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NASD VIEQUES
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VALIDATED LABORATORY DATA PACKAGE, 1439006 & 1439024, VIEQUES ISLAND PUERTO RICO

09/18/2014

DATAQUAL

DataQual
Environmental Services, LLC

CH2M HILL-VBO
5701 Cleveland Street
Suite 200
Virginia Beach, VA 23462

December 31, 2014
Brooks Rand Lab – Report #s 1439006 & 1439024
CTO-037, NTR Vieques West SWMU 4 Tissue Sampling

Dear Ms. Dean,

The following Data Validation report is provided as requested for the parameters noted in the table below for Report #s 1439006 & 1439024. The data validation was performed in accordance with the EPA 1600 series methods utilized by the laboratory, the laboratory SOPs, professional judgment, the guidance offered in the DoD Quality Systems Manual for Environmental Laboratories Version 5.0 and the project specific SAP. The Region II SOPs also consulted in this validation effort include HW-2b Revision 15, December 2012, for ICP-MS data validation, and HW-2c Revision 15, December 2012, for Mercury & Cyanide data validation. However, please note that the Region II SOPs were not written for the analytical methods used in the preparation and analysis of the samples addressed in this report so the methods and lab SOPs are the primary source of QC information. Worksheets tabulating the validation process including calculation verifications are included in the support documentation section of this report. All areas of concern are discussed in the body of the report and a summary of data qualifications are provided.

Sample ID	Lab ID	Matrix	Methyl Hg by 1630M	Select Metals by 1638M	Inorganic As by 1632M
Homogenization Blank - Fish	1439006-18	tissue	X	X	X
Homogenization Blank - Crab	1439024-25	tissue	X	X	X
VWW04-BAB01-0914	1439006-26	tissue	X	X	X
VWW04-BAB01-0914 MS	1439006-26MS	tissue	X		
VWW04-BAB01-0914 MSD	1439006-26MSD	tissue	X		
VWW04-CRB01-0914	1439006-22	tissue	X	X	X
VWW04-CRB01P-0914	1439006-27	tissue	X	X	X
VWW04-CRB02-0914	1439006-23	tissue	X	X	X
VWW04-CRB03-0914	1439006-24	tissue	X	X	X
VWW04-CRB04-0914	1439006-25	tissue	X	X	X
VWW04-CRB05-0914	1439006-01	tissue	X	X	X
VWW04-CRB06-0914	1439006-02	tissue	X	X	X
VWW04-CRB07-0914	1439006-03	tissue	X	X	X
VWW04-CRB08-0914	1439006-04	tissue	X	X	X
VWW04-CRB09-0914	1439006-05	tissue	X	X	X
VWW04-CRB10-0914	1439006-06	tissue	X	X	X
VWW04-CRB10-0914 MS	1439006-06MS	tissue	X	X	X
VWW04-CRB10-0914 MSD	1439006-06MSD	tissue	X	X	X
VWW04-FS01-0914	1439006-07	tissue	X	X	X

Sample ID	Lab ID	Matrix	Methyl Hg by 1630M	Select Metals by 1638M	Inorganic As by 1632M
VWW04-FS01P-0914	1439006-18	tissue	X	X	X
VWW04-FS02-0914	1439006-09	tissue	X	X	X
VWW04-FS03-0914	1439006-10	tissue	X	X	X
VWW04-FS04-0914	1439006-11	tissue	X	X	X
VWW04-FS05-0914	1439006-12	tissue	X	X	X
VWW04-FS06-0914	1439006-13	tissue	X	X	X
VWW04-FS07-0914	1439006-14	tissue	X	X	X
VWW04-FS08-0914	1439006-15	tissue	X	X	X
VWW04-FS09-0914	1439006-16	tissue	X	X	X
VWW04-FS10-0914	1439006-17	tissue	X	X	X
VWW04-FS10-0914 MS	1439006-17MS	tissue	X	X	
VWW04-FS10-0914 MSD	1439006-17MSD	tissue	X	X	

The following quality control samples were provided with this SDG: sample VWW04-FS01P-0914-field duplicate of sample VWW04-FS01-0914; sample VWW04-CRB01P-0914-field duplicate of sample VWW04-CRB01-0914; and two homogenization blanks – crab & fish.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- Initial/Continuing Calibrations
- ICSA/ICSAB Standards
- Low Level Standards *
- Internal Standards *
- Blanks *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs *
- Serial Dilutions NA
- Field Duplicates *
- Identification/Quantitation
- Reporting Limits *

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. *If an issue is not addressed in this narrative there were no actions required based on unmet quality control criteria.*

No critical findings resulting in data rejections were noted. Some major findings resulting in qualification of data as estimated were noted. The majority of the data in this data package is reported without qualification.

Methyl Mercury by 1630M

Qualifications were required in two samples due to the non-compliant recoveries noted in the MS/MSD pairs.

Inorganic Arsenic by 1632M

No qualifications to the analytical data were required.

Select Metals by 1638M

Qualification of nickel was required in one sample due to a high recovery in the associated interference check sample.

Qualification of silver was required in all samples due to a low recovery in the ICV in the sequence.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Additional information regarding calibration processing and the calculations for the methods was requested from the lab. All requested information was received from the lab. A copy of all email correspondence is included in the worksheets section of this report.

Technical Holding Times

According to chain of custody records, sampling was performed on 9/18-23/14 and samples were received at Brooks Rand labs on 9/23/14. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibrations

Select Metals by 1638M

The ICV associated with sequence 1400884 exhibited a non-compliant recovery for silver at 85%. All reported results for silver in the samples were qualified as potentially biased low J-/UJ based on Region II guidelines with a qualifier code of ICL.

ICSA/ICSAB Standards

Select Metals by 1638M

The IFA standard associated with sequence 1400878 exhibited a high recovery for nickel at 222%. The lab raised the reporting limits for the analyte based on this issue. One qualification was required because there was one low level positive result reported for nickel in the samples. The analyte nickel in sample VWW04-CRB10-0914 was qualified as biased high J+ with an OT qualifier code based on Region II guidance.

Matrix Spike Recoveries

Methyl Mercury by 1630M

The matrix spike pair of sample VWW06-CRB10-0914 exhibited recoveries above the upper QC limit of 135% at 158% & 153% for the target analyte methyl mercury. The reported positive result in the native sample was qualified as biased high J+ with a qualifier code of MSH based on Region II guidance.

The matrix spike pair of sample VWW06-FS10-0914 exhibited recoveries above the upper QC limit of 135% at 141% & 147% for the target analyte methyl mercury. The reported positive result in the native sample was qualified as biased high J+ with a qualifier code of MSH based on Region II guidance.

Quantitation/Identification

All Fractions

All B flagged results are qualified as estimated J because the reported result is between the MDL and the MRL. There is no qualifier code required for this flag.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
Vice President

Summary of Data Qualifications

Methyl Mercury by 1630M

Sample ID	Analyte	Results	Q Flag	Q Code
VWW06-CRB10-0914	methyl mercury	+	J+	MSH
VWW06-FS10-0914	methyl mercury	+	J+	MSH

Inorganic Arsenic by 1632M

Sample ID	Analyte	Results	Q Flag	Q Code
No qualifications were required				

Select Metals by 1638M

Sample ID	Analyte	Results	Q flag	Q Code
all samples	silver	+/-	J-/UJ	ICL
VWW04-CRB10-0914	nickel	+	J+	OT

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
J+	estimated biased high
J-	estimated biased low
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for the blank contaminant is not qualified with any blank qualifiers.
LOD	The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and qualified as non-detect U.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the LOD and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.
R -	Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.
J+ -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.
J/UJ -	Sample result is less than 10X LOD when blank result is below the negative LOD.

Glossary of Qualification Flags and Abbreviations, continued

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action - The sample result is greater than the LOD and greater than ten times (10X) the blank value.

U - The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the LOD when the FB result is less or greater than the LOD.

R - Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.

J+ - Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

General Abbreviations

MDL	method detection limit
IDL	instrument detection limit
LOD/RL	Level of Detection//Reporting Limit
LOQ	Level of Quantitation
+	positive result
-	non-detect result

Project ID: CHM-CH1401
PM: Lydia Greaves

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MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
Homogenization Blank (Crab)										
1439006-18	Ag	wet	0.060	UJ / U ICL	0.020	0.060	0.099	mg/kg	B141811	1400884
1439006-18	As	wet	0.028	U	0.014	0.028	0.040	mg/kg	B141813	1400888
1439006-19	As(Inorg)	wet	0.008	U	0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-18	Cd	wet	0.069	U	0.035	0.069	0.099	mg/kg	B141811	1400884
1439006-18	Cr	wet	0.054	U	0.018	0.054	0.119	mg/kg	B141921	1400882
1439006-18	Cu	wet	0.20	U	0.10	0.20	0.20	mg/kg	B141811	1400884
1439006-20	MeHg	wet	0.0003	J / B	0.0002	0.0003	0.0005	mg/kg	B141783	1400856
1439006-18	Ni	wet	0.30	U	0.10	0.30	0.30	mg/kg	B141812	1400878
1439006-18	Pb	wet	0.012	U	0.004	0.012	0.040	mg/kg	B141811	1400884
1439006-18	Se	wet	0.12	U	0.06	0.12	0.15	mg/kg	B141813	1400888
1439006-18	Zn	wet	0.60	U	0.20	0.60	0.99	mg/kg	B141811	1400884
Homogenization Blank (Fish)										
1439024-25	Ag	wet	0.059	UJ / U ICL	0.020	0.059	0.099	mg/kg	B141811	1400884
1439024-25	As	wet	0.028	U	0.014	0.028	0.040	mg/kg	B141813	1400889
1439024-24	As(Inorg)	wet	0.008	U	0.004	0.008	0.010	mg/kg	B141818	1400859
1439024-25	Cd	wet	0.069	U	0.035	0.069	0.099	mg/kg	B141811	1400884
1439024-25	Cr	wet	0.053	U	0.018	0.053	0.119	mg/kg	B141921	1400882
1439024-25	Cu	wet	0.20	U	0.10	0.20	0.20	mg/kg	B141811	1400884
1439024-23	MeHg	wet	0.0003	U	0.0002	0.0003	0.0005	mg/kg	B141797	1400856
1439024-25	Ni	wet	0.30	U	0.10	0.30	0.30	mg/kg	B141812	1400878
1439024-25	Pb	wet	0.012	U	0.004	0.012	0.040	mg/kg	B141811	1400884
1439024-25	Se	wet	0.12	U	0.06	0.12	0.15	mg/kg	B141813	1400888
1439024-25	Zn	wet	0.59	U	0.20	0.59	0.99	mg/kg	B141811	1400884

12/20/14

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Project ID: CHM-CH1401
PM: Lydia Greaves

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MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-BAB01-0914										
1439006-26	%TS	NA	28.05		0.30		1.00	%	B141784	N/A
1439006-26	Ag	wet	0.052	UJ U ICL	0.017	0.052	0.086	mg/kg	B141811	1400884
1439006-26	As	wet	1.04		0.012	0.024	0.035	mg/kg	B141813	1400889
1439006-26	As(Inorg)	wet	0.007	U	0.004	0.007	0.009	mg/kg	B141785	1400891
1439006-26	Cd	wet	0.060	U	0.030	0.060	0.086	mg/kg	B141811	1400884
1439006-26	Cr	wet	0.047	U	0.016	0.047	0.104	mg/kg	B141921	1400882
1439006-26	Cu	wet	0.22		0.09	0.17	0.17	mg/kg	B141811	1400884
1439006-26	MeHg	wet	0.0585		0.0015	0.0030	0.0045	mg/kg	B141783	1400856
1439006-26	Ni	wet	0.26	U	0.09	0.26	0.26	mg/kg	B141812	1400878
1439006-26	Pb	wet	0.031	J ~~B~~	0.003	0.010	0.035	mg/kg	B141811	1400884
1439006-26	Se	wet	0.61		0.05	0.10	0.13	mg/kg	B141813	1400888
1439006-26	Zn	wet	7.25		0.17	0.52	0.86	mg/kg	B141811	1400884
VWW04-CRB01-0914										
1439006-22	%TS	NA	30.72		0.30		1.00	%	B141784	N/A
1439006-22	Ag	wet	0.055	UJ U ICL	0.018	0.055	0.091	mg/kg	B141811	1400884
1439006-22	As	wet	2.30		0.013	0.026	0.037	mg/kg	B141813	1400888
1439006-22	As(Inorg)	wet	0.023		0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-22	Cd	wet	0.064	U	0.032	0.064	0.091	mg/kg	B141811	1400884
1439006-22	Cr	wet	0.053	J ~~B~~	0.016	0.049	0.110	mg/kg	B141921	1400882
1439006-22	Cu	wet	15.8		0.09	0.18	0.18	mg/kg	B141811	1400884
1439006-22	MeHg	wet	0.0445		0.0009	0.0017	0.0026	mg/kg	B141783	1400856
1439006-22	Ni	wet	0.27	U	0.09	0.27	0.27	mg/kg	B141812	1400878
1439006-22	Pb	wet	0.028	J ~~B~~	0.004	0.011	0.037	mg/kg	B141811	1400884
1439006-22	Se	wet	0.24		0.05	0.11	0.14	mg/kg	B141813	1400888
1439006-22	Zn	wet	16.2		0.18	0.55	0.91	mg/kg	B141811	1400884

