COPPER	224.70	0	0	0.0000770	0	0
IRON	261.20	-0.000120	-0.00000600	0	-0.0000460	-0.0000290
LEAD	220.30	0	0	-0.0000930	-0.000172	0.000809
LITHIUM	670.80	0	0	0	0	0
MAGNESIUM	279.10	0	0	0	0	0
MANGANESE	257.60	0	0	0	-0.0000910	0
MOLYBDENUM	202.03	0	0	0	0	0
NICKEL	231.60	0	0	0.000100	0	0
PHOSPHORUS	214.90	0	0	0	0	0.00200
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	0	0	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.80	0.0000310	0	0	0	0
THALLIUM	190.80	0	0	0.00397	0.000276	0
TIN	189.90	0	0	0	0	0
TITANIUM	337.30	0	0	0	0	0
VANADIUM	292.40	0	0	0	0	0
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.20	0	0	0	0	0

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INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L14031621 **Date:** 01/02/2014

Insturment ID: ICP-THERMO2 **Method:** 6010B

Analyte	Wave Length	FE	LI	MG	MN	MO
ALUMINUM	308.20	0	0	0	0	0.0153
ANTIMONY	206.80	0.0000560	0	0	0	0.000670
ARSENIC	189.00	-0.0000190	0	0	0	0.0000100
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.00	0	0	0	0	0
BORON	249.70	-0.000259	0	0	0	-0.00169
CADMIUM	228.80	0.00000900	0	0	0	0.0000220
CALCIUM	422.70	0	0	0	0	0
CHROMIUM	267.70	0.0000220	0	0	0.000160	0
COBALT	228.60	0	0	0	0	0.00300
COPPER	224.70	0.000519	0	0	0	0.00260
IRON	261.20	0	0	0	0	0
LEAD	220.30	0	0	0	0	-0.00110
LITHIUM	670.80	0	0	0	0	0
MAGNESIUM	279.10	0	0	0	-0.00190	-0.0110
MANGANESE	257.60	0	0	0.00000700	0	-0.0000720
MOLYBDENUM	202.03	0	0	0	0	0
NICKEL	231.60	0.0000320	0	0	0	0
PHOSPHORUS	214.90	0.00120	0	0	0	0.00800
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	0	0	0	0	0.000156
SILICON	212.40	0	0	0	0	0.0187
SILVER	328.00	0	0	0	0	-0.0000440
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.80	0	0	0	0	0
THALLIUM	190.80	0	0	0	0	0
TIN	189.90	0	0	0	0	0
TITANIUM	337.30	0	0	0	0	-0.000153
VANADIUM	292.40	-0.00000200	0	0	0	-0.00600
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.20	-0.0000300	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 3459227
Report generated: 04/07/2014 16:18

Microbac Laboratories Inc.

INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L14031621 **Date:** 01/02/2014

Insturment ID: ICP-THERMO2 **Method:** 6010B

Analyte	Wave Length	NA	NI	PB	SB	SN
ALUMINUM	308.20	0	0	0	0	0
ANTIMONY	206.80	0	0	0	0	-0.00840
ARSENIC	189.00	0	0	0	0	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.00	0	0	0	0	0
BORON	249.70	0	0	0	0	0
CADMIUM	228.80	0	-0.000180	0	0	0
CALCIUM	422.70	0	0	0	0	0
CHROMIUM	267.70	0	0	0	0	0
COBALT	228.60	0	0.000420	0	0	0
COPPER	224.70	0	-0.00402	0.00173	0	0
IRON	261.20	0	0	0	0	0
LEAD	220.30	0	0.000110	0	0	0
LITHIUM	670.80	0	0	0	0	0
MAGNESIUM	279.10	0	0	0	0	0
MANGANESE	257.60	0	0	0	0	0
MOLYBDENUM	202.03	0	0	0	0	0
NICKEL	231.60	0	0	0	0	0
PHOSPHORUS	214.90	0	0	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	0	0	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.80	0	0	0	0	0
THALLIUM	190.80	0	0	0	0	0
TIN	189.90	0	0	0	0	0
TITANIUM	337.30	0	0	0	0	0
VANADIUM	292.40	0	0	0	0	0
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.20	0	0	0	0	0

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INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L14031621 **Date:** 01/02/2014

Insturment ID: ICP-THERMO2 **Method:** 6010B

Analyte	Wave Length	SR	TI	TL	V	ZN
ALUMINUM	308.20	0	0	0	0.00300	0
ANTIMONY	206.80	0	-0.000990	0	-0.00120	0
ARSENIC	189.00	0	0	0	0.000107	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.00	0	-0.00160	0	0.000170	0
BORON	249.70	0	0	0	0	0
CADMIUM	228.80	0	0	0	0.0000820	0
CALCIUM	422.70	0	0	0	0	0
CHROMIUM	267.70	0	0.0000550	0	-0.000120	-0.000740
COBALT	228.60	0	0.00200	-0.00120	0.0000200	0
COPPER	224.70	0	0.000460	0	0	0
IRON	261.20	0	0	0	0	0
LEAD	220.30	0	0	0	-0.000126	0
LITHIUM	670.80	0	0	0	0	0
MAGNESIUM	279.10	0	-0.00290	0	0	0
MANGANESE	257.60	0	0	0	-0.00000600	0
MOLYBDENUM	202.03	0	0	0	-0.000110	0
NICKEL	231.60	0	0	0	0	0
PHOSPHORUS	214.90	0	0	0	-0.00500	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	0	0	0	0	0
SILICON	212.40	0	0	0	0	0
SILVER	328.00	0	-0.00620	0	-0.00617	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	407.80	0	0	0	0	0
THALLIUM	190.80	0	-0.00120	0	-0.00540	0
TIN	189.90	0	-0.00220	0	0	0
TITANIUM	337.30	0	0	0	0.000200	0
VANADIUM	292.40	0	0.00104	0	0	0
ZINC	206.20	0	0	0	0	0
ZIRCONIUM	339.20	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 3459227
Report generated: 04/07/2014 16:18

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L14031621 **Date:** 01/02/2014
Insturment ID: ICP-THERMO2 **Method:** 6010B

Analyte	Wave Length	ZR
ALUMINUM	308.20	0
ANTIMONY	206.80	0
ARSENIC	189.00	0
BARIUM	455.40	0
BERYLLIUM	313.00	0
BORON	249.70	0
CADMIUM	228.80	0
CALCIUM	422.70	0
CHROMIUM	267.70	0
COBALT	228.60	0
COPPER	224.70	0
IRON	261.20	0
LEAD	220.30	0
LITHIUM	670.80	0
MAGNESIUM	279.10	0
MANGANESE	257.60	0
MOLYBDENUM	202.03	0
NICKEL	231.60	0
PHOSPHORUS	214.90	0.00200
POTASSIUM	766.40	0
SELENIUM	196.00	0
SILICON	212.40	0
SILVER	328.00	0
SODIUM	589.50	0
STRONTIUM	407.80	0
THALLIUM	190.80	0
TIN	189.90	0
TITANIUM	337.30	0
VANADIUM	292.40	
ZINC	206.20	0
ZIRCONIUM	339.20	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 3459227
Report generated: 04/07/2014 16:18

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L14031621 **Date:** 01/07/2014
Insturment ID: ICP-THERMO2 **Method:** 6010B

Analyte	Integration Time (Sec.)	Concentration (mg/L)
Antimony	10.00	90.0
Arsenic	10.00	90.0
Boron	10.00	90.0
Cadmium	10.00	9.0
Cobalt	10.00	9.0
Copper	10.00	180.0
Magnesium	15.00	900.0
Molybdenum	10.00	9.0
Phosphorus	10.00	810.0
Potassium	10.00	360.0
Selenium	10.00	90.0
Silicon	10.00	81.0
Sodium	10.00	360.0
Strontium	10.00	4.5
Thallium	10.00	9.0
Tin	10.00	90.0
Titanium	15.00	90.0
Vanadium	10.00	90.0
Zinc	10.00	45.0
Zirconium	10.00	36.0

LINEAR_RANGE - Modified 03/06/2008
PDF File ID: 3459226
Report generated: 04/07/2014 16:18

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L14031621 **Date:** 01/22/2014
Insturment ID: ICP-THERMO2 **Method:** 6010B

Analyte	Integration Time (Sec.)	Concentration (mg/L)
Aluminum	10.00	810.0
Barium	10.00	81.0
Beryllium	15.00	9.0
Calcium	10.00	900.0
Chromium	10.00	45.0
Iron	5.00	900.0
Lead	10.00	225.0
Lithium	10.00	90.0
Manganese	15.00	27.0
Nickel	10.00	90.0
Silver	5.00	9.0

Comments:
All analytes passed acceptance criteria at the specified concentration.