JLC 12/20/14

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PM: Lydia Greaves

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Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-CRB01P-0914										
1439006-27	%TS	NA	30.70		0.30		1.00	%	B141784	N/A
1439006-27	Ag	wet	0.053	UJ U ICL	0.018	0.053	0.088	mg/kg	B141811	1400884
1439006-27	As	wet	1.94		0.012	0.025	0.035	mg/kg	B141813	1400889
1439006-27	As(Inorg)	wet	0.025		0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-27	Cd	wet	0.061	U	0.031	0.061	0.088	mg/kg	B141811	1400884
1439006-27	Cr	wet	0.052	J B	0.016	0.047	0.105	mg/kg	B141921	1400882
1439006-27	Cu	wet	12.8		0.09	0.18	0.18	mg/kg	B141811	1400884
1439006-27	MeHg	wet	0.0408		0.0009	0.0017	0.0026	mg/kg	B141783	1400856
1439006-27	Ni	wet	0.26	U	0.09	0.26	0.26	mg/kg	B141812	1400878
1439006-27	Pb	wet	0.028	J B	0.004	0.011	0.035	mg/kg	B141811	1400884
1439006-27	Se	wet	0.21		0.05	0.11	0.13	mg/kg	B141813	1400888
1439006-27	Zn	wet	14.3		0.18	0.53	0.88	mg/kg	B141811	1400884
VWW04-CRB02-0914										
1439006-23	%TS	NA	25.55		0.30		1.00	%	B141784	N/A
1439006-23	Ag	wet	0.052	UJ U ICL	0.017	0.052	0.086	mg/kg	B141811	1400884
1439006-23	As	wet	2.75		0.013	0.025	0.036	mg/kg	B141813	1400888
1439006-23	As(Inorg)	wet	0.013		0.004	0.007	0.009	mg/kg	B141785	1400891
1439006-23	Cd	wet	0.060	U	0.030	0.060	0.086	mg/kg	B141811	1400884
1439006-23	Cr	wet	0.050	J B	0.016	0.049	0.108	mg/kg	B141921	1400882
1439006-23	Cu	wet	24.2		0.09	0.17	0.17	mg/kg	B141811	1400884
1439006-23	MeHg	wet	0.0299		0.0010	0.0019	0.0029	mg/kg	B141783	1400856
1439006-23	Ni	wet	0.27	U	0.09	0.27	0.27	mg/kg	B141812	1400878
1439006-23	Pb	wet	0.019	J B	0.003	0.010	0.034	mg/kg	B141811	1400884
1439006-23	Se	wet	0.31		0.05	0.11	0.14	mg/kg	B141813	1400888
1439006-23	Zn	wet	18.8		0.17	0.52	0.86	mg/kg	B141811	1400884

JC 13014

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Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-CRB03-0914										
1439006-24	%TS	NA	27.81		0.30		1.00	%	B141784	N/A
1439006-24	Ag	wet	0.028	J- B ICL	0.018	0.054	0.091	mg/kg	B141811	1400884
1439006-24	As	wet	2.44		0.013	0.025	0.036	mg/kg	B141813	1400888
1439006-24	As(Inorg)	wet	0.017		0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-24	Cd	wet	0.063	U	0.032	0.063	0.091	mg/kg	B141811	1400884
1439006-24	Cr	wet	0.049	U	0.016	0.049	0.109	mg/kg	B141921	1400882
1439006-24	Cu	wet	27.4		0.09	0.18	0.18	mg/kg	B141811	1400884
1439006-24	MeHg	wet	0.0403		0.0010	0.0019	0.0029	mg/kg	B141783	1400856
1439006-24	Ni	wet	0.27	U	0.09	0.27	0.27	mg/kg	B141812	1400878
1439006-24	Pb	wet	0.020	J B	0.004	0.011	0.036	mg/kg	B141811	1400884
1439006-24	Se	wet	0.31		0.05	0.11	0.14	mg/kg	B141813	1400888
1439006-24	Zn	wet	18.9		0.18	0.54	0.91	mg/kg	B141811	1400884
VWW04-CRB04-0914										
1439006-25	%TS	NA	24.33		0.30		1.00	%	B141784	N/A
1439006-25	Ag	wet	0.059	UJ U ICL	0.020	0.059	0.098	mg/kg	B141811	1400884
1439006-25	As	wet	2.55		0.014	0.028	0.039	mg/kg	B141813	1400888
1439006-25	As(Inorg)	wet	0.019		0.004	0.008	0.009	mg/kg	B141785	1400891
1439006-25	Cd	wet	0.069	U	0.034	0.069	0.098	mg/kg	B141811	1400884
1439006-25	Cr	wet	0.021	J B	0.018	0.053	0.118	mg/kg	B141921	1400882
1439006-25	Cu	wet	20.7		0.10	0.20	0.20	mg/kg	B141811	1400884
1439006-25	MeHg	wet	0.0327		0.0009	0.0017	0.0026	mg/kg	B141783	1400856
1439006-25	Ni	wet	0.30	U	0.10	0.30	0.30	mg/kg	B141812	1400878
1439006-25	Pb	wet	0.018	J B	0.004	0.012	0.039	mg/kg	B141811	1400884
1439006-25	Se	wet	0.26		0.06	0.12	0.15	mg/kg	B141813	1400888
1439006-25	Zn	wet	15.6		0.20	0.59	0.98	mg/kg	B141811	1400884

JMC 1/30/2014

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Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-CRB05-0914										
1439006-01	%TS	NA	28.02		0.30		1.00	%	B141784	N/A
1439006-01	Ag	wet	0.052	UJ U ICL	0.017	0.052	0.087	mg/kg	B141811	1400884
1439006-01	As	wet	1.85		0.012	0.024	0.035	mg/kg	B141813	1400888
1439006-01	As(Inorg)	wet	0.015		0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-01	Cd	wet	0.061	U	0.030	0.061	0.087	mg/kg	B141811	1400884
1439006-01	Cr	wet	0.026	J ~~B~~	0.016	0.047	0.104	mg/kg	B141921	1400882
1439006-01	Cu	wet	22.3		0.09	0.17	0.17	mg/kg	B141811	1400884
1439006-01	MeHg	wet	0.0467		0.0010	0.0020	0.0030	mg/kg	B141783	1400856
1439006-01	Ni	wet	0.26	U	0.09	0.26	0.26	mg/kg	B141812	1400878
1439006-01	Pb	wet	0.010	J ~~B~~	0.003	0.010	0.035	mg/kg	B141811	1400884
1439006-01	Se	wet	0.25		0.05	0.10	0.13	mg/kg	B141813	1400888
1439006-01	Zn	wet	14.3		0.17	0.52	0.87	mg/kg	B141811	1400884
VWW04-CRB06-0914										
1439006-02	%TS	NA	27.81		0.30		1.00	%	B141784	N/A
1439006-02	Ag	wet	0.058	UJ U ICL	0.019	0.058	0.096	mg/kg	B141811	1400884
1439006-02	As	wet	1.94		0.013	0.027	0.038	mg/kg	B141813	1400888
1439006-02	As(Inorg)	wet	0.013		0.004	0.008	0.009	mg/kg	B141785	1400891
1439006-02	Cd	wet	0.067	U	0.034	0.067	0.096	mg/kg	B141811	1400884
1439006-02	Cr	wet	0.026	J ~~B~~	0.017	0.052	0.115	mg/kg	B141921	1400882
1439006-02	Cu	wet	19.8		0.10	0.19	0.19	mg/kg	B141811	1400884
1439006-02	MeHg	wet	0.0278		0.0008	0.0017	0.0025	mg/kg	B141783	1400856
1439006-02	Ni	wet	0.29	U	0.10	0.29	0.29	mg/kg	B141812	1400878
1439006-02	Pb	wet	0.019	J ~~B~~	0.004	0.012	0.038	mg/kg	B141811	1400884
1439006-02	Se	wet	0.29		0.06	0.12	0.14	mg/kg	B141813	1400888
1439006-02	Zn	wet	16.6		0.19	0.58	0.96	mg/kg	B141811	1400884

JLC 12/2014

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-CRB07-0914										
1439006-03	%TS	NA	33.74		0.30		1.00	%	B141784	N/A
1439006-03	Ag	wet	0.056	UJ U ICL	0.019	0.056	0.093	mg/kg	B141811	1400884
1439006-03	As	wet	2.84		0.013	0.026	0.037	mg/kg	B141813	1400888
1439006-03	As(Inorg)	wet	0.008	J ~~B~~	0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-03	Cd	wet	0.065	U	0.033	0.065	0.093	mg/kg	B141811	1400884
1439006-03	Cr	wet	0.028	J ~~B~~	0.017	0.050	0.112	mg/kg	B141921	1400882
1439006-03	Cu	wet	26.4		0.09	0.19	0.19	mg/kg	B141811	1400884
1439006-03	MeHg	wet	0.0483		0.0008	0.0017	0.0025	mg/kg	B141783	1400856
1439006-03	Ni	wet	0.28	U	0.09	0.28	0.28	mg/kg	B141812	1400878
1439006-03	Pb	wet	0.009	J ~~B~~	0.004	0.011	0.037	mg/kg	B141811	1400884
1439006-03	Se	wet	0.33		0.06	0.11	0.14	mg/kg	B141813	1400888
1439006-03	Zn	wet	20.2		0.19	0.56	0.93	mg/kg	B141811	1400884
VWW04-CRB08-0914										
1439006-04	%TS	NA	22.94		0.30		1.00	%	B141784	N/A
1439006-04	Ag	wet	0.058	UJ U ICL	0.019	0.058	0.096	mg/kg	B141811	1400884
1439006-04	As	wet	2.13		0.013	0.027	0.039	mg/kg	B141813	1400888
1439006-04	As(Inorg)	wet	0.013		0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-04	Cd	wet	0.067	U	0.034	0.067	0.096	mg/kg	B141811	1400884
1439006-04	Cr	wet	0.054	J ~~B~~	0.017	0.052	0.116	mg/kg	B141921	1400882
1439006-04	Cu	wet	22.3		0.10	0.19	0.19	mg/kg	B141811	1400884
1439006-04	MeHg	wet	0.0434		0.0008	0.0017	0.0025	mg/kg	B141783	1400856
1439006-04	Ni	wet	0.29	U	0.10	0.29	0.29	mg/kg	B141812	1400878
1439006-04	Pb	wet	0.013	J ~~B~~	0.004	0.012	0.039	mg/kg	B141811	1400884
1439006-04	Se	wet	0.32		0.06	0.12	0.14	mg/kg	B141813	1400888
1439006-04	Zn	wet	18.4		0.19	0.58	0.96	mg/kg	B141811	1400884

JC 12/2014

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PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-CRB09-0914										
1439006-05	%TS	NA	26.55		0.30		1.00	%	B141784	N/A
1439006-05	Ag	wet	0.058	UJ ~~U~~ ICL	0.019	0.058	0.097	mg/kg	B141811	1400884
1439006-05	As	wet	2.11		0.014	0.027	0.039	mg/kg	B141813	1400888
1439006-05	As(Inorg)	wet	0.020		0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-05	Cd	wet	0.068	U	0.034	0.068	0.097	mg/kg	B141811	1400884
1439006-05	Cr	wet	0.029	J ~~B~~	0.017	0.052	0.116	mg/kg	B141921	1400882
1439006-05	Cu	wet	12.8		0.10	0.19	0.19	mg/kg	B141811	1400884
1439006-05	MeHg	wet	0.0494		0.0010	0.0020	0.0029	mg/kg	B141783	1400856
1439006-05	Ni	wet	0.29	U	0.10	0.29	0.29	mg/kg	B141812	1400878
1439006-05	Pb	wet	0.012	J ~~B~~	0.004	0.012	0.039	mg/kg	B141811	1400884
1439006-05	Se	wet	0.31		0.06	0.12	0.15	mg/kg	B141813	1400888
1439006-05	Zn	wet	13.5		0.19	0.58	0.97	mg/kg	B141811	1400884
VWW04-CRB10-0914										
1439006-06	%TS	NA	27.35		0.30		1.00	%	B141784	N/A
1439006-06	Ag	wet	0.055	UJ ~~U~~ ICL	0.018	0.055	0.091	mg/kg	B141811	1400884
1439006-06	As	wet	2.31		0.013	0.025	0.036	mg/kg	B141813	1400888
1439006-06	As(Inorg)	wet	0.038		0.007	0.015	0.019	mg/kg	B141785	1400891
1439006-06	Cd	wet	0.064	U	0.032	0.064	0.091	mg/kg	B141811	1400884
1439006-06	Cr	wet	0.226		0.016	0.049	0.109	mg/kg	B141921	1400882
1439006-06	Cu	wet	23.0		0.09	0.18	0.18	mg/kg	B141811	1400884
1439006-06	MeHg	wet	0.0235	J+ ~~N~~ MSH	0.0015	0.0030	0.0045	mg/kg	B141783	1400856
1439006-06	Ni	wet	0.13	J+ ~~B~~ OT	0.09	0.27	0.27	mg/kg	B141812	1400878
1439006-06	Pb	wet	0.041		0.004	0.011	0.036	mg/kg	B141811	1400884
1439006-06	Se	wet	0.26		0.05	0.11	0.14	mg/kg	B141813	1400888
1439006-06	Zn	wet	16.9		0.18	0.55	0.91	mg/kg	B141811	1400884

JLC 1/9/15

JLC 1/30/14

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PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-FS01-0914										
1439006-07	%TS	NA	31.94		0.30		1.00	%	B141950	N/A
1439006-07	Ag	wet	0.058	UJ J ICL	0.019	0.058	0.096	mg/kg	B141811	1400884
1439006-07	As	wet	1.44		0.013	0.027	0.039	mg/kg	B141813	1400888
1439006-07	As(Inorg)	wet	0.008	U	0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-07	Cd	wet	0.067	U	0.034	0.067	0.096	mg/kg	B141811	1400884
1439006-07	Cr	wet	0.054	J ~~B~~	0.017	0.052	0.116	mg/kg	B141921	1400882
1439006-07	Cu	wet	0.81		0.10	0.19	0.19	mg/kg	B141811	1400884
1439006-07	MeHg	wet	0.0758		0.0009	0.0018	0.0026	mg/kg	B141783	1400856
1439006-07	Ni	wet	0.29	U	0.10	0.29	0.29	mg/kg	B141812	1400878
1439006-07	Pb	wet	0.025	J ~~B~~	0.004	0.012	0.039	mg/kg	B141811	1400884
1439006-07	Se	wet	0.29		0.06	0.12	0.14	mg/kg	B141813	1400888
1439006-07	Zn	wet	21.2		0.19	0.58	0.96	mg/kg	B141811	1400884
VWW04-FS01P-0914										
1439006-08	%TS	NA	29.11		0.30		1.00	%	B141950	N/A
1439006-08	Ag	wet	0.056	UJ J ICL	0.019	0.056	0.094	mg/kg	B141811	1400884
1439006-08	As	wet	1.57		0.013	0.026	0.038	mg/kg	B141813	1400888
1439006-08	As(Inorg)	wet	0.007	U	0.004	0.007	0.009	mg/kg	B141785	1400891
1439006-08	Cd	wet	0.066	U	0.033	0.066	0.094	mg/kg	B141811	1400884
1439006-08	Cr	wet	0.064	J ~~B~~	0.017	0.051	0.113	mg/kg	B141921	1400882
1439006-08	Cu	wet	0.72		0.09	0.19	0.19	mg/kg	B141811	1400884
1439006-08	MeHg	wet	0.0725		0.0009	0.0017	0.0026	mg/kg	B141783	1400856
1439006-08	Ni	wet	0.28	U	0.09	0.28	0.28	mg/kg	B141812	1400878
1439006-08	Pb	wet	0.015	J ~~B~~	0.004	0.011	0.038	mg/kg	B141811	1400884
1439006-08	Se	wet	0.28		0.06	0.11	0.14	mg/kg	B141813	1400888
1439006-08	Zn	wet	16.5		0.19	0.56	0.94	mg/kg	B141811	1400884

JC 1/30/14

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-FS02-0914										
1439006-09	%TS	NA	22.33		0.30		1.00	%	B141950	N/A
1439006-09	Ag	wet	0.061	UJ ~~U~~ ICL	0.020	0.061	0.102	mg/kg	B141811	1400884
1439006-09	As	wet	0.520		0.014	0.028	0.041	mg/kg	B141813	1400888
1439006-09	As(Inorg)	wet	0.008	U	0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-09	Cd	wet	0.071	U	0.036	0.071	0.102	mg/kg	B141811	1400884
1439006-09	Cr	wet	0.055	U	0.018	0.055	0.122	mg/kg	B141921	1400882
1439006-09	Cu	wet	0.51		0.10	0.20	0.20	mg/kg	B141811	1400884
1439006-09	MeHg	wet	0.0515		0.0009	0.0019	0.0028	mg/kg	B141783	1400856
1439006-09	Ni	wet	0.30	U	0.10	0.30	0.30	mg/kg	B141812	1400878
1439006-09	Pb	wet	0.012	J ~~B~~	0.004	0.012	0.041	mg/kg	B141811	1400884
1439006-09	Se	wet	0.24		0.06	0.12	0.15	mg/kg	B141813	1400888
1439006-09	Zn	wet	20.9		0.20	0.61	1.02	mg/kg	B141811	1400884
VWW04-FS03-0914										
1439006-10	%TS	NA	23.04		0.30		1.00	%	B141950	N/A
1439006-10	Ag	wet	0.053	UJ ~~U~~ ICL	0.018	0.053	0.088	mg/kg	B141811	1400884
1439006-10	As	wet	0.208		0.012	0.025	0.035	mg/kg	B141813	1400888
1439006-10	As(Inorg)	wet	0.007	U	0.004	0.007	0.009	mg/kg	B141785	1400891
1439006-10	Cd	wet	0.062	U	0.031	0.062	0.088	mg/kg	B141811	1400884
1439006-10	Cr	wet	0.047	U	0.016	0.047	0.105	mg/kg	B141921	1400882
1439006-10	Cu	wet	0.36		0.09	0.18	0.18	mg/kg	B141811	1400884
1439006-10	MeHg	wet	0.0666		0.0010	0.0020	0.0029	mg/kg	B141783	1400856
1439006-10	Ni	wet	0.26	U	0.09	0.26	0.26	mg/kg	B141812	1400878
1439006-10	Pb	wet	0.041		0.004	0.011	0.035	mg/kg	B141811	1400884
1439006-10	Se	wet	0.16		0.05	0.11	0.13	mg/kg	B141813	1400888
1439006-10	Zn	wet	15.8		0.18	0.53	0.88	mg/kg	B141811	1400884

JAC 12/2014

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PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-FS04-0914										
1439006-11	%TS	NA	23.50		0.30		1.00	%	B141950	N/A
1439006-11	Ag	wet	0.055	UJ J ICL	0.018	0.055	0.091	mg/kg	B141811	1400884
1439006-11	As	wet	0.841		0.013	0.025	0.036	mg/kg	B141813	1400888
1439006-11	As(Inorg)	wet	0.008	U	0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-11	Cd	wet	0.064	U	0.032	0.064	0.091	mg/kg	B141811	1400884
1439006-11	Cr	wet	0.049	U	0.016	0.049	0.109	mg/kg	B141921	1400882
1439006-11	Cu	wet	0.75		0.09	0.18	0.18	mg/kg	B141811	1400884
1439006-11	MeHg	wet	0.0516		0.0008	0.0017	0.0025	mg/kg	B141783	1400856
1439006-11	Ni	wet	0.27	U	0.09	0.27	0.27	mg/kg	B141812	1400878
1439006-11	Pb	wet	0.123		0.004	0.011	0.036	mg/kg	B141811	1400884
1439006-11	Se	wet	0.20		0.05	0.11	0.14	mg/kg	B141813	1400888
1439006-11	Zn	wet	19.8		0.18	0.55	0.91	mg/kg	B141811	1400884
VWW04-FS05-0914										
1439006-12	%TS	NA	22.98		0.30		1.00	%	B141950	N/A
1439006-12	Ag	wet	0.052	UJ J ICL	0.017	0.052	0.087	mg/kg	B141811	1400884
1439006-12	As	wet	0.642		0.012	0.024	0.035	mg/kg	B141813	1400888
1439006-12	As(Inorg)	wet	0.007	U	0.004	0.007	0.009	mg/kg	B141785	1400891
1439006-12	Cd	wet	0.061	U	0.031	0.061	0.087	mg/kg	B141811	1400884
1439006-12	Cr	wet	0.047	U	0.016	0.047	0.105	mg/kg	B141921	1400882
1439006-12	Cu	wet	0.45		0.09	0.17	0.17	mg/kg	B141811	1400884
1439006-12	MeHg	wet	0.0528		0.0010	0.0020	0.0030	mg/kg	B141783	1400856
1439006-12	Ni	wet	0.26	U	0.09	0.26	0.26	mg/kg	B141812	1400878
1439006-12	Pb	wet	0.011	J B	0.003	0.010	0.035	mg/kg	B141811	1400884
1439006-12	Se	wet	0.22		0.05	0.10	0.13	mg/kg	B141813	1400888
1439006-12	Zn	wet	18.9		0.17	0.52	0.87	mg/kg	B141811	1400884

JLC 1/22/014

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-FS06-0914										
1439006-13	%TS	NA	23.16		0.30		1.00	%	B141950	N/A
1439006-13	Ag	wet	0.059	UJ U ICL	0.020	0.059	0.098	mg/kg	B141811	1400884
1439006-13	As	wet	0.335		0.014	0.028	0.039	mg/kg	B141813	1400888
1439006-13	As(Inorg)	wet	0.007	U	0.004	0.007	0.009	mg/kg	B141785	1400891
1439006-13	Cd	wet	0.069	U	0.034	0.069	0.098	mg/kg	B141811	1400884
1439006-13	Cr	wet	0.053	U	0.018	0.053	0.118	mg/kg	B141921	1400882
1439006-13	Cu	wet	0.40		0.10	0.20	0.20	mg/kg	B141811	1400884
1439006-13	MeHg	wet	0.0606		0.0009	0.0019	0.0028	mg/kg	B141783	1400856
1439006-13	Ni	wet	0.30	U	0.10	0.30	0.30	mg/kg	B141812	1400878
1439006-13	Pb	wet	0.009	J B	0.004	0.012	0.039	mg/kg	B141811	1400884
1439006-13	Se	wet	0.20		0.06	0.12	0.15	mg/kg	B141813	1400888
1439006-13	Zn	wet	15.2		0.20	0.59	0.98	mg/kg	B141811	1400884
VWW04-FS07-0914										
1439006-14	%TS	NA	21.49		0.30		1.00	%	B141950	N/A
1439006-14	Ag	wet	0.058	UJ U ICL	0.019	0.058	0.097	mg/kg	B141811	1400884
1439006-14	As	wet	0.377		0.014	0.027	0.039	mg/kg	B141813	1400888
1439006-14	As(Inorg)	wet	0.007	U	0.004	0.007	0.009	mg/kg	B141785	1400891
1439006-14	Cd	wet	0.068	U	0.034	0.068	0.097	mg/kg	B141811	1400884
1439006-14	Cr	wet	0.053	U	0.018	0.053	0.117	mg/kg	B141921	1400882
1439006-14	Cu	wet	0.47		0.10	0.19	0.19	mg/kg	B141811	1400884
1439006-14	MeHg	wet	0.0589		0.0009	0.0017	0.0026	mg/kg	B141783	1400856
1439006-14	Ni	wet	0.29	U	0.10	0.29	0.29	mg/kg	B141812	1400878
1439006-14	Pb	wet	0.015	J B	0.004	0.012	0.039	mg/kg	B141811	1400884
1439006-14	Se	wet	0.19		0.06	0.12	0.15	mg/kg	B141813	1400888
1439006-14	Zn	wet	16.0		0.19	0.58	0.97	mg/kg	B141811	1400884