LINEAR_RANGE - Modified 03/06/2008
PDF File ID: 3459226
Report generated: 04/07/2014 16:18

Login Number: L14031621
Department: Metals
Analyst: Ji Hu

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6020

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration: WG469374 - Due to continuing calibration verification internal standard failure for germanium on 04-Apr-2014 at 12:34, client sample 04 was reanalyzed later in the analytical sequence for arsenic, cobalt, manganese and selenium.

Continuing Calibration Blank: All acceptance criteria were met.

Low Level Check: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG469374 - All acceptance criteria were met.

Matrix Spikes: WG469374 - Sample 07 was chosen by the client for MS/MSD analysis. Samples 08(MS) and 09(MSD) met all acceptance criteria.

SAMPLES

Samples: WG469374 - Due to internal standard failure for germanium on 04-Apr-2014 at 12:21, client sample 03 was reanalyzed later in the analytical sequence for arsenic, cobalt, manganese and selenium.

Narrative ID: 80746
Approved By: Sheri Pfalzgraf

Microbac Laboratories Inc.

METHOD BLANK SUMMARY

Login Number: L14031621
Work Group: WG469374
Blank File ID: NI.040414.110519
Blank Sample ID: WG469188-03
Prep Date: 03/31/14 09:29
Instrument ID: ICP-MS2
Analyzed Date: 04/04/14 11:05
Method: 6020
Analyst: JYH

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
FLT_BLK	WG469188-05	NI.040414.110821	04/04/14 11:08	01
LCS	WG469188-04	NI.040414.111123	04/04/14 11:11	01
LFMW01GW32714	L14031621-07	NI.040414.113240	04/04/14 11:32	01
LFMW01MSGW32714	L14031621-08	NI.040414.113542	04/04/14 11:35	01
LFMW01MSDGW32714	L14031621-09	NI.040414.113844	04/04/14 11:38	01
40MW7GW32714	L14031621-01	NI.040414.114146	04/04/14 11:41	01
40EQR32714	L14031621-02	NI.040414.114448	04/04/14 11:44	01
DUP	WG469188-08	NI.040414.121207	04/04/14 12:12	01
40FB32714	L14031621-03	NI.040414.121810	04/04/14 12:18	01
40MW5GW32714	L14031621-04	NI.040414.122113	04/04/14 12:21	01
40FB32714	L14031621-03	NI.040414.134019	04/04/14 13:40	02
40MW5GW32714	L14031621-04	NI.040414.134330	04/04/14 13:43	02
40DUPGW32714	L14031621-05	NI.040414.134631	04/04/14 13:46	01
40MW6GW32714	L14031621-06	NI.040414.134953	04/04/14 13:49	01

Report Name: BLANK_SUMMARY
PDF File ID: 3459709
Report generated 04/04/2014 14:46

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L14031621 Prep Date:03/31/14 09:29 Sample ID:WG469188-03
Instrument ID:ICP-MS2 Run Date:04/04/14 11:05 Prep Method:3015
File ID:NI.040414.110519 Analyst:JYH Method:6020
Workgroup (AAB#):WG469374 Matrix:Water Units:mg/L
Contract #: Cal ID:ICP-MS-04-APR-14

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
Arsenic, Total	0.000500	0.00100	0.000500	1	U
Barium, Total	0.00150	0.00300	0.00150	1	U
Cobalt, Total	0.000500	0.00100	0.000500	1	U
Lead, Total	0.000500	0.00100	0.000500	1	U
Manganese, Total	0.00100	0.00200	0.00100	1	U
Selenium, Total	0.000500	0.00100	0.000500	1	U

LOD 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: 3459710
04-APR-2014 14:46

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG469188-04
Instrument ID: ICP-MS2 Run Time: 11:11 Prep Method: 3015
File ID: NI.040414.111123 Analyst: JYH Method: 6020
Workgroup (AAB#): WG469374 Matrix: Water Units: mg/L
QC Key: DOD4 Lot#: STD62325 Cal ID: ICP-MS - 04-APR-14

Analytes	Expected	Found	% Rec	LCS Limits	Q
Arsenic, Total	0.0625	0.0607	97.1	80 - 120	
Barium, Total	0.0625	0.0587	94.0	80 - 120	
Cobalt, Total	0.0625	0.0611	97.7	80 - 120	
Lead, Total	0.0625	0.0614	98.2	80 - 120	
Manganese, Total	0.0625	0.0612	97.9	80 - 120	
Selenium, Total	0.0625	0.0610	97.5	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 3459711
Report generated: 04/04/2014 14:46

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L14031621 Cal ID:ICP-MS2- 04-APR-14 Worknum:WG469374

Instrument ID:ICP-MS2 Contract #: Prep Method:3015

Parent ID:L14031621-07 File ID:NI.040414.113240 Dil:1 Method:6020

Sample ID:L14031621-08 MS File ID:NI.040414.113542 Dil:1 Matrix:Water

Sample ID:L14031621-09 MSD File ID:NI.040414.113844 Dil:1 Units:mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Arsenic, Total	U	0.0625	0.0617	98.7	0.0625	0.0629	101	1.93	80 - 120	20	
Barium, Total	0.0698	0.0625	0.124	86.3	0.0625	0.124	86.8	0.252	80 - 120	20	
Cobalt, Total	U	0.0625	0.0620	99.2	0.0625	0.0623	99.6	0.378	80 - 120	20	
Lead, Total	U	0.0625	0.0628	100	0.0625	0.0626	100	0.356	80 - 120	20	
Manganese, Total	0.00275	0.0625	0.0683	105	0.0625	0.0671	103	1.81	80 - 120	20	
Selenium, Total	0.00149	0.0625	0.0610	95.2	0.0625	0.0627	98	2.81	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
PDF File ID: 3459713
Report generated 04/04/2014 14:46

Microbac Laboratories Inc.

Serial Dilution Report

Login: L14031621 **Worknum:** WG469374

Instrument: ICP-MS2 **Method:** 6020

Serial Dil: WG469374-02 **File ID:** NI.040414.141210 **Dil:** 5 **Units:** ug/L

Sample: L14031621-06 **File ID:** NI.040414.134953 **Dil:** 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Arsenic	ND	U	ND	U		
Barium	5.06	X	5.66	F	11.80	
Cobalt	ND	U	ND	U		
Lead	ND	U	ND	U		
Manganese	0.665	F	ND	U		
Selenium	ND	U	ND	U		

U = Result is below MDL.

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

X = Result is greater than or equal to RL and less than 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: 3459705

04/04/2014 14:46

Microbac Laboratories Inc.