JMC 1/22/14

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-FS08-0914										
1439006-15	%TS	NA	22.34		0.30		1.00	%	B141950	N/A
1439006-15	Ag	wet	0.057	UJ U ICL	0.019	0.057	0.095	mg/kg	B141811	1400884
1439006-15	As	wet	0.429		0.013	0.026	0.038	mg/kg	B141813	1400888
1439006-15	As(Inorg)	wet	0.008	U	0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-15	Cd	wet	0.066	U	0.033	0.066	0.095	mg/kg	B141811	1400884
1439006-15	Cr	wet	0.051	U	0.017	0.051	0.113	mg/kg	B141921	1400882
1439006-15	Cu	wet	0.58		0.09	0.19	0.19	mg/kg	B141811	1400884
1439006-15	MeHg	wet	0.0580		0.0009	0.0018	0.0027	mg/kg	B141783	1400856
1439006-15	Ni	wet	0.28	U	0.09	0.28	0.28	mg/kg	B141812	1400878
1439006-15	Pb	wet	0.008	J B	0.004	0.011	0.038	mg/kg	B141811	1400884
1439006-15	Se	wet	0.17		0.06	0.11	0.14	mg/kg	B141813	1400888
1439006-15	Zn	wet	12.7		0.19	0.57	0.95	mg/kg	B141811	1400884
VWW04-FS09-0914										
1439006-16	%TS	NA	20.08		0.30		1.00	%	B141950	N/A
1439006-16	Ag	wet	0.052	UJ U ICL	0.017	0.052	0.087	mg/kg	B141811	1400884
1439006-16	As	wet	0.160		0.012	0.024	0.035	mg/kg	B141813	1400888
1439006-16	As(Inorg)	wet	0.008	U	0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-16	Cd	wet	0.061	U	0.030	0.061	0.087	mg/kg	B141811	1400884
1439006-16	Cr	wet	0.047	U	0.016	0.047	0.105	mg/kg	B141921	1400882
1439006-16	Cu	wet	0.49		0.09	0.17	0.17	mg/kg	B141811	1400884
1439006-16	MeHg	wet	0.0717		0.0009	0.0017	0.0026	mg/kg	B141783	1400856
1439006-16	Ni	wet	0.26	U	0.09	0.26	0.26	mg/kg	B141812	1400878
1439006-16	Pb	wet	0.016	J B	0.003	0.010	0.035	mg/kg	B141811	1400884
1439006-16	Se	wet	0.18		0.05	0.10	0.13	mg/kg	B141813	1400888
1439006-16	Zn	wet	19.1		0.17	0.52	0.87	mg/kg	B141811	1400884

JAC 13014

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Results

Sample	Analyte	Basis	Result	Qualifier	MDL	LOD	MRL	Unit	Batch	Sequence
VWW04-FS10-0914										
1439006-17	%TS	NA	32.27		0.30		1.00	%	B141950	N/A
1439006-17	Ag	wet	0.056	UJ ~~U~~ ICL	0.019	0.056	0.093	mg/kg	B141811	1400884
1439006-17	As	wet	1.13	~~M~~	0.013	0.026	0.037	mg/kg	B141813	1400888
1439006-17	As(Inorg)	wet	0.008	U	0.004	0.008	0.010	mg/kg	B141785	1400891
1439006-17	Cd	wet	0.065	U	0.033	0.065	0.093	mg/kg	B141811	1400884
1439006-17	Cr	wet	0.074	J ~~B~~	0.017	0.050	0.112	mg/kg	B141921	1400882
1439006-17	Cu	wet	0.86		0.09	0.19	0.19	mg/kg	B141811	1400884
1439006-17	MeHg	wet	0.0973	J + ~~N~~ MSH	0.0015	0.0030	0.0044	mg/kg	B141783	1400856
1439006-17	Ni	wet	0.28	U	0.09	0.28	0.28	mg/kg	B141812	1400878
1439006-17	Pb	wet	0.020	J ~~B~~	0.004	0.011	0.037	mg/kg	B141811	1400884
1439006-17	Se	wet	0.31		0.06	0.11	0.14	mg/kg	B141813	1400888
1439006-17	Zn	wet	19.8		0.19	0.56	0.93	mg/kg	B141811	1400884

JMC 1/9/15

JMC 1/22/14

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021

Case Narrative

Shipping and Receiving

On September 23, 2014, Brooks Rand Labs (BRL) received eleven (11) crab samples, eleven (11) fish samples, and one (1) bait sample at 09:50 A.M. in three coolers with ice and at temperatures of 1.4 °C, -0.8 °C, and 0.8 °C. On September 23, 2014, BRL received an additional eleven (11) crab samples and eleven (11) fish samples at 09:30 A.M. in two coolers with ice and at temperatures of -1.0 °C and -1.2 °C. These additional samples were put on hold with the exception of the associated homogenization blank. Samples listed on the COC forms with "MS" and "MSD" were to indicate that the sample should be used as a quality control sample and no samples with "MS" or "MSD" in their sample IDs were logged. Samples with "P" in the sample ID were considered field duplicates and were generated at BRL during homogenization. The chain-of-custody (COC) forms requested analysis for percent total solids (%TS), methyl mercury (MeHg), silver (Ag), arsenic (As), inorganic arsenic [As(Inorg)], cadmium (Cd), chromium (Cr), copper (Cu), nickel (Ni), lead (Pb), selenium (Se), and zinc (Zn). The samples were received and stored securely according to BRL standard operating procedures (SOP) and EPA methodology.

Preservation and Holding Time

All method and SOP requirements for preservation and holding time were satisfied.

Homogenization (SOP BR-0106)

Once thawed, the samples were homogenized using pre-cleaned commercial grade homogenization equipment. During homogenization of the biota samples, two homogenization blanks, one for fish and one for crab, were collected and batched for analysis.

Methylmercury in Tissue by EPA Method 1630 (SOP BR-0011)

Tissue samples are prepared by alkaline digestion in 25% KOH in methanol and oven digestion at 65 °C for 3-4 hours. Samples are analyzed by ethylation, Tenax trap collection, gas chromatography separation, isothermal decomposition, and cold vapor fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instruments MERX-M CVAFS Methylmercury Automated-Analyzer.

- Per the client's specific request to adhere to the EPA Draft Method 1638 requirement of non-method blank corrected data, the results were not method blank corrected as described in the calculations section of the relevant BRL SOP(s). This deviates from BRL's standard protocol for trace level data quality and BRL believes that all low-level metals analyses should be method blank corrected and that not doing so may lead to less accurate results. The results from the method blanks that were analyzed are listed in the *Method Blanks & Reporting Limits* section of this report.

All results have been reported to the concentration of the method detection limit (MDL), referred to as the detection limit (DL) in the DoD QSM. The Limit of Quantitation (LOQ) is defined in this report as the method reporting limit (MRL).

Results less than or equal to the MDL are reported at the Limit of Detection (LOD) and qualified **U**. Results between the MDL and MRL were qualified **B**.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

Sequence 1400856

Instrument calibration, meeting all quality control criteria, was successfully achieved on the day of sample analysis.

Several peaks were manually integrated by the analyst and approved by BRL's QA department.

All continuing calibration blanks (CCBs) had concentrations less the MRL for biota samples (3.60 pg).

Batch B141783

The matrix spike/matrix spike duplicate (MS/MSD) sets performed on samples *VWW04-CRB10-0914* (1439006-06) and *VWW04-FS10-0914* (1439006-17) had elevated recoveries. The sample results were qualified **N** for inaccuracy and potential high bias.

Aside from concentration qualifiers, all data was reported without further qualification and all other associated quality control sample results met the acceptance criteria.

Batch B141797

The MS/MSD set performed on sample 1439038-02 had elevated recoveries. The sample result was qualified **N** for inaccuracy and potential high bias. No samples from this work order were qualified.

Aside from concentration qualifiers, all data was reported without qualification and all other associated quality control sample results met the acceptance criteria.

Trace Metals EPA Method 1638 modified (BR-0070) [tissues]

Analysis is performed by EPA Draft Method 1638 (modified) using inductively coupled plasma - mass spectrometry (ICP-MS) with Dynamic Reaction Cell (DRC™) technology. Prior to analysis, 0.5 mg aliquots of the samples are digested with 10 mL ultra-pure nitric acid and 100 µL hydrogen peroxide and heating for a minimum of four hours at 100 °C. Aliquots of digested sample are analyzed utilizing internal standardization. This method incorporates ionization of the sample in an inductively-coupled RF plasma, with detection of the resulting ions by mass spectrometer on the basis of their mass-to-charge ratio.

- Per the client's specific request to adhere to the EPA Draft Method 1638 requirement of non-method blank corrected data, the results were not method blank corrected as described in the calculations section of the relevant BRL SOP(s). This deviates from BRL's standard protocol for trace level data quality and BRL believes that all low-level metals analyses should be method blank corrected and that not doing so may lead to less accurate results. The results from the method blanks that were analyzed are listed in the *Method Blanks & Reporting Limits* section of this report.

All results have been reported to the concentration of the method detection limit (MDL), referred to as the detection limit (DL) in the DoD QSM. The Limit of Quantitation (LOQ) is defined in this report as the method reporting limit (MRL).

Results less than or equal to the MDL are reported at the Limit of Detection (LOD) and qualified **U**. Results between the MDL and MRL were qualified **B**.

The interference check standard known generally as ICS-A was labeled "IFA". The interference check standard generally known as ICS-AB was labeled "IFB". The information for the interference check standards can be found in the Instrument Calibration pages of the respective analyte and sequence. In cases where the interference check solution has no certified value, the report indicates that the true value is the LOD with -100% to 100% limits. If IFA or IFB were not certiefied for a particular analyte, no recovery is reported.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

The recovery criteria limits did not apply to specific elements when the standard reference materials (SRMs) only listed information values. The recovery limits were not applicable (**N/A**). Not all SRMs provided certified or information values for all elements; therefore, not all elements were reported.

Sequence 1400878

Instrument calibration, meeting all quality control criteria, was successfully achieved on the day of sample analysis. The initial calibration verification (ICV) standard for Cr recovered low. All samples for Cr analysis were re-analyzed and reported in sequence 1400882.

The IFA had an elevated recovery for Ni. The MDL, LOD, and MRL were elevated from 0.05 mg/kg, 0.15 mg/kg and 0.15 mg/kg, respectively, to 0.1 mg/kg, 0.3 mg/kg, and 0.3 mg/kg, respectively. All sample results were already less than the initial MRL of 0.15 mg/kg.

The initial calibration blank (ICB) ICB2 had an elevated concentration for Ni. No samples were bracketed by this blank and no further action was required.

The continuing calibration verification (CCV) standards CCV3 through CCV6 and CCVB had recoveries that did not meet DoD criteria. CCV5 and CCV6 bracketed sample results. These had elevated recoveries and all sample results were less than the MRL or were quality control sample results that met acceptance criteria, indicating that a high bias did not affect the sample results. No further action was required.

Batch B141812

Aside from concentration qualifiers, all data was reported without qualification and all associated quality control sample results met the acceptance criteria.

Sequence 1400882

Instrument calibration, meeting all quality control criteria, was successfully achieved on the day of sample analysis.

The initial calibration verification (ICV) standards ICV1 and ICV2 did not meet criteria for Cr. The ICV3 did, verifying the calibration, and ICV1 and ICV2 were not reported.

The ICB2 had an elevated concentration for Cr. No samples were bracketed by this blank and no further action was required.

The CCV2 had a recovery that did not meet DoD criteria. No samples from these work orders were bracketed by this CCV and no further action was required.

Batch B141921

The SRM TORT-3 (SRM1) had a low recovery of 68% for Cr. The historical recovery of this SRM is 66%. The SRM NIST 1547 (SRM2) is not certified for Cr and had a recovery of 43%. The historical recovery of this SRM is 47%. Since both SRMs were similar to historical recoveries, no qualifications were necessary.

The Cr native result for sample *VWW04-FS10-0914* (1439006-17) and its associated DUP result yielded a RPD above the acceptance limit (39%). The sample result and the associated DUP met the secondary criteria of being less than 5x the MRL and within 2x the MRL of each other. No qualifications were necessary.

Aside from concentration qualifiers, all data was reported without qualification and all associated quality control sample results met the acceptance criteria.

Sequence 1400884

Instrument calibration, meeting all quality control criteria, was successfully achieved on the day of sample analysis.

The ICV1 had a low recovery for Ag. This is a known issue with this standard. SCV1, another independent standard, met acceptance criteria and no further action was required.

The CCV4 through CCV6 had recoveries that did not meet DoD criteria for Cu. No samples from these work orders were bracketed by these CCVs and no further action was required.