POST SPIKE REPORT

Sample Login ID: L14031621 **Worknum:** WG469374

Instrument ID: ICP-MS2 **Method:** 6020

Post Spike ID: WG469374-01 **File ID:** NI.040414.140908 **Dil:** 1 **Units:** ug/L

Sample ID: L14031621-06 **File ID:** NI.040414.134953 **Dil:** 1 **Matrix:** Water

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ARSENIC	50.2		0	U	50	100.4	75 - 125	
BARIUM	54.7		5.06		50	99.3	75 - 125	
COBALT	52.3		0	U	50	104.6	75 - 125	
LEAD	51.2		0	U	50	102.4	75 - 125	
MANGANESE	52.3		0.665	F	50	103.3	75 - 125	
SELENIUM	48.9		0	U	50	97.8	75 - 125	

N = % Recovery exceeds control limits
F = Result is between MDL and RL
U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 3459707
Report generated: 04/04/2014 14:46

Microbac Laboratories Inc.
Initial Calibration Summary

Login:	L14031621	Workgroup (AAB#):	WG469374
Analytical Method:	6020	Instrument ID:	ICP-MS2
ICAL Worknum:	WG470000	Initial Calibration Date:	04-APR-2014 10:40

	WG470000-01		WG470000-02		WG470000-03		WG470000-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ARSENIC	0	-22.9	.4	68.4	50	90400	100	176000	1	
BARIUM	0	11.7	.4	179	50	147000	100	285000	.999968	
COBALT	0	349	.4	822	50	422000	100	804000	.99995	
LEAD	0	796	.4	2320	50	1440000	100	2770000	.999977	
MANGANESE	0	1200	.4	1940	50	582000	100	1110000	.999963	
SELENIUM	0	26.1	.4	31.5	50	9870	100	19100	.999997	

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

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 3459718
Report generated: 04-APR-2014 14:47

Microbac Laboratories Inc.

INITIAL CALIBRATION BLANK (ICB)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-06

Instrument ID: ICP-MS2 Run Time: 10:47 Method: 6020

File ID: NI.040414.104704 Analyst: JYH Units: ug/L

Workgroup (AAB#): WG469374 Cal ID: ICP-MS2 - 04-APR-14

Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ARSENIC	.2	.4	.2	U
BARIUM	.6	1.2	.6	U
COBALT	.2	.4	.2	U
MANGANESE	.4	.8	.4	U
LEAD	.2	.4	.2	U
SELENIUM	.2	.4	.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: 3459720

Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-11

Instrument ID: ICP-MS2 Run Time: 11:02 Method: 6020

File ID: NI.040414.110217 Analyst: JYH Units: ug/L

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

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

CCB - Modified 03/05/2008
PDF File ID: 3459723
Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-13

Instrument ID: ICP-MS2 Run Time: 11:29 Method: 6020

File ID: NI.040414.112937 Analyst: JYH Units: ug/L

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

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

CCB - Modified 03/05/2008
PDF File ID: 3459723
Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-15

Instrument ID: ICP-MS2 Run Time: 11:59 Method: 6020

File ID: NI.040414.115958 Analyst: JYH Units: ug/L

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

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

CCB - Modified 03/05/2008
PDF File ID: 3459723
Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-17

Instrument ID: ICP-MS2 Run Time: 12:37 Method: 6020

File ID: NI.040414.123757 Analyst: JYH Units: ug/L

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

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

CCB - Modified 03/05/2008
PDF File ID: 3459723
Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-20

Instrument ID: ICP-MS2 Run Time: 13:21 Method: 6020

File ID: NI.040414.132105 Analyst: JYH Units: ug/L

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

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

CCB - Modified 03/05/2008
PDF File ID: 3459723
Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-22

Instrument ID: ICP-MS2 Run Time: 14:18 Method: 6020

File ID: NI.040414.141816 Analyst: JYH Units: ug/L

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

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

CCB - Modified 03/05/2008
PDF File ID: 3459723
Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number:L14031621 Run Date:04/04/2014 Sample ID:WG470000-05
Instrument ID:ICP-MS2 Run Time:10:44 Method:6020
File ID:NI.040414.104400 Analyst:JYH Units:ug/L
Workgroup (AAB#):WG469374 Cal ID:ICP-MS - 04-APR-14
QC Key:DOD4

Analyte		Expected	Found	%REC	LIMITS	Q
Arsenic		50	49.6	99.2	90 - 110	
Barium		50	50.0	100	90 - 110	
Cobalt		50	50.2	100	90 - 110	
Lead		50	50.4	101	90 - 110	
Manganese		50	50.5	101	90 - 110	
Selenium		50	50.3	101	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 3459719
Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-10

Instrument ID: ICP-MS2 Run Time: 10:59 Method: 6020

File ID: NI.040414.105915 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0495	mg/L	98.9	90 - 110		
Barium		0.0500	0.0489	mg/L	97.9	90 - 110		
Cobalt		0.0500	0.0502	mg/L	100	90 - 110		
Lead		0.0500	0.0502	mg/L	100	90 - 110		
Manganese		0.0500	0.0500	mg/L	99.9	90 - 110		
Selenium		0.0500	0.0497	mg/L	99.3	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 3459722

Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-12

Instrument ID: ICP-MS2 Run Time: 11:26 Method: 6020

File ID: NI.040414.112635 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0503	mg/L	101	90 - 110		
Barium		0.0500	0.0492	mg/L	98.3	90 - 110		
Cobalt		0.0500	0.0514	mg/L	103	90 - 110		
Lead		0.0500	0.0506	mg/L	101	90 - 110		
Manganese		0.0500	0.0511	mg/L	102	90 - 110		
Selenium		0.0500	0.0507	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 3459722

Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-14

Instrument ID: ICP-MS2 Run Time: 11:56 Method: 6020

File ID: NI.040414.115657 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0495	mg/L	99.1	90 - 110		
Barium		0.0500	0.0496	mg/L	99.2	90 - 110		
Cobalt		0.0500	0.0509	mg/L	102	90 - 110		
Lead		0.0500	0.0497	mg/L	99.5	90 - 110		
Manganese		0.0500	0.0512	mg/L	102	90 - 110		
Selenium		0.0500	0.0502	mg/L	100	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 3459722

Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-16

Instrument ID: ICP-MS2 Run Time: 12:34 Method: 6020

File ID: NI.040414.123455 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0486	mg/L	97.2	90 - 110		
Barium		0.0500	0.0474	mg/L	94.7	90 - 110		
Cobalt		0.0500	0.0478	mg/L	95.6	90 - 110		
Lead		0.0500	0.0510	mg/L	102	90 - 110		
Manganese		0.0500	0.0468	mg/L	93.6	90 - 110		
Selenium		0.0500	0.0487	mg/L	97.3	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 3459722

Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-19

Instrument ID: ICP-MS2 Run Time: 13:18 Method: 6020

File ID: NI.040414.131803 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0505	mg/L	101	90 - 110		
Barium		0.0500	0.0480	mg/L	96.0	90 - 110		
Cobalt		0.0500	0.0480	mg/L	96.0	90 - 110		
Lead		0.0500	0.0514	mg/L	103	90 - 110		
Manganese		0.0500	0.0469	mg/L	93.8	90 - 110		
Selenium		0.0500	0.0507	mg/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 3459722

Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L14031621 Run Date: 04/04/2014 Sample ID: WG470000-21

Instrument ID: ICP-MS2 Run Time: 14:15 Method: 6020

File ID: NI.040414.141514 Analyst: JYH QC Key: DOD4

Workgroup (AAB#): WG469374 Cal ID: ICP-MS - 04-APR-14

Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		0.0500	0.0499	mg/L	99.8	90 - 110		
Barium		0.0500	0.0496	mg/L	99.1	90 - 110		
Cobalt		0.0500	0.0501	mg/L	100	90 - 110		
Lead		0.0500	0.0504	mg/L	101	90 - 110		
Manganese		0.0500	0.0493	mg/L	98.7	90 - 110		
Selenium		0.0500	0.0508	mg/L	102	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008

PDF File ID: 3459722

Report generated 04/04/2014 14:47

Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L14031621 **Workgroup (AAB#):** WG469374
Instrument ID: ICP-MS2 **Method:** 6020
Sol. A : WG470000-08 **File ID:** NI.040414.105309 **Units:** ug/L
Sol. AB : WG470000-09 **File ID:** NI.040414.105611 **Matrix:** Water

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Arsenic	NS	-0.0319	NS	100	98.9	98.9	
Barium	NS	0.0262	NS	100	97.7	97.7	
Cobalt	NS	0.00510	NS	100	98.6	98.6	
Lead	NS	0.0445	NS	100	99.1	99.1	
Manganese	NS	0.118	NS	100	96.8	96.8	
Selenium	NS	-0.00230	NS	100	99.2	99.2	

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: 3459721
Report generated 04/04/2014 14:47

Microbac Laboratories Inc.

INTERNAL STANDARD REPORT

Login: L14031621 **Analytical Method:** 6020
Analytical Workgroup: WG469374 **Matrix:** 1
Instrument: ICP-MS2 **Analyst:** JYH
ICAL Date: 04-APR-2014 10:31

			BISMUTH	GERMANIUM	INDIUM
Sample	Type	Run Date	% Rec	% Rec	% Rec
L14031621-01	SAMP	04-APR-2014 11:41	100.807	115.011	106.067
L14031621-02	SAMP	04-APR-2014 11:44	105.091	118.447	110.613
L14031621-03	SAMP	04-APR-2014 12:18	103.324	109.669	96.039
L14031621-03	SAMP	04-APR-2014 13:40	102.351	115.388	104.256
L14031621-04	SAMP	04-APR-2014 12:21	110.799	**121.639**	105.461
L14031621-04	SAMP	04-APR-2014 13:43	99.891	111.775	101.7
L14031621-05	SAMP	04-APR-2014 13:46	97.023	102.673	94.747
L14031621-06	SAMP	04-APR-2014 13:49	96.875	101.735	94.068
L14031621-07	SAMP	04-APR-2014 11:32	98.648	110.383	103.453
L14031621-08	SAMP	04-APR-2014 11:35	96.867	107.968	102.254
L14031621-09	SAMP	04-APR-2014 11:38	100.553	111.1	105.532
WG469188-03	BLANK	04-APR-2014 11:05	92.503	96.616	95.475
WG469188-04	LCS	04-APR-2014 11:11	107.274	116.381	112.305
WG469188-05	FLT_BLK	04-APR-2014 11:08	93.018	96.326	94.884
WG469374-01	PSPK	04-APR-2014 14:09	95.221	101.367	99.825
WG469374-02	SERIAL	04-APR-2014 14:12	81.412	79.911	81.66
WG470000-05	ICV	04-APR-2014 10:44	100.87	102.979	101.67
WG470000-06	ICB	04-APR-2014 10:47	101.542	103.156	102.312
WG470000-07	LLICV	04-APR-2014 10:50	100.668	104.682	102.569
WG470000-08	ICS	04-APR-2014 10:53	95.04	95.147	94.064
WG470000-09	ICS	04-APR-2014 10:56	105.323	112.521	106.446
WG470000-10	CCV	04-APR-2014 10:59	106.546	114.118	108.62
WG470000-11	CCB	04-APR-2014 11:02	105.745	114.236	108.741
WG470000-12	CCV	04-APR-2014 11:26	105.91	115.449	111.215
WG470000-13	CCB	04-APR-2014 11:29	97.54	108.193	102.241
WG470000-14	CCV	04-APR-2014 11:56	105.437	118.492	110.337
WG470000-15	CCB	04-APR-2014 11:59	105.303	118.506	110.129
WG470000-16	CCV	04-APR-2014 12:34	109.789	**123.054**	108.327
WG470000-17	CCB	04-APR-2014 12:37	99.863	105.186	95.31
WG470000-18	LLCCV	04-APR-2014 12:41	104.855	112.461	102.356
WG470000-19	CCV	04-APR-2014 13:18	95.265	101.538	93.646
WG470000-20	CCB	04-APR-2014 13:21	89.32	93.537	85.395
WG470000-21	CCV	04-APR-2014 14:15	90.773	97.263	94.57
WG470000-22	CCB	04-APR-2014 14:18	87.728	92.298	90.296
WG470000-23	LLCCV	04-APR-2014 14:21	88.099	93.408	92.872
WG470000-24	ICS	04-APR-2014 14:25	83.356	84.335	82.626
WG470000-25	ICS	04-APR-2014 14:28	93.274	101.328	95.338
WG470000-26	CCV	04-APR-2014 14:31	93.325	102.721	97.73
WG470000-27	CCB	04-APR-2014 14:34	90.178	97.541	93.043

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: 3459717
Report generated: 04/04/2014 14:47

Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L14031621 **Date:** 01/03/2014
Insturment ID: ICP-MS2 **Method:** 6020

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: 3459716
Report generated: 04/04/2014 14:46

Kemron–Radford Army Ammunition Plant Data Validation Summary Worksheet

SDG#: L14031621	Laboratory: Microbac	Validator: Jeanne Peterson	Validation Start Date: 04/24/2014
Site: Radford	AR/COC#: A5625		Validation Level: ☐ III ☒ IV
Matrix: Water	# of Samples: 8	Tracking docs present: See sample receipt and log-in documentation	
COCs present: yes	COCs signed: yes	COCs dated: yes	Sample Container Integrity: OK

Analyses:
☒ VOCs ☐ SVOCs ☒ PAHs ☐ GRO ☐ DRO ☐ Pests ☐ PCBs ☐ Metals ☐ Gen Chem
☒ Other: CLO4

Requested Analyses Not Reported

Client Sample ID	Lab Sample ID	Analysis	Comments
None			

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
None								

Comments: Colleted 03/27/2014

Collection time not documented on VOC containers for EB and FB. Logged in per COC.

Date received for TB different than samples; however, the TB should travel with the samples in the same cooler.

Kemron–Radford Army Ammunition Plant Organic Worksheet (GCMS)

SDG: L14031621	Method: 8260	Matrix: Water	Level III Lab Sample IDs: NA
Batch #s: WG469134			Level IV Lab Sample IDs: L14031621-001 thru -007, -08MS, -09MSD, -010

Tuning: ☒ Pass ☐ Fail TICs Required? ☐ Yes ☒ No (*EPA Region III Limits*[1])

Analyte (outliers)	Calibration				Method Blank	5X (10X) Method Blank	LCS %R	MS %R (-08)	MSD %R (-09)	MS/D RPD	TB (-10)	FB (-03)	EQR (-02)	
	RF *≥0.05*	RSD/r *≤30% ≥0.995*	ICV %D *±25%*	CCV %D *±25%*										
Acetone	0.0305	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓	

(Limits[1]*: 1,2-DCA-d4 76-114%)* **Surrogate Recovery Outliers** *(BFB 86-115% Tol-d8 88-110%)*

Sample ID	1,2-DCA-d4	DBFM	BFB	Tol-d8	Sample ID	1,2-DCA-d4	DBFM	BFB	Tol-d8
None									

IS Outliers *(-50% to +100% of CCV)*

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: Samples unpreserved; analyzed within HT for unpreserved samples; OK.
Acetone and 2-CEVE only.
Lab used midpoint std for IS summary; DV uses CCV; both OK.

[1]Derived laboratory limits used for compounds not listed.