The IFA had an elevated recovery for Cd. The MDL, LOD, and MRL were elevated from 0.007 mg/kg, 0.014 mg/kg and 0.020 mg/kg, respectively, to 0.035 mg/kg, 0.070 mg/kg, and 0.100 mg/kg, respectively. All sample results were already less than the initial MRL of 0.020 mg/kg.

Batch B141811

The Cu and Pb native results for sample *VWW04-FS10-0914* (1439006-17) and its associated DUP2 results yielded RPDs above the acceptance limit (33% and 74%, respectively). The sample results and the associated DUPs met the secondary criteria of being less than 5x the MRL and within 2x the MRL of each other. No qualifications were necessary.

Aside from concentration qualifiers, all data was reported without qualification and all associated quality control sample results met the acceptance criteria.

Sequence 1400888

Instrument calibration, meeting all quality control criteria, was successfully achieved on the day of sample analysis.

The ICB2 had elevated concentrations for As & Se. In addition, ICB and the instrument blanks (IBLs) IBL1 through IBL4 had elevated concentrations for Se. No samples were bracketed by these blanks and no further action was required.

The CCV9 had an elevated recovery for As. All client samples bracketed by this elevated CCV were re-analyzed in sequence 1400889. All other elevated CCVs and CCBs for As and Se did not bracket sample results.

Sequence 1400889

Instrument calibration, meeting all quality control criteria, was successfully achieved on the day of sample analysis.

The ICB2 had an elevated concentration for As. No samples were bracketed by this blank and no further action was required. All other elevated CCVs and CCBs for As did not bracket sample results.

Batch B141813

The As native result for sample *VWW04-FS10-0914* (1439006-17) and its associated DUP2 result yielded a RPD above the acceptance limit (24%). The As sample result was qualified **M** for duplicate imprecision.

The Se MS/MSD set performed on sample 1439035-10 had elevated recoveries. The sample result was qualified **N** for inaccuracy and potential high bias. No samples from this work order were qualified.

Aside from concentration qualifiers, all data was reported without further qualification and all other associated quality control sample results met the acceptance criteria.

Inorganic Arsenic in Biota by EPA Method 1632, Modified (SOP BR-0021)

Prior to analysis, samples are digested with 2 M hydrochloric acid (HCl) and heated for 16 hours. Then, an aliquot of biota digestate is placed in a specially-designed reaction vessel and 6 M HCl is added. To this, a 4% (m/v) sodium borohydride ($NaBH_4$) solution is added to convert the inorganic arsenic to volatile arsines. Arsines are purged from the sample onto a cooled glass trap. The trapped arsines are thermally desorbed, in order of increasing boiling points, into an inert gas stream that carries them into the quartz furnace of an atomic absorption spectrophotometer for detection. The first arsine (AsH_3) to be desorbed is represents total inorganic As in the sample.

Per the client's specific request to adhere to the EPA Draft Method 1638 requirement of non-method blank corrected data, the results were not method blank corrected as described in the calculations section of the relevant BRL SOP(s). This deviates from BRL's standard protocol for trace level data quality and BRL believes that all low-level metals analyses should be method blank corrected and that not doing so may lead to less accurate results. The results from the method blanks that were analyzed are listed in the *Method Blanks & Reporting Limits* section of this report.

All results have been reported to the concentration of the method detection limit (MDL), referred to as the detection limit (DL) in the DoD QSM. The Limit of Quantitation (LOQ) is defined in this report as the method reporting limit (MRL).

Results less than or equal to the MDL are reported at the Limit of Detection (LOD) and qualified **U**. Results between the MDL and MRL were qualified **B**.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

Sequence 1400859

Instrument calibration, meeting all quality control criteria, was successfully achieved on the day of sample analysis.

Several peaks were manually integrated by the analyst and approved by BRL's QA department.

Batch B141818

Aside from concentration qualifiers, all data was reported without qualification and all associated quality control sample results met the acceptance criteria.

Sequence 1400891

Instrument calibration, meeting all quality control criteria, was successfully achieved on the day of sample analysis.

Several peaks were manually integrated by the analyst and approved by BRL's QA department.

Batch B141785

Samples *VWW04-CRB10-0914* (1439006-06), DUP1, and *VWW04-BAB01-0914* (1439026-26) were analyzed at two dilutions. The re-analyses were reported.

The MS/MSD sets performed on samples VWW04-FS10-0914 (1439006-17) and VWW04-BAB01-0914 (1439026-26) were overspiked and not analyzed. Post-preparation spikes (PS) were analyzed instead and met acceptance criteria.

Aside from concentration qualifiers, all data was reported without qualification and all associated quality control sample results met the acceptance criteria.

Percent Total Solids in Solids by SM 2540G (SOP BR-1501)

A solid sample is homogenized and an aliquot is measured into a pre-weighed vessel, dried in an oven overnight, weighed again, and the percent of dried solid material is calculated.

The results may have been evaluated using reporting limits that have been adjusted to account for sample aliquot size. Please refer to the Sample Results page for sample-specific MDLs, MRLs, and other details.

Batch B141784

The DUP performed on sample *VWW04-FS10-0914* (1439006-17) did not meet duplicate precision criteria. This sample and all other fish samples were re-prepared and reported in batch B141950. All data was reported without qualification and all associated quality control sample results met the acceptance criteria.

Batch B141950

All data was reported without qualification and all associated quality control sample results met the acceptance criteria.

We certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. BRL, an accredited laboratory, certifies that the reported results of all analyses for which BRL is NELAP accredited meet all NELAP requirements. For more details, please see the *Report Information* page in your report. Please feel free to contact us if you have any questions regarding this report.

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PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
VWW04-CRB05-0914	1439006-01	Crab	Sample	09/19/2014	09/23/2014
VWW04-CRB06-0914	1439006-02	Crab	Sample	09/19/2014	09/23/2014
VWW04-CRB07-0914	1439006-03	Crab	Sample	09/19/2014	09/23/2014
VWW04-CRB08-0914	1439006-04	Crab	Sample	09/19/2014	09/23/2014
VWW04-CRB09-0914	1439006-05	Crab	Sample	09/19/2014	09/23/2014
VWW04-CRB10-0914	1439006-06	Crab	QC Sample	09/19/2014	09/23/2014
VWW04-FS01-0914	1439006-07	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS01P-0914	1439006-08	Fish	Field Duplicate	09/19/2014	09/23/2014
VWW04-FS02-0914	1439006-09	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS03-0914	1439006-10	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS04-0914	1439006-11	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS05-0914	1439006-12	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS06-0914	1439006-13	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS07-0914	1439006-14	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS08-0914	1439006-15	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS09-0914	1439006-16	Fish	Sample	09/19/2014	09/23/2014
VWW04-FS10-0914	1439006-17	Fish	QC Sample	09/19/2014	09/23/2014
Homogenization Blank (Crab)	1439006-18	DIW	Homog Blank	09/23/2014	09/23/2014
Homogenization Blank (Crab)	1439006-19	DIW	Homog Blank	09/23/2014	09/23/2014
Homogenization Blank (Crab)	1439006-20	DIW	Homog Blank	09/23/2014	09/23/2014
Homogenization Blank (crab)	1439006-21	DIW	Homog Blank	09/23/2014	09/23/2014
VWW04-CRB01-0914	1439006-22	Crab	Sample	09/18/2014	09/23/2014
VWW04-CRB02-0914	1439006-23	Crab	Sample	09/18/2014	09/23/2014
VWW04-CRB03-0914	1439006-24	Crab	Sample	09/18/2014	09/23/2014
VWW04-CRB04-0914	1439006-25	Crab	Sample	09/18/2014	09/23/2014
VWW04-BAB01-0914	1439006-26	Bait	Sample	09/18/2014	09/23/2014
VWW04-CRB01P-0914	1439006-27	Crab	Field Duplicate	09/18/2014	09/23/2014

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
VWW04-CRB11-0914	1439024-01	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB11P-0914	1439024-02	Crab	Field Duplicate	09/22/2014	09/24/2014
VWW04-CRB12-0914	1439024-03	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB13-0914	1439024-04	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB14-0914	1439024-05	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB15-0914	1439024-06	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB16-0914	1439024-07	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB17-0914	1439024-08	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB18-0914	1439024-09	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB19-0914	1439024-10	Crab	Sample	09/22/2014	09/24/2014
VWW04-CRB20-0914	1439024-11	Crab	QC Sample	09/22/2014	09/24/2014
VWW04-FS11-0914	1439024-12	Fish	Sample	09/22/2014	09/24/2014
VWW04-FS11P-0914	1439024-13	Fish	Field Duplicate	09/22/2014	09/24/2014
VWW04-FS12-0914	1439024-14	Fish	Sample	09/22/2014	09/24/2014
VWW04-FS13-0914	1439024-15	Fish	Sample	09/22/2014	09/24/2014
VWW04-FS14-0914	1439024-16	Fish	Sample	09/22/2014	09/24/2014
VWW04-FS15-0914	1439024-17	Fish	Sample	09/23/2014	09/24/2014
VWW04-FS16-0914	1439024-18	Fish	Sample	09/23/2014	09/24/2014
VWW04-FS17-0914	1439024-19	Fish	Sample	09/23/2014	09/24/2014
VWW04-FS18-0914	1439024-20	Fish	Sample	09/23/2014	09/24/2014
VWW04-FS19-0914	1439024-21	Fish	Sample	09/23/2014	09/24/2014
VWW04-FS20-0914	1439024-22	Fish	QC Sample	09/23/2014	09/24/2014
Homogenization Blank (Fish)	1439024-23	DIW	Homog Blank	09/25/2014	09/24/2014
Homogenization Blank (Fish)	1439024-24	DIW	Homog Blank	09/25/2014	09/24/2014
Homogenization Blank (Fish)	1439024-25	DIW	Homog Blank	09/25/2014	09/24/2014
Homogenization Blank (Fish)	1439024-26	DIW	Homog Blank	09/25/2014	09/24/2014

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MEANINGFUL METALS DATA

3958 6th Avenue NW
Seattle, WA 98107
Phone: 206-632-6206
Fax: 206-632-6017

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www.brooksrand.com

Chain of Custody Record

BRL Report 1439096 & 1439024

White: LAB COPY
Yellow: CUSTOMER COPY

Client: Juliana Vegan	Address: 5701 Cleveland St. Suite 200 Virginia Beach, VA 23462	COC receipt confirmation? Y / N If so, by: email / fax (circle one)
Contact: CH2M Hill		Email:
Client project ID:		Fax #:
PO #:	Phone #: 757-497-6885	

Requested TAT in business days:
- ☐ 20 (standard)
- ☐ 15
- ☐ 10
- ☐ 5
- ☐ Other ____

Surcharges apply for expedited turn around times.

	Sample ID	Collection: Date	Collection: Time	Miscellaneous: Sampler (initials)	Miscellaneous: Matrix type	Miscellaneous: # of containers	Miscellaneous: Field filtered? (Y/N)	Field Preservation: Unpreserved / ice only	Field Preservation: HCl / HNO_3 (circle one)	Field Preservation: Other (specify)	Analyses required: Total Hg, EPA 1631	Analyses required: Methyl Hg, EPA 1630 ✓	Analyses required: ICP-MS Metals (specify)	Analyses required: As / Se species (specify) ✓	Analyses required: % Solids	Analyses required: Filtration	Analyses required: Other (specify)	Analyses required: Other (specify)	Comments
1	VWW04-CRB05-0914	9/19/14	0905	TS	TS	1					X	X	X	X	X				
2	VWW04-CRB06-0914	9/19/14	0840	JRM	TS	1					X	X	X	X	X				
3	VWW04-CRB07-0914	9/19/14	0810	JRM	TS	1					X	X	X	X	X				
4	VWW04-CRB08-0914	9/19/14	0750	JRM	TS	1					X	X	X	X	X				
5	VWW04-CRB09-0914	9/19/14	0755	JRM	TS	1					X	X	X	X	X				
6	VWW04-CRB10-0914	9/19/14	0820	JRM	TS	1					X	X	X	X	X				
7	VWW04-CRB10-0914MS	9/19/14	0820	JRM	TS	1					X	X	X	X	X	JRM			
8	VWW04-CRB10-0914SD	9/19/14	0820	JRM	TS	1					X	X	X						
9																			
10																			

Relinquished by:	Date: 9/19/14	Time: 1300	Relinquished by: / Date: / Time:
Received by:	Date:	Time:	Received at BRL by: [illegible] Date: 9/23/14 Time: 0950
Shipping carrier:	# of coolers: 3		BRL work order ID: 1439096 BRL project ID: CH14-CH140

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3958 6th Avenue NW
Seattle, WA 98107
Phone: 206-632-6206
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Chain of Custody Record

Rpt 1439006 & 1439024

White: LAB COPY
Yellow: CUSTOMER COPY

Client: JULIANA PEÑA	Address: SAMG	COC receipt confirmation? Y / N If so, by: email / fax (circle one)
Contact: CH2M HILL		Email:
Client project ID:		Fax #:
PO #:	Phone #:	

Requested TAT in business days:
- ☐ 20 (standard)
- ☐ 15
- ☐ 10
- ☐ 5
- ☐ Other ____

Surcharges apply for expedited turn around times.