Revised 12/2010

Kemron–Radford Army Ammunition Plant Organic Worksheet (GCMS)

SDG: L14031621	Method: 8270C SIM	Matrix: Water	Level III Lab Sample IDs: NA
Batch #s: WG469379			Level IV Lab Sample IDs: L14031621-001 thru -007, -08MS, -09MSD

Tuning: ☒ Pass ☐ Fail TICs Required? ☐ Yes ☒ No (*EPA Region III Limits*[1])

Analyte (outliers)	Calibration				Method Blank	5X (10X) Method Blank	LCS/D %R	MS %R (-08)	MSD %R (-09)	MS/D RPD	FB (-03)	FB X5	EQR (-02)	EQR X5
	RF *≥0.05*	RSD/r *≤30% ≥0.995*	ICV %D *±25%*	CCV %D *±25%*										
Be nzo(a)anthracene	✓	✓	✓	✓	✓	NA	✓	✓	✓	33.9	✓	NA	✓	NA
Benzo(a)pyrene	✓	✓	✓	✓	✓	NA	✓	✓	✓	37.2	✓	NA	✓	NA
Benzo(b)fluoroanthene	✓	✓	✓	✓	✓	NA	✓	✓	✓	40.6	✓	NA	✓	NA
Benzo(k)fluoroanthene	✓	✓	✓	✓	✓	NA	✓	✓	✓	36.1	✓	NA	✓	NA
Chrysene	✓	✓	✓	✓	✓	NA	✓	✓	✓	35.0	✓	NA	✓	NA

(Limits: NB-d5 35-114%) **Surrogate Recovery Outliers** (*2-Flbiph 43-116% p-Terph-d14 33-141%)*

Sample ID	2-FlBP	NB-d5	p-Terp-d14
-09	✓	✓	49.1*

IS Outliers (*-50% to +100%)*

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK.
*Surrogate recovery is outside of lab-derived limits but meets EPA Reg III limits.
Lab used midpoint std for IS summary; DV uses CCV; both OK.

[1]Derived laboratory limits used for compounds not listed.

Revised 12/2010

Kemron–Radford Army Ammunition Plant Organic Worksheet (LCMS)

SDG: L14031621	Method: 6850	Matrix: Water	Level III Lab Sample IDs: NA
Batch #s: WG469638			Level IV Lab Sample IDs: L14031621-001 thru -007, -08MS, -09MSD

Tuning: ☐ Pass ☐ Fail Mass Calib: ☐ Pass ☐ Fail (*75-125%*) (*≤30%*)

Analyte (outliers)	Calibration				Method Blank	5X (10X) Method Blank	LCS %R [1](80-120%)	MS %R (-08)	MSD %R (-9)	MS/D RPD	FB (-03)	EQR (-02)		
	RSD/r ≤30% ≥0.995	ICV/ CCV %R ±15%	CRDL %R ±30%	ICS %R ±20%										
Perchlorate	✓	✓	✓	NA	✓	NA	✓	✓	35*	✓	✓	✓		

$_{35}Cl/_{37}Cl$ Isotope Ratio *(Theoretical ratio ~3.06; window: 2.3-3.8)*

Sample ID	Ratio								
None									

(Area: ±50% of ICAL avg) **IS Outliers** *(RRT: 0.98 - 1.02)*

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK
CCBs OK
*Sample conc >4X spike amount.

[1]Or method-specified limits, whichever is more stringent

Revised 12/2010

Kemron–Radford Army Ammunition Plant Data Validation Summary Worksheet

SDG#: L14031621	Laboratory: Microbac	Validator: Linda Thal	Validation Start Date: 05/01/2014
Site: Radford	AR/COC#: A5625		Validation Level: ☐ III ☒ IV
Matrix: Water	# of Samples: 7	Tracking docs present: See sample receipt and log-in documentation	
COCs present: yes	COCs signed: yes	COCs dated: yes	Sample Container Integrity: OK

Analyses:
☐ VOCs ☐ SVOCs ☐ PAHs ☐ GRO ☐ DRO ☐ Pests ☐ PCBs ☒ Metals ☐ Gen Chem
☐ Other: CLO4

Requested Analyses Not Reported

Client Sample ID	Lab Sample ID	Analysis	Comments
None			

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
None								

Comments: Sampled 03/27/2014

Revised 12/2010

Kemron–Radford Army Ammunition Plant Inorganic Metals Worksheet

SDG: L14031621	Matrix: Water	Level III Lab Sample IDs: NA
Method/Batch #s: 6010B/WG469838/WG469555(prep); 6020/WG469374/WG469188 (prep)		Level IV Lab Sample IDs: L13060982-01 thru -12 (excl -04)

ICPMS Mass Cal: ☒ Pass ☐ Fail ☐ NA ICPMS Resolution: ☒ Pass ☐ Fail ☐ NA ICPMS %RSD: ☒ Pass ☐ Fail ☐ NA

Analyte (outliers)	**Calibration**						**ICP CRDL** *±10%*	**Method Blank** *(<MDL)*	**5X MB**	**ICS A** *<IDL*	**ICS AB** *±20%*	**LCS %R** *(80-120%)*	**MS %R** *(75-125%)*	**MSD %R** *(75-125%)*	**MS/D RPD** *(≤20%)*	**Serial Dil. %D** *(±10%)*	**PS** *(75-125%)*	**DUP RPD** *(≤20%)*
	r *≥0.995*	**ICV** *±10%*[1]	**CCV** *±10%*[1]	**ICB** ug/L	**CCB** *(<IDL)*	**5X CB**												
Fe	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	✓	128	✓	✓	✓	✓	✓
Ca	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	✓	22.5*	✓	✓	✓	✓	✓
	1	2	3	4	5	6	7											
Fe	K			K	K	K	K	MS										
Na	<5X							EQR										
Mn	<5X			<5X	<5X	<5X	<5X	EQR										
Al				J	J			FD										
Fe				J	J			FD										

IS Outliers[3] *(60-120%)*				**IS Outliers**[3] *(60-120%)*			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK.; LOD and/or LOQ slightly > QAPP for Al, Ca, Fe, (6010B); As, Ba, Co, Pb, Mn, Se (6020) all LOQs OK, LOD >QAPP; *>4X spike amount
Ca diluted 10X -01, -04, -05, -07,-08MS,-09MSD
Mg diluted 10X -01, -07, -08MS and -09MSD
-02(EQR): Na 0.803 >LOQ (sample -01 is <5X the EQR); Mn .00166J (samples -01, -04, -05, -06, -07 <5X the EQR)
-03(FB): ND
Field Dups: Fe "J"
PS and SD performed on -06; Ca calc PS does not agree with lab result.
No CRIs but low standard at RL; also LLICV with no results reported
ICS not performed at end of analysis; NA since results for Al, Ca, Mg and Fe are < ICS spiked amounts

[1]20% for Hg [2]For sample results <5X RL, ±RL [3]Standard CLP NFG criteria used; no criteria specified in QAPP or Region III NFG

VOC Calibration Verification for SDG L14031621

Calibration: WG468975 HPMS8 03/28/2014

Average RF | Int. Std. = 25 | 13 | 53 | 37 | 43

				Acetone		2-CEVE		Dibromofluoromethane		1,2-DCE-d4	
Conc.	Internal Area #1	Internal Area #1	Internal Area #1	Area	RRF		RRF	Area	RRF	Area	RRF
0.3		770836									
0.4		750615									
1		753028	753028					3125	0.207	2773	0.184
2		760009	760009			5303	0.087	7149	0.235	5737	0.189
5	771351	771351	771351	4885	0.032	13600	0.088	18189	0.236	14659	0.190
20	783694	783694	783694	21535	0.034	68525	0.109	71265	0.227	59015	0.188
50	798177	798177	798177	58377	0.037	188905	0.118	185118	0.232	148919	0.187
100	830805	830805	830805	117530	0.035	375428	0.113	382600	0.230	306758	0.185
200	846655	846655	846655	245414	0.036	766050	0.113	795815	0.235	638539	0.189
300	867852	867852	867852	387894	0.037	1153274	0.111	1211953	0.233	964593	0.185
Multiplier				1		1		1		1	
AveRF				0.035		0.1057		0.231		0.187	
RSD				5.728		11.9365		4.026		1.17039	

	ICV 03/28/2014		CCV 03/29/2014	
	Acetone	2-CEVE	Acetone	2-CEVE
Int. Std. Response	870939	870939	808390	808390
Analyte Response	62249	190242	49269	166546
Analyte Concentration	50	50	50	50
Int. Std. Concentration	25	25	25	25
CCRF	0.036	0.109	0.030	0.103
Ave RF	0.035	0.1057	0.035	0.1057
Calc'd Concentration	50.7	51.7	43.2	48.7
CCV %D	1.415	3.34	-13.52	-2.53

3/29/2014	MB	LCS	-01	-02	-03	-04	-05	-06	-07	-08	-09
Dilution/DF	1	1	1	1	1	1	1	1	1	1	1
Final Volume (mL)	5	5	5	5	5	5	5	5	5	5	5
Sample Aliquot (mL)	5	5	5	5	5	5	5	5	5	5	5
IS Response	705375	767448	690241	674452	681012	676612	660317	685605	651905	689695	692799
Surr Response	169362	146244	164039	133645	165203	130741	162057	133766	157500	131960	162929
Surrogate #	1	2	1	2	1	2	1	2	1	2	1
Calibration R.F.	0.231	0.187	0.231	0.187	0.231	0.187	0.231	0.187	0.231	0.187	0.231
Surr spike Conc. (ug/L)	25	25	25	25	25	25	25	25	25	25	25
Surr spike Conc. (ug/L)	25	25	25	25	25	25	25	25	25	25	25
Surr Conc. (ug/L)	25.9	25.5	25.7	26.5	26.2	25.9	26.5	26.1	26.1	25.6	25.4
Surr %REC	104	102	103	106	105	104	106	105	104	103	102
	TC	Acetone	*TC*	*TC*	*TC*	*TC*	*TC*	*TC*	*TC*	2-CEVE	2-CEVE
IS Response		767448								689695	692799
TC Response		22218								58301	60857
Calibration R.F.		0.035				0.106	0.106			0.106	0.106
TC Conc. (ug/L)		20.539								19.995	20.779
Amount Spiked		20								20	20
%R		102.70								99.98	103.89
RPD										3.84	

PAH Calibration Verification L14031621

Calibration: WG465525 HPMS7 03/05/2014

Average RF **Int. Std. =** 1 19 17 22

				Chrysene		p-Terphenyl-d14		Benzo(k)fluoranthene	
Conc.	**Internal Area 4**	**Internal Area 4**	**Internal Area 5**	**Area**	**RRF**	**Area**	**RRF**	**Area**	**RRF**
0.05	190000	190000	172775	11096	1.168	9126	0.961	10435	1.208
0.1	208121	208121	184606	24168	1.161	16309	0.784	25407	1.376
0.5	232661	232661	204894	135179	1.162	105098	0.903	134968	1.317
1	252338	252338	221948	290093	1.150	221401	0.877	289450	1.304
2.5	219947	219947	189297	618313	1.124	493197	0.897	615749	1.301
5	227516	227516	200897	1276780	1.122	1016788	0.894	1405774	1.399
10	230605	230605	215980	2458406	1.066	1960230	0.850	2477011	1.147
AveRF				1.136		0.8808		1.293	
RSD				3.16		6.17		6.89	

CCV Verification Worksheet AVG RF HPMS7 L14031621

$$CCRF = \frac{(Analyte\,Response)(IS\,Conc.)}{(IS\,Response)(Analyte\,Conc)}$$

Int. Std. = 1

PAH ICV # WG465525-09 03/05/2014 **PAH CCV # WG469371-02 04/01/2014**

	Benzo(a)anthracene	Benzo(a)pyrene	Chrysene	p-Terph-d14	Benzo(b)fluor
Int. Std. Response	207684	185289	181194	170559	170559
Analyte Response	245060	239946	213300	162115	231260
Analyte Concentration	1	1	1	1	1
Int. Std. Concentration	1	1	1	1	1
CCRF	1.180	1.295	1.177	0.950	1.356
Ave RF	1.155	1.150	1.136	0.8808	1.311
CCV %D	2.16	12.61	3.63	7.91	3.42

	MB	LCS	-01	-02	-03	-04
Dilution/DF	1	1	1	1	1	1
Final Volume (mL)	1	1	1	1	1	1
Sample Aliquot (mL)	1000	1000	960	970	980	960
Internal STD Response	179000	198447	181491	186665	199831	189530
Surr Response	298252	298046	326703	292300	369029	301944
Surrogate #	3	3	3	3	3	3
Calibration R.F.	0.8808	0.8808	0.8808	0.8808	0.8808	0.8808
Surr spike Conc. (ug/L)	2.5	2.5	2.5	2.5	2.5	2.5
Surr spike Conc. (ug/L)	2.5	2.5	2.6	2.6	2.6	2.6
Surr Conc. ug/L	1.9	1.7	2.13	1.8	2.1	1.9
Surr %REC	75.7	68.2	81.7	71.1	83.9	72.3
	TC	Benzo(b)fl	*TC*	TC	TC	TC
Internal STD Response		207876				
TC Response		188749				
Calibration R.F.		1.311				
TC Conc. (ug/L)		0.693				
Amount Spiked		1.00				
%R		69.3				

WG391960	-05	-06	-07	-08MS	-09MSD
Dilution/DF	1	1	1	1	1
Final Volume (mL)	1	1	1	1	1
Sample Aliquot (mL)	960	960	1000	960	930
Internal STD Response	184928	192095	186520	179479	187978
Surr Response	303585	283468	318989	294956	203357
Surrogate #	3	3	3	3	3
Calibration R.F.	0.8808	0.8808	0.8808	0.8808	0.8808
Surr spike Conc. (ug/L)	2.5	2.5	2.5	2.5	2.5
Surr spike Conc. (ug/L)	2.6	2.6	2.5	2.6	2.7
Surr Conc. ug/L	1.9	1.7	1.9	1.9	1.3
Surr %REC	74.6	67.0	77.7	74.6	49.1
	TC	*TC*	*TC*	*Chrysene*	*Chrysene*
Internal STD Response				179479	187978
TC Response				195073	138970
Calibration R.F.				1.136	1.136
TC Conc. (ug/L)				0.997	0.700
Amount Spiked				1.05	1.08
%R				95.4	64.8
RPD				35.00	

Regression Calculator for a Linear RF Curve - Conc. Ratio On X-Axis WG456864 Perchlorate for SDG L14031621

6/8/2013	ICAL1	ICAL2	ICAL3	ICAL4	ICAL5	ICAL6	ICAL7	ICAL8	ICAL9	ICAL10
Counts Analyte (^{35}Cl)	8410	16200	39200	78800	157000	393000	784000	0	0	0
Counts IS	274000	277000	272000	274000	277000	279000	279000	1	1	1
Conc Analyte	0.10	0.20	0.50	1.00	2.00	5.00	10.00	0	0	0
Conc IS	5.00	5.00	5.00	5.00	5.00	5.00	5.00	1	1	1
RF	1.535	1.462	1.441	1.438	1.417	1.409	1.405			
x-axis	0.020	0.040	0.100	0.200	0.400	1.000	2.000	0.000	0.000	0.000
y-axis	0.03069	0.05848	0.14412	0.28759	0.56679	1.40860	2.81004	0.00000	0.00000	0.00000

Perform Regression

Perform Regression (Forced Zero)

Enter 0 for Counts Analyte and Conc Analyte if a standard is not used
Enter 1 for Counts IS and Conc IS if a standard is not used
Unused standards must be on the far right (no gaps in the used standards)

Calcs slightly off due to rounding.