	Sample ID	Collection: Date	Collection: Time	Miscellaneous: Sampler (initials)	Miscellaneous: Matrix type	Miscellaneous: # of containers	Miscellaneous: Field filtered? (Y/N)	Field Preservation: Unpreserved / ice only	Field Preservation: HCl / HNO_3 (circle one)	Field Preservation: Other (specify)	Analyses required: Total Hg, EPA 1631	Analyses required: Methyl Hg, EPA 1630	Analyses required: ICP-MS Metals (specify)	Analyses required: As / Se species (specify)	Analyses required: % Solids	Analyses required: Filtration	Analyses required: Other (specify)	Analyses required: Other (specify)	Comments
1	VWW04-FS01-0914	9/19/14	0745	JRM	TS	1					X	X	X	X	X				
2	VWW04-FS01P-0914		~~0750~~ 0745	JRM		1					X	X	X	X					
3	VWW04-FS02-0914		~~0800~~	JRM		1					X	X	X	X	X				
4	VWW04-FS03-0914		0805	JRM		1					X	X	X	X	X				
5	VWW04-FS04-0914		0815	JRM		1					X	X	X	X	X				
6	VWW04-FS05-0914		0825	JRM		1					X	X	X	X	X				
7	VWW04-FS06-0914		0830	JRM		1					X	X	X	X	X				
8	VWW04-FS07-0914		0835	JRM		1					X	X	X	X	X				
9	VWW04-FS08-0914		0840	JRM		1					X	X	X	X	X				
10	VWW04-FS09-0914		0850	JRM		1					X	X	X	X	X				

Relinquished by: [signature]	Date: 9/19/14	Time: 1300	Relinquished by:
Received by:	Date:	Time:	Received at BRL by: [signature] Date: 9/23/14 Time: 1050
Shipping carrier:	# of coolers:		BRL work order ID: 1439006 BRL project ID: CHM-CH101

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Chain of Custody Record

Report 1439006 & 1439024

White: LAB COPY
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Client: Julian Pgon	Address: SAME	COC receipt confirmation? Y / N If so, by: email / fax (circle one)
Contact: Chazm Hill		Email:
Client project ID:		
PO #:	Phone #:	Fax #:

Requested TAT in business days:
- ☐ 20 (standard)
- ☐ 15
- ☐ 10
- ☐ 5
- ☐ Other ____

Surcharges apply for expedited turn around times.

	Sample ID	Collection: Date	Collection: Time	Miscellaneous: Sampler (initials)	Miscellaneous: Matrix type	Miscellaneous: # of containers	Miscellaneous: Field-filtered? (Y/N)	Field Preservation: Unpreserved / ice only	Field Preservation: HCl / HNO_3 (circle one)	Field Preservation: Other (specify)	Analyses required: Total Hg, EPA 1631	Analyses required: Methyl Hg, EPA 1630	Analyses required: ICP-MS Metals (specify)	Analyses required: As / Se species (specify)	Analyses required: % Solids	Analyses required: Filtration	Analyses required: Other (specify)	Analyses required: Other (specify)	Comments
1	VWW04-FS10-0914	9/19/14	0900	JRM	TS	1					X	X	X	X	X				
2	VWW04-FS10-0914MS	9/19/14	0900	JRM	TS	1					X	X	X	X					
3	VWW04-FS10-0914SD	9/19/14	0900	JRM	TS	1					X	X	X	X					
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Relinquished by:	Date: 9/19/14	Time: 1360	Relinquished by:	Date:	Time:
Received by:	Date:	Time:	Received at BRL by: Lorin Hall	Date: 9/23/14	Time: 0950
Shipping carrier:	# of coolers:		BRL work order ID: 1439006	BRL project ID: CHM-CH1401	

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SEATTLE, WA

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19292

BRL Report 1439006 & 1439024

Send Results to:	Send Invoice to:
Name JULIANA DEAN	Name SAME
Company CHAM PRL	Company
Address 5701 CLEVELAND ST. STE 200	Address
City VIRGINIA BEACH	City
State, Zip VA 23462	State, Zip
Phone 757-671-6232	Phone
Fax 757-497-6885	Fax
E-mail JULIANA.DEANE CHAM.COM	E-mail
Project No./Name: VIEQUES SWMU 4 TISSUE	**Sampler's (Signature):** John A Martin

Analysis Requirements: BR-0106 Homogenize; EPA 1630 MeHg; EPA 1632 Inorg As; EPA 1638 As, Cd, Cr, Cu, Pb, Ni, Se, Ag, Zn; 2,4,6-TNT, NMX, PETN, RDX; % Lipids EXT-Lipid; % Solids SM 2540

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #: _____

CAR #: _____

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	Comments	No. of Bottles	Lab Use Only Containers/Pres.
	9/18/14 1230	VWW04-CRB01-0914	TISSUE	1-CRAB		
	9/18/14 1235	VWW04-CRB02-0914	TISSUE	1-CRAB		
	9/18/14 1345	VWW04-CRB03-0914	TISSUE	1-CRAB		
	9/18/14 1350	VWW04-CRB04-0914	TISSUE	1-CRAB		
	9/18/14 1400	VWW04-BAB01-0914	TISSUE	1-CRAB		
	9/18/14 1230	VWW04-CRB01P-0914	TISSUE	BAIT- SPANISH MACKEREL		

Sample Kit Prep'd by: (Signature)	Date/Time	Received By: (Signature)	
Relinquished by: (Signature) John A Martin	Date/Time 9/19/14 1200	Received By: (Signature)	
Relinquished by: (Signature)	Date/Time 9/23/14 0950	Received By: (Signature)	
Received for Laboratory by: (Signature)	Date/Time	*Temperature*	

REMARKS:

Details:

Page _____ of _____

Cooler No. ____ of ____

Date Shipped _____

Shipped By _____

Turnaround _____

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

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1 of 2

19293

1439024 ERI Report 1439006 & 1439024

Send Results to:	Send Invoice to:
Name Juliana Dean	Name
Company CH2M Hill	Company
Address 5701 Cleveland St. #200	Address
City Virginia Beach	City
State, Zip VA 23462	State, Zip
Phone 757-671-6282	Phone
Fax	Fax
E-mail Juliana.Dean@CH2M.com	E-mail

Project No./Name: Vieques Swmu 4 Tissue

Sampler's (Signature): John R Martin

Analysis Requirements: BR-0106 Homogenize; EPA 1630 Me Hg; EPA 1632 Inorg As; EPA 1638 As, Cd, Cr, Co, Pb, Ni, Se, Ag, Zn; 2,4,6-TNT, HMX, RDX, Picrate; 20 Lipids GC Lipids; 2. Solids SM 2540

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #:

CAR #:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	Comments	No. of Bottles	Lab Use Only Containers/Pres.
	9/22/14 0915	VWW04-CRB11-0914	TS	CRAB X2	1	
	9/22/14 0915	VWW04-CRB11P-0914		CRAB	1	
	9/22/14 1017	VWW04-CRB12-0914		CRAB	1	
	9/22/14 0950	VWW04-CRB13-0914		CRAB	1	
	9/22/14 0930	VWW04-CRB14-0914		CRAB	1	
	9/22/14 0932	VWW04-CRB15-0914		CRAB	1	
	9/22/14 0921	VWW04-CRB16-0914		CRAB	1	
	9/23/14 0923	VWW04-CRB17-0914		CRAB	1	
	9/22/14 1003	VWW04-CRB18-0914		CRAB	1	
	9/22/14 1000	VWW04-CRB19-0914		CRAB	1	
	9/22/14 1030	VWW04-CRB20-0914		CRAB X3	1	
	9/22/14 1630	VWW04-CRB20-0914MS	✓	CRAB X3	1	

	Date/Time	Received By: (Signature)
Sample Kit Prep'd by: (Signature)		
Relinquished by: (Signature) John R Martin	Date/Time 9/23/14 0900	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature) Lori Wyatt	Date/Time 9/24/14 0930	*Temperature* -1.0°C & -1.2°C

REMARKS:

Details:

Page 1 of 2

Cooler No. ____ of ____

Date Shipped

Shipped By

Turnaround

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

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P. 272
19294

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BRL Report 1439006 & 1439024

Send Results to:	Send Invoice to:
Name Juliana Dean	Name
Company CH2M HILL	Company
Address	Address
City	City
State, Zip	State, Zip
Phone	Phone
Fax	Fax
E-mail	E-mail
Project No./Name: Vieques Sumu 4 Tissue	**Sampler's (Signature):** Stephen M Martin

Analysis Requirements:

BR-0906 Homogenize; EPA 1630 Me Hg; EPA 1632 Trace As As(3+ or 5+) Cu Pb Ni Se Ag Zn; EPA 1638 Trace Ag Cd Cu Pb Ni Se Tl Zn; 2,4,6 Tet, HMX, RDX, Perchlorate; % Lipids EXT. Lipids; % Solids SM 2540

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #:

CAR #:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	Comments	No. of Bottles	Lab Use Only Containers/Pres.
	9/22/14 1030	VWW04-CRB20-0914SD	TS	CRAB x3		
	9/22/14 0920	VWW04-FS11-0914	TS	FISH		
	9/22/14 0920	VWW04-FS11P-0914	TS	FISH		
	9/22/14 0925	VWW04-FS12-0914	TS	FISH		
	9/22/14 0930	VWW04-FS13-0914	TS	FISH		
	9/22/14 1030	VWW04-FS14-0914	TS	FISH		

Sample Kit Prep'd by: (Signature)	Date/Time	Received By: (Signature)	REMARKS:
Relinquished by: (Signature) Stephen M Martin	Date/Time 9/23/14 0800	Received By: (Signature)	
Relinquished by: (Signature)	Date/Time	Received By: (Signature)	
Received for Laboratory by: (Signature) Lori Lunn	Date/Time 9/24/14 0930	*Temperature*	

Details:

Page 2 of 2

Cooler No. ____ of ____

Date Shipped ____

Shipped By ____

Turnaround ____

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

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BRL Report 1439006 & 1439024

19205

Send Results to:	Send Invoice to:
Name Juliana Dean	Name SAME
Company CH2M Hill	Company
Address 5701 Cleveland St. #200	Address
City Virginia Beach	City
State, Zip VA 23462	State, Zip
Phone 757-671-6232	Phone
Fax	Fax
E-mail Juliana.Dean@CH2M.com	E-mail

Project No./Name: Vieques Swmu4 Tissue

Samplers (Signature):

Analysis Requirements:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	B2-006 Homogenize	EPA 1630 Me Hg	EPA 1632 Inorg. As	EPA 1638 As, Cd, Cr, Cu, Pb Ni, Se, Ag, Zn	3,4,6 TNT, HMX, RDX, Picric Acid	% Lipids GRAV.	% Solids SM 2540	Comments	No. of Bottles	Lab Use Only Containers/Pres.
	9/23/14 0745	VWW04-FS15-0914	TS	X	X	X	X	X	X	X	FISH		
	9/23/14 0755	VWW04-FS16-0914	TS	X	X	X	X	X	X	X	FISH		
	9/23/14 0810	VWW04-FS17-0914	TS	X	X	X	X	X	X	X	FISH		
	9/23/14 0820	VWW04-FS18-0914	TS	X	X	X	X	X	X	X	FISH		
	9/23/14 0830	VWW04-FS19-0914	TS	X	X	X	X	X	X	X	FISH		
	9/23/14 0845	VWW04-FS20-0914	TS	X	X	X	X	X	X	X	FISH		
	9/23/14 0845	VWW04-FS20-0914MS	TS	X	X	X	X	X			FISH		
	9/23/14 0845	VWW04-FS20-0914SD	TS	X	X	X	X	X			FISH		

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #:

CAR #:

Sample Kit Prep'd by: (Signature)	Date/Time	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature) Lori Wiq	Date/Time 9/24/14 0930	*Temperature*

REMARKS:

Details:

Page 1 of 1

Cooler No. ____ of ____

Date Shipped ____

Shipped By ____

Turnaround ____

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

1439006

This SDG contains trace metals analysis using USEPA methods 1638M with laboratory SOP modifications, methyl mercury analysis by1630M with laboratory SOP modifications, and inorganic arsenic by 1632M with SOP modifications. The site is in Region II. However, the region does not have validation SOP checklists for these methods. Therefore, the validation was performed using method/SOP QC specifications, the DOD specifications, and good professional judgment. Region II guidance was utilized as applicable.