	Offset b	Slope m1	r^2
	4.2365E-03	1.4034E+00	1.00000
Lab reported	2.75E-03	1.41E+00	1.0000

LOD= 0.100
LOQ= 0.200

$$C_X = C_{IS}\left[\frac{(A_X)}{(A_{IS})(m1)} - \frac{b}{m1}\right]$$

	SSV	CCB1	CCV1	QCMRL 1	MCT	CCV2	QCMRL 2	CCB2	CCV3	QCMRL 3	CCB3
Counts Analyte (^{35}Cl)	81000	188	75600	14500	17800	82600	16800	0	83500	17400	1020
Counts IS	291000	265000	264000	259000	266000	290000	300000	294000	300000	298000	302000
Conc IS	5	5	5	5	5	5	5	5	5	5	5
Amount On Col (ug/L)	0.9766	-0.0126	1.0052	0.1844	0.2233	0.9997	0.1844	0	0.9766	0.1929	-0.0031
True value	1.0		1.0	0.2	0.2	1.0	0.2		1.0	0.2	
%R	97.66	<LOD	100.52	92.19	111.66	99.97	92.21	<LOD	97.66	96.47	<LOD
%D	-2.34		0.52	-7.81	11.66	-0.03	-7.79		-2.34	-3.53	
Perchlorate Conf (^{37}Cl)	26800	123	24100	4960	5620	26900	5400	0	27200	5820	0
Ion Ratio	3.02	1.53	3.14	2.92	3.17	3.07	3.11	0.00	3.07	2.99	0.00

	MB	LCS	-01	-02	-03	-04	-05	-06	-07	-08 MS	-09 MSD
Counts Analyte (^{35}Cl)	0	16100	284000	0	519	42600	51300	42900	528000	519000	499000
Counts IS	283000	261000	269000	26700	260000	207000	251000	296000	251000	240000	235000
Conc IS	5	5	5	5	5	5	5	5	5	5	5
Amount On Col (ug/L)	0	0.2047	3.7464	0	-0.0080	0.7181	0.7131	0.5013	7.4797	7.6896	7.5503
Dilution factor	1	1	1	1	1	1	1	1	1	1	1
Sample Aliquot (mL)	10	10	10	10	10	10	10	10	10	10	10
Final Volume (mL)	10	10	10	10	10	10	10	10	10	10	10
Final Conc (ug/L)	0.00	0.205	3.75	0.00	-0.01	0.718	0.713	0.501	7.48	7.69	7.55
Amount Spiked		0.2								0.2	0.2
%Rec	<LOD	102.34		<LOD	<LOD					104.95	35.31
RPD										-0.05	
Perchlorate Conf (^{37}Cl)	515	4770	92300	221	98	15000	17100	14700	172000	167000	164000
Ion Ratio	0.00	3.38	3.08	0.00	5.30	2.84	3.00	2.92	3.07	3.11	3.04

2.3-3.8

ICAL							
Perchlorate Conf (^{37}Cl)	2790	5210	12700	25700	51500	129000	253000
Ion Ratio	3.01	3.11	3.09	3.07	3.05	3.05	3.10

CALCULATION WORKSHEET FOR 6010 METALS WATER RESULTS FOR SDG L14031621

Water Sample Calculations:

	MDL (mg/L)	CRQL (mg/L)			MB		LCS		-01		-02		-03		-04	
Final Volume (ml)					50		50		50		50		50		50	
Sample Aliquot (ml)					40		40		40		40		40		40	
					ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L
					DF	1	DF	1	DF	1	DF	1	DF	1	DF	1
Al	0.100	0.200			0.02297	U	4.9541	6.19	0.06974	U	0.0097	U	0.0022	U	0.1355	0.169
Ca	0.250	0.500			0.02708	U	5.0425	6.30			0.12678	U	0.07741	U		
Fe	0.050	0.100			-0.00104	U	1.9452	2.43	0.17038	0.213	0.0036	U	0.00716	U	0.10008	0.125
Mg	0.250	0.500			-0.00395	U	4.8033	6.00			0.02762	U	-0.00271	U	15.194	18.9925
K	0.500	1.000			0.03654	U	24.919	31.15	1.2556	1.570	0.0109	U	0.02638	U	0.75708	0.9464
Na	0.250	0.500			0.01502	U	23.56	29.45	2.9255	3.657	0.64201	0.803	0.0583	U	4.299	5.374
V	0.005	0.010			0.00015	U	0.50404	0.63	0.00051	U	-0.00013	U	0.00022	U	0.00018	U

	MDL (mg/L)	CRQL (mg/L)			-05		-06		-07		-08 ms		-09 msd	
Final Volume (ml)					50		50		50		50		50	
Sample Aliquot (ml)					40		40		40		40		40	
					ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L
					DF	1	DF	1	DF	1	DF	1	DF	1
Al	0.100	0.200			0.29298	0.366	0.23069	0.29	0.09954	0.12	5.8118	7.265	5.5117	6.89
Ca	0.250	0.500					18.761	23.45						
Fe	0.050	0.100			0.2715	0.3394	0.23373	0.29	0.13776	0.17	2.6937	3.3671	2.483	3.10
Mg	0.250	0.500			15.599	19.499	6.0486	7.56						
K	0.500	1.000			0.81388	1.017	0.59049	0.74	1.3876	1.73	26.638	33.298	26.558	33.20
Na	0.250	0.500			4.5157	5.645	6.1926	7.74	4.2082	5.26	27.907	34.884	27.678	34.60
V	0.005	0.010			0.00066	U	0.00063	U	0.00064	U	0.49469	0.618	0.50645	0.63

	MDL (mg/L)	CRQL (mg/L)			-01		04		05		07		08 ms		-9 msd	
Final Volume (ml)					50		50		50		50		50		50	
Sample Aliquot (ml)					40		40		40		40		40		40	
					ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L
					DF	10	DF	10	DF	10	DF	10	DF	10	DF	10
Ca	0.250	0.500			6.5213	81.52	5.4619	68.27	5.812	72.65	7.3943	92.43	7.5069	93.84	7.8095	97.62
Mg	0.250	0.500			2.6078	32.60					2.7655	34.57	3.1674	39.59	3.2772	40.97

CALCULATION WORKSHEET FOR METALS RESULTS FOR SDG L14031621

6010 Water:

				9.32	22.35	23.17	00.01
4/3/2014	**ICV**	**ICSA**	**ICSAB**	**CCV**	**CCV**	**CCV**	**CCV**
Analyte	**Al**	**Ca**	**Fe**	**Mg**	**K**	**Na**	**V**
True Conc	10.0	250.0	100.0	10.0	50.0	50.0	1.0
Reported Conc	10.2	251	98	9.9	51.6	49.4	1.0
%D	2.19	0.24	-1.99	-0.63	3.10	-1.26	3.64
%R	102.2	100.2	98.0	99.4	103.1	98.7	103.7

				10.25	14.54	15.31	15.53
4/7/2014	**ICV**	**ICSA**	**ICSAB**	**CCV**	**CCV**	**CCV**	**CCV**
Analyte	**Ca**	**Mg**	**Ca**	**Mg**	**Ca**	**Mg**	**Ca**
True Conc	10.0	250.0	250.0	10.0	10.0	10.0	10.0
Reported Conc	10.0	253	253	10.1	10.2	9.9	9.8
%D	-0.18	1.17	1.17	1.24	1.98	-0.74	-2.07
%R	99.8	101.2	101.2	101.3	102.0	99.3	97.9