A case narrative that tabulated pertinent information regarding sample receipt, condition, preservation & holding time compliance was provided by the laboratory. Specific information regarding the method and modifications was present in this narrative. Any QC issues were also noted in the narrative. CLP or CLP-like forms were not present in the data package. Results were summarized on spreadsheets that were printed and submitted in the front of the data package. These summaries along with the raw data were sufficient to allow a complete review of the analytical data package with the request of additional information regarding calibration processing and calculations.

SAMPLE RECEIPT, PRESERVATION & HOLDING TIMES

Sampling Date: 9/18-23/14
Received Date: 9/23/14
Prep. Dates: 10/2-3/14 (1630); 10/16 (1632); 10/13-10/14 (1638)
Analysis Dates: 10/15 (1630); 10/17 (1632); 10/16 & 10/20 (1638)

Sample shipping and receipt paperwork was in order. Cooler temperatures were acceptable. All holding time requirements were met. COC records are present, containing necessary signatures indicating change of custody between sampler and laboratory.

Sample preparation digestion logs were present in the data package. The pH value for the homogenization blanks was <2. The sampling date was incorrect for one of the homogenization blanks. This was corrected by the client.

CALIBRATIONS

Information regarding specific calibration procedures was requested from the laboratory. This information was provided in the form of spreadsheets that tabulated the ICAL curves and responses as well as average calibration factors since the information was not provided in the data package.

Methyl Mercury - 1630: All initial calibration criteria were met. Proper sequence was analyzed. All ICV and CCV recoveries were met. Raw data was verified.

Inorganic Arsenic - 1632: All initial calibration criteria were met. Proper sequence was analyzed. All ICV and CCV recoveries were met. Raw data was verified.

Select Metals – 1638: All initial calibration criteria were met. All ICP Tuning and internal standard requirements were met. All ICV, CCV and low calibration standard criteria were met or associated samples were reanalyzed against acceptable QC standards with one exception. *The ICV associated with the silver analysis exhibited a low recovery (<90%) at 85%. For this reason, all silver results in samples analyzed on this sequence were qualified as J-/UJ. This affects all samples reported in this data package.*

Some of the IFA (interference check) standards exhibited high recoveries (Cd and Ni). Based on these issues the lab raised the reporting limits. *There was one positive result reported for Ni which was less than the adjusted MRL but slightly above the MDL. This result is flagged as J+ based on Region II recommendation.* There were no positive results reported for Cd. All other IFA & IFB criteria were met.

Raw data was verified.

BLANK SUMMARY

Blank qualification guidelines:

- No action is taken if an analyte is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the criteria.

- See blank type specific validation guidelines noted below (taken from the Region II SOP for CLP metals and adapted to this project).
- Qualification/Action codes:

Note: non-detect results are reported to the LOD so the LOD is the RL for this project.

ICB/CCB/PB Action:

No Action - The sample result is greater than the LOD and greater than ten times (10X) the blank value.

U - The sample result is greater than or equal to the MDL but less than or equal to the LOD, result is reported as non-detect at the reporting limit, when the ICB/CCB/PB result is less than the LOD.

U - Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD. Flag is U at the blank level.

J - Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the LOD.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.
Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action - The sample result is greater than the LOD and greater than ten times (10X) the blank value.

U - The sample result is greater than or equal to the MDL but less than or equal to the LOD when the field blank result is greater than the LOD - result is reported as non-detect at the reporting limit.

U - Sample result is greater than the LOD and less than the field blank value when the field blank result is greater than the LOD. Flag is U at the blank level.

J - Sample result is greater than the field blank value but less than 10X the field blank value when field blank result is greater than the LOD.

Blank Contamination and Qualification Summaries

Blank ID	Analyte	Concentration	Action Level
No contamination resulting in qualification of the analytical results was noted in this data package.			

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here. Negative contamination in a prep blank or CCB, if less than the analyte LOD, is qualified based on professional judgment. Field QC blank associations are determined using tracking provided by the client. Flags are applied to samples based on these associations. **The concentration noted for the CCBs is the highest concentration in all the associated CCBs. However, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.**

LABORATORY CONTROL SAMPLE SUMMARY

All LFB and CRM criteria were met with the exception of Ag in the CRM (not certified) which exhibited low recoveries as expected based on historical performance. The LFB was fine so no qualification of the data was applied.

MATRIX SPIKE/DUPLICATE SUMMARY

Qualifications were made based on the spike recoveries exhibited by client MS/MSD pairs only. Non-client pairs were submitted in some cases. The results from these spikes were not used to assess the data since the results are not matrix specific to the site in question.

Methyl Mercury – 1630: The matrix spike pair of sample VWW06-CRB10-0914 exhibited recoveries above the upper QC limit of 135% at 158% & 153% for the target analyte methyl mercury. *The reported positive result in the native sample was qualified as biased high J+ based on Region II guidance.* The matrix spike pair of sample VWW06-FS10-0914 exhibited recoveries above the upper QC limit of 135% at 141% & 147% for the target analyte methyl mercury. *The reported positive result in the native sample was qualified as biased high J+ based on Region II guidance.*

All other client matrix spike pairs exhibited acceptable results. Summary pages of these results are included in these worksheets.

The matrix duplicate results were acceptable (within 35% RPD for results >5X MRL). No qualifications were required.

SERIAL DILUTIONS

There were no serial dilution results submitted for these methods. No qualifications were required.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Raw data and calculations were verified. Field duplicate reproducibility was assessed – see next page. No qualifications were required based on FD results. *All B flagged analytes were qualified as estimated J because the reported results were between the MDL and the MRL.*

Reviewer Jacqueline Cleveland **Date:** 12/31/14

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VWW04-CRB01-0914
Duplicate Sample ID: VWW04-CRB01P-0914

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
SILVER			#DIV/0!
ARSENIC	2.3	1.94	17
CADMIUM			#DIV/0!
CHROMIUM *	0.047	0.052	10
COPPER	15.8	12.8	21
NICKEL			#DIV/0!
LEAD	0.028	0.028	0
SELENIUM	0.24	0.21	13
ZINC	16.2	14.3	12
INORGANIC ARSENIC	0.023	0.025	8
METHYL MERCURY	0.0445	0.0408	9

COMMENTS: No qualifications were required.
* Indicates that the results are < MRL

Sample ID: VWW04-FS01-0914
Duplicate Sample ID: VWW04-FS01P-0914

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
SILVER			#DIV/0!
ARSENIC	1.44	1.57	9
CADMIUM			#DIV/0!
CHROMIUM *	0.054	0.064	17
COPPER	0.81	0.72	12
NICKEL			#DIV/0!
LEAD *	0.025	0.015	50
SELENIUM	0.29	0.28	4
ZINC	21.2	16.5	25
INORGANIC ARSENIC			#DIV/0!
METHYL MERCURY	0.0758	0.0725	4

COMMENTS: No qualifications were required.
* Indicates that the results are < MRL

CH2M HILL VIEQUES CTO-37 - SWMU4 METHYL MERCURY CALCULATIONS

Sample -Positive result

ICP-MS	
SAMPLE ID	VWW04-CRB01P-0914
ANALYTE	methyl Hg
Lab Value CONCENTRATION (mg/Kg)	0.0408
AMOUNT FROM RAW DATA (pg)	56.7
SAMPLE SIZE (g)	0.116
FINAL VOLUME (L)	2.5
DILUTION FACTOR	1
ANALYZED VOLUME	0.03
CONVERSION FACTOR (ug/g to mg/Kg)	1000
CALCULATED CONCENTRATION (ug/Kg)	0.041

Samples are reported on a wet weight basis with Solids reported.

CH2M HILL VIEQUES CTO-37 - SWMU4 INORGANIC ARSENIC CALCULATIONS

Sample -Positive result

ICP-MS	
SAMPLE ID	VWW04-CRB10-0914
ANALYTE	Inorganic As
Lab Value CONCENTRATION (mg/Kg)	0.038
AMOUNT FROM RAW DATA (ng)	2.03
SAMPLE SIZE (g)	0.5392
FINAL VOLUME (L)	10
DILUTION FACTOR	1
ANALYZED VOLUME	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	0.038

Samples are reported on a wet weight basis with Solids reported.

CH2M HILL VIEQUES CTO-37 - SWMU4 METALS CALCULATIONS

Sample -Positive result

ICP-MS	
SAMPLE ID	VWW06-BAB01-0914
ANALYTE	copper
Lab Value CONCENTRATION (mg/Kg)	0.22
AMOUNT FROM RAW DATA (ug/L)	3.2499
SAMPLE SIZE (g)	0.579
FINAL VOLUME (L)	0.04
DILUTION FACTOR	1
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	0.22

Samples are reported on a wet weight basis with Solids reported.

CH2M HILL Vieques - CTO-37, SWMU4 — Reporting Limit Calcs

Select Metals - 1638

ICP - MS	
SAMPLE ID	VWW04-CRB04-0914
ANALYTE	zinc
Form 1 LOD or LOQ Value (mg/Kg)	0.59
Analyte LOD or LOQ	0.6
Dilution Factor	1
Nominal Sample Size (g)	0.5
SAMPLE SIZE (g)	0.508
DRYNESS FACTOR	1
Corrected LOD or LOQ (mg/Kg)	0.591

Samples are reported on a wet weight basis with Total Solids reported.

Jacqueline Cleveland

From: Tiffany Stilwater <Tiffany@brooksrand.com>
Sent: Tuesday, December 30, 2014 12:51 PM
To: Jacqueline Cleveland; Misty Kennard-Mayer
Cc: 'Juliana Dean'
Subject: RE: CH2M HILL Vieques West SWMU4 Data
Attachments: 1400891 QA.PDF; 1400856 QA.PDF; 1400859 QA.PDF

Good morning Jackie!
I've got a response and hopefully all will make sense!

The average calibration coefficient isn't normally part of the data package, but we have been printing out the QA Summary page from Guru for some clients when requested. I've attached these Summary Pages for the analytical sequences in your report. The "Calibration Factor", which is what Guru calls the average calibration coefficient. We typically only report 3 significant figures, so using this value won't necessarily give the exact same result since Guru does not round this value before calculating the results.

With regards to processing curves without BLK correction, if that is done they will likely have to accept higher reporting limits since it is likely that at least the low standard will fail without this correction. EPA 1630, 1631e, and 1632 all call for this correction. It is not the same as method blank correction, but instead corrects for "noise" inherent in the analysis. ICP-MS corrects for this by zeroing the instrument after the first ICB. The IBL correction called for in the 1600 series methods is essentially doing the same and is necessary to get accurate results.

Note, all sample results were reported without the use of method-blank correction.

Let me know if you need anything else!
Tiffany

From: Jacqueline Cleveland [mailto:cleve137@charter.net]
Sent: Monday, December 29, 2014 1:38 PM
To: Tiffany Stilwater; Misty Kennard-Mayer
Cc: 'Juliana Dean'
Subject: RE: CH2M HILL Vieques West SWMU4 Data
Importance: High

Hi Tiffany,

Thank you for the information. I have a couple of questions as a result of your response.

Is there a place in the data package that lists the average of the calibration coefficients for each of these methods? I need to verify the calibrations somehow and cannot find a summary page reporting these averages. Also, I believe the client requested that the results be reported without blank correction. Does that mean that the curves were processed without blank correction also?

It would be helpful if you would point me to the pages where I can find this information if available in the package. If it is not available I need a summary of the average calibration coefficients for each target compound for the methods. I found the calculations page you referred to in the data package but this only discusses sample quantitation, not calibrations.

I appreciate your help in sorting this out!