	LCS	**-06 MS**	**-07 MSD**
Analyte	**Al**	**Fe**	**Fe**
True Conc	6.250	2.500	2.500
Reported Conc	6.190	3.370	3.100
Sample Conc		0.172	0.172
%R	99.04	127.92	117.12
RPD		8.35	

lab reported

Analyte	**MDL**	**PS**	**-06**	**Spike Added**	**%R**	
Al	0.100	5.278	0.23069	5.000	100.9	101.4
Ca	0.250	22.087	18.761	5.000	66.5	104
Fe	0.050	2.2252	0.23373	2.000	99.6	100.7
Mg	0.250	10.249	6.0486	5.0	84.0	96.1
K	0.500	25.775	0.59049	25.000	100.7	101
Na	0.250	30.267	6.1926	25.000	96.3	98.8
V	0.005	0.51048	0.00063	0.500	102.1	102.1

Analyte	***unknown**	**Serial Dilution 5x**		**IDL**	**50 * IDL**	**> 50*IDL?**	**RPD Limit**	**%D**	**>Limit?**
	mg/L	**mg/L**	**mg/L**	**mg/L**	**mg/L**				
Al	0.23069	0.05014	0.2507	0.100	5.000		10		
Ca	18.761	3.8459	19.2295	0.250	12.500	Y	10	2.50	
Fe	0.23373	0.05127	0.25635	0.050	2.500		10		
Mg	6.0486	1.227	6.135	0.250	12.500		10		
K	0.59049	0.1043	0.5215	0.500	25.000		10		
Na	6.1926	1.2476	6.238	0.250	12.500		10		
V	0	0	0	0.005	0.250		10		

CALCULATION WORKSHEET FOR 6020 METALS WATER RESULTS FOR SDG L14031621

Water Sample Calculations:

	MDL (mg/L)	CRQL (mg/L)			MB		LCS		-01		-02		-03		-04	
Final Volume (ml)					100		100		100		100		100		100	
Sample Aliquot (ml)					40		40		40		40		40		40	
					ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L
					DF	1	DF	1	DF	1	DF	1	DF	1	DF	1
As	0.00050	0.0010			0.0032	U	24.2649	0.0607	0.061	U	0.0172	U	-0.0128	U	0.0334	U
Ba	0.00150	0.0030			-0.0058	U	23.4967	0.0587	47.063	0.1177	0.1434	U	0.0564	U	13.6473	0.0341
Co	0.00050	0.0010			-0.0081	U	24.4322	0.0611	0.067	U	0.0066	U	-0.0226	U	0.0259	U
Pb (208)	0.00050	0.0010			-0.001	U	24.5475	0.0614	0.0518	U	0.0399	U	0.0028	U	0.0473	U
Mn	0.00100	0.0020			-0.0711	U	24.4774	0.0612	0.7534	0.0019	0.6656	0.0017	0.1538	U	0.4225	0.0011
Se (82)	0.00050	0.0010			0.0354	U	24.3802	0.0610	0.1719	U	0.1426	U	-0.0144	U	0.1275	U

	MDL (mg/L)	CRQL (mg/L)			05		-06		-07		-08 ms		-09 msd	
Final Volume (ml)					100		100		100		100		100	
Sample Aliquot (ml)					40		40		40		40		40	
					ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L	ug/L	mg/L
					DF	1	DF	1	DF	1	DF	1	DF	1
As	0.00050	0.0010			0.0523	U	0.0185	U	0.1384	U	24.6858	0.0617	25.1657	0.0629
Ba	0.00150	0.0030			13.2771	0.0332	5.0639	0.0127	27.9241	0.0698	49.5091	0.1238	49.6342	0.1241
Co	0.00050	0.0010			0.0322	U	0.0126	U	0.0741	U	24.8083	0.0620	24.9022	0.0623
Pb (208)	0.00050	0.0010			0.0716	U	0.1947	U	0.0526	U	25.1106	0.0628	25.0213	0.0626
Mn	0.00100	0.0020			0.6283	0.0016	0.6654	0.0017	1.099	0.0027	27.3306	0.0683	26.8399	0.0671
Se (82)	0.00050	0.0010			0.1812	U	0.1245	U	0.5949	0.0015	24.3986	0.0610	25.0936	0.0627

Low level initial calibration 10.50

		Assumed conc	
Sb		0.4000	0
As	0.3708	0.4000	92.7
Ba	0.7185	1.2000	59.875
Cd (111)		0.2400	0
Cr (52)		0.8000	0
Co	0.4	0.4000	100
Cu		0.8000	0
Pb (208)	0.1958	0.4000	48.95
Mn	0.4891	0.8000	61.1375
Ni		1.6000	0
Se (82)	0.3656	0.4000	91.4
Ag		0.4000	0
Tl (203)		0.0800	0

Low level continuing calibration 14.21

		Assumed conc	
Sb		0.4000	0
As	0.3825	0.4000	95.625
Ba	0.7224	1.2000	60.2
Cd (111)		0.2400	0
Cr (52)		0.8000	0
Co	0.3786	0.4000	94.65
Cu		0.8000	0
Pb (208)	0.1944	0.4000	48.6
Mn	0.4884	0.8000	61.05
Ni		1.6000	0
Se (82)	0.3401	0.4000	85.025
Ag		0.4000	0
Tl (203)		0.0800	0

CALCULATION WORKSHEET FOR METALS RESULTS FOR SDG L14031621

6020 Water:

				10.59	'11.26	11.56	12.34	13.18	14.15
4/4/2014	ICV	ICSAB	ICSAB	CCV	CCV	CCV	CCV	CCV	CCV
Analyte	As	Ba	Co	Pb	Mn	Se	As	Pb	Mn
True Conc	50.0	100.0	100.0	50.0	50.0	50.0	50.0	50.0	50.0
Reported Conc	49.58	97.73	98.59	50.18	51.09	50.24	48.58	51.4	49.3
%D	-0.85	-2.29	-1.42	0.35	2.15	0.48	-2.89	2.80	-1.35
%R	99.2	97.7	98.6	100.4	102.2	100.5	97.2	102.8	98.7

	LCS	-08 MS	-09 MSD
Analyte	Pb	Mn	Mn
True Conc	0.0625	0.0625	0.0625
Reported Conc	0.0614	0.0683	0.0671
Sample Conc		0.0028	0.0028
%R	98.24	104.88	102.96
RPD		1.77	

Analyte	MDL	-06 PS	-06	Spike Added	%R
As	0.00050	50.20	0.0185	50.000	100.4
Ba	0.00150	54.71	5.0639	50.000	99.3
Co	0.00050	52.32	0.0126	50.000	104.6
Pb (208)	0.00050	51.20	0.1947	50.000	102.0
Mn	0.00100	52.33	0.6654	50.000	103.3
Se (82)	0.00050	48.91	0.1245	50.000	97.6
				50.000	

Analyte	-06	Serial Dilution 5x		IDL	50 * IDL	> 50*IDL?	RPD Limit	%D	>Limit?
	ug/L	ug/L	ug/L	mg/L	mg/L				
As	0.0185			0.00050	0.025		10		
Ba	5.0639	1.1321	5.6605	0.00150	0.075		10		
Co	0.0126			0.00050	0.025		10		
Pb (208)	0.1947			0.00050	0.025		10		
Mn	0.6654	0.1667	0.8335	0.00100	0.050		10		
Se (82)	0.1245			0.00050	0.025		10		