Jackie

From: Tiffany Stilwater [mailto:Tiffany@brooksrand.com]
Sent: Tuesday, December 23, 2014 5:12 PM
To: Misty Kennard-Mayer; Jacqueline Cleveland
Cc: 'Juliana Dean'
Subject: RE: CH2M HILL Vieques West SWMU4 Data

Hi Jackie,
Hopefully it's not too late...this just in from my QA VP:

There are a few things they should know and may not be doing:

1. These methods do not use curves. They instead use the average of the calibration coefficients as described in the EPA Methods and our SOP. We do this a little different (backwards) from the EPA methods in that we divide the calibration standard by the associated peak area (height) - average IBL peak area (height).
   Cal Coeficient = Conc. / (PA_{Cal} - PA_{AvgIBL})
   and take the average of all of the seperate calibration coeficcient

2. Which brings us to the next point. The average IBL peak area (EPA 1632) or peak height (EPA 1630) is subtracted from each sample (including calibration standards). This is straight from the methods and must be done. There is one difference in that the EPA methods say to use the average of all of the CCBs, but we only use the initial IBLs so that any potential carryover during the analysis does not affect the average of the IBLs used to correct the samples.

3. We also method blank correct data, which is not discussed in these two methods. The only one without any actual BLKs would be EPA 16322 methods for waters, where the IBLs are uploaded as BLKs, but since they have already been accounted for (See #2 above), they are not used again to correct results. However, all 1630 matrices and all solid 1632 matrices have associated prepared blanks that are also subtracted from the results.

Tell them to try to calculate the data by these rules and see if it matches. If not, they can email their spreadsheet to me and I'll take a look at it. I'll be in this Friday and then again next week on Monday and Tuesday.

Let me know if you need anything else! God Jul!
Tiffany

From: Misty Kennard-Mayer
Sent: Tuesday, December 23, 2014 10:19 AM
To: Jacqueline Cleveland
Cc: 'Juliana Dean'; Tiffany Stilwater
Subject: RE: CH2M HILL Vieques West SWMU4 Data

Jackie –

Thank you for contacting me. Yes, Lydia is on maternity leave and we are a bit short staffed this week. By when do you need this information?

Sincerely,

Misty Kennard-Mayer
Business Development

Direct: 206-753-6125
misty@brooksrand.com

If you haven't seen our new website yet, check it out!

BROOKS RAND LABS

MEANINGFUL METALS DATA
P: 206-632-6206 | F: 206-632-6017 | 3958 6th Ave NW, Seattle WA 98107, USA
GSA Contract Number GS07F0288Y (SIN 873-2)

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From: Jacqueline Cleveland [mailto:cleve137@charter.net]
Sent: Tuesday, December 23, 2014 9:56 AM
To: Misty Kennard-Mayer
Cc: 'Juliana Dean'
Subject: FW: CH2M HILL Vieques West SWMU4 Data

Hi Misty,

I am trying to obtain some calibration information on some data I am validating for Juliana Dean at CH2M HILL. She said she thought Lydia might be on maternity leave. If so, will you help me with the following request? Thanks so much.

Jackie

From: Jacqueline Cleveland [mailto:cleve137@charter.net]
Sent: Monday, Decernber 22, 2014 2:04 PM
To: 'lydia@brooksrand.com'
Cc: 'Juliana Dean (Juliana.Dean@ch2m.com)'
Subject: CH2M HILL Vieques West SWMU4 Data

Hello Lydia,

Your name was given to me by Juliana Dean at CH2M HILL as a contact on the job mentioned above. I am providing data validation for this site and need to request a couple of items. Please send over the calibration curve plots and equations for the curves for the methyl mercury (1630) and for the inorganic arsenic (1632) methods. I was able to find all of the data but when I plotted the curves and tried to verify results I was unable to do so. If you would please, also send over a calculation example for both methods. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual Environmental Serrvices, LLC
636-352-9391 (cell)

Jacqueline Cleveland

From: Tiffany Stilwater <Tiffany@brooksrand.com>
Sent: Tuesday, December 23, 2014 5:12 PM
To: Misty Kennard-Mayer; Jacqueline Cleveland
Cc: 'Juliana Dean'
Subject: RE: CH2M HILL Vieques West SWMU4 Data

Hi Jackie,
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There are a few things they should know and may not be doing:

1. These methods do not use curves. They instead use the average of the calibration coefficients as described in the EPA Methods and our SOP. We do this a little different (backwards) from the EPA methods in that we divide the calibration standard by the associated peak area (height) - average IBL peak area (height).
   Cal Coeficient = Conc. / (PA_{Cal} - PA_{AvgIBL})
   and take the average of all of the seperate calibration coeficcient

   — Client requested no blank correction

2. Which brings us to the next point. The average IBL peak area (EPA 1632) or peak height (EPA 1630) is subtracted from each sample (including calibration standards). This is straight from the methods and must be done. There is one difference in that the EPA methods say to use the average of all of the CCBs, but we only use the initial IBLs so that any potential carryover during the analysis does not affect the average of the IBLs used to correct the samples.

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Tell them to try to calculate the data by these rules and see if it matches. If not, they can email their spreadsheet to me and I'll take a look at it. I'll be in this Friday and then again next week on Monday and Tuesday.

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Cc: 'Juliana Dean'; Tiffany Stilwater
Subject: RE: CH2M HILL Vieques West SWMU4 Data

Jackie –

Thank you for contacting me. Yes, Lydia is on maternity leave and we are a bit short staffed this week. By when do you need this information?

Sincerely,

Jacqueline Cleveland

From: Tiffany Stilwater <Tiffany@brooksrand.com>
Sent: Tuesday, December 23, 2014 2:53 PM
To: Misty Kennard-Mayer; Jacqueline Cleveland
Cc: 'Juliana Dean'
Subject: RE: CH2M HILL Vieques West SWMU4 Data

Hi Jackie,
Thanks for reaching out! Today is like one big snowball!

For the Sample Calculations please refer to page 96 of your report. (assuming you are reviewing BRL report 1439006/1439024).

Honestly, I am not sure what you need exactly for additional " calibration curve plots and equations for the curves for the methyl mercury (1630) and for the inorganic arsenic (1632) methods". My VP of Quality is out of the office right now, but suppose to be back later this afternoon. I will touch bases with him then.

Talk to you soon!
Tiffany

From: Misty Kennard-Mayer
Sent: Tuesday, December 23, 2014 10:19 AM
To: Jacqueline Cleveland
Cc: 'Juliana Dean'; Tiffany Stilwater
Subject: RE: CH2M HILL Vieques West SWMU4 Data

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Sincerely,

Misty Kennard-Mayer
Business Development
Direct: 206-753-6125
misty@brooksrand.com

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GSA Contract Number GS07F0288Y (SIN 873-2)

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Jacqueline Cleveland

From: Misty Kennard-Mayer <Misty@brooksrand.com>
Sent: Tuesday, December 23, 2014 12:19 PM
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Subject: RE: CH2M HILL Vieques West SWMU4 Data

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Jackie

From: Jacqueline Cleveland [mailto:cleve137@charter.net]
Sent: Monday, December 22, 2014 2:04 PM
To: 'lydia@brooksrand.com'
Cc: 'Juliana Dean (Juliana.Dean@ch2m.com)'
Subject: CH2M HILL Vieques West SWMU4 Data

Hello Lydia,

Your name was given to me by Juliana Dean at CH2M HILL as a contact on the job mentioned above. I am providing data validation for this site and need to request a couple of items. Please send over the calibration curve plots and equations for the curves for the methyl mercury (1630) and for the inorganic arsenic (1632) methods. I was able to find all of the data but when I plotted the curves and tried to verify results I was unable to do so. If you would please, also send over a calculation example for both methods. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual Environmental Serrvices, LLC
636-352-9391 (cell)
cleve137@charter.net

Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400856
Instrument: MMHG-09
Date: 10/08/2014
Analyte: MeHg

Total Mercury and Mercury Speciation by CVAFS
Method: EPA 1630

Lab ID	True Value	Result	Units	REC & Limits	
1400856-IBL1		0.0417	pg MeHg		
1400856-IBL2		0.0167	pg MeHg		
1400856-IBL3		0.0417	pg MeHg		
1400856-CAL1	0.5000	0.5	pg MeHg	107%	
1400856-CAL2	1.000	0.9	pg MeHg	85%	
1400856-CAL3	2.000	1.8	pg MeHg	89%	
1400856-CAL4	10.00	10.1	pg MeHg	101%	
1400856-CAL5	50.00	50.7	pg MeHg	101%	
1400856-CAL6	250.0	274.5	pg MeHg	110%	
1400856-CAL7	1000	1141	pg MeHg	114%	
1400856-CCB1		1.81	pg MeHg		
1400856-ICV1	100.0	102.0	pg MeHg	102%	80-120
1400856-CCB2		1.55	pg MeHg		
1400856-CCV1	25.00	26.3	pg MeHg	105%	67-133
1400856-CCB3		0.350	pg MeHg		
1400856-CCB4		0.317	pg MeHg		
1400856-CCB5		0.0917	pg MeHg		
1400856-CCV2	25.00	27.4	pg MeHg	110%	67-133
1400856-CCB6		0.917	pg MeHg *		
1400856-CCV3	25.00	26.5	pg MeHg	106%	67-133
1400856-CCB7		0.200	pg MeHg		
1400856-CCV4	25.00	25.4	pg MeHg	102%	67-133
1400856-CCB8		0.108	pg MeHg		
1400856-CCV5	25.00	26.7	pg MeHg	107%	67-133
1400856-CCB9		0.167	pg MeHg		
1400856-CCV6	25.00	26.3	pg MeHg	105%	67-133
1400856-CCBA		0.0917	pg MeHg		
1400856-CCV7	25.00	25.7	pg MeHg	103%	67-133
1400856-CCBB		0.100	pg MeHg		
1400856-CCV8	25.00	27.5	pg MeHg	110%	67-133
1400856-CCBC		0.0584	pg MeHg		
1400856-CCV9	25.00	27.1	pg MeHg	108%	67-133
1400856-CCBD		0.300	pg MeHg		
1400856-CCVA	25.00	28.4	pg MeHg	114%	67-133
1400856-CCBE		0.284	pg MeHg		
1400856-CCVB	25.00	27.5	pg MeHg	110%	67-133
1400856-CCBF		1.82	pg MeHg *		
1400856-CCVC	25.00	30.7	pg MeHg	123%	67-133
1400856-CCBG		1.11	pg MeHg *		
1400856-CCVD	25.00	27.3	pg MeHg	109%	67-133

no Quals required

no Quals required

no Quals required

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052

Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400856
Instrument: MMHG-09
Date: 10/08/2014
Analyte: MeHg

Total Mercury and Mercury Speciation by CVAFS
Method: EPA 1630

Lab ID	True Value	Result	Units	REC & Limits
1400856-CCBH		0.384	pg MeHg	

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Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400884
Instrument: ICP-MS-3
Date: 10/16/2014
Analyte: Cd 114

Trace Metals by ICP-MS
Method: EPA 1638

Lab ID	True Value	Result	Units	REC & Limits	
1400884-ICB1		0.000	µg/L		
1400884-CAL1	0.02000	0.020	µg/L	99%	
1400884-CAL2	0.04000	0.041	µg/L	102%	
1400884-CAL3	0.2000	0.204	µg/L	102%	
1400884-CAL4	0.4000	0.396	µg/L	99%	
1400884-CAL5	1.000	0.983	µg/L	98%	
1400884-CAL6	2.000	2.019	µg/L	101%	
1400884-CAL7	10.00	10.03	µg/L	100%	
1400884-CAL8	20.00	19.78	µg/L	99%	
1400884-ICB2		0.0004	µg/L		
1400884-ICV1	0.5000	0.488	µg/L	98%	90-110
1400884-IBL1		0.0006	µg/L		
1400884-IBL2		0.0004	µg/L		
1400884-IBL3		0.0006	µg/L		
1400884-IBL4		0.001	µg/L		
1400884-SCV1	3.992	3.778	µg/L	95%	75-125
1400884-IFA1	2.800	12.34	µg/L	*441%*	-100-100
1400884-IFB1	50.00	58.06	µg/L	116%	80-120
1400884-CCV1	0.4000	0.399	µg/L	100%	90-110
1400884-CCB1		0.0002	µg/L		
1400884-CCV2	0.4000	0.393	µg/L	98%	90-110
1400884-CCB2		0.00007	µg/L		
1400884-CCV3	0.4000	0.400	µg/L	100%	90-110
1400884-CCB3		0.00006	µg/L		
1400884-CCV4	0.4000	0.414	µg/L	103%	90-110
1400884-CCB4		0.0005	µg/L		
1400884-CCV5	0.4000	0.400	µg/L	100%	90-110
1400884-CCB5		0.0007	µg/L		
1400884-CCV6	0.4000	0.406	µg/L	101%	90-110
1400884-CCB6		0.0005	µg/L		
1400884-CCV7	0.4000	0.406	µg/L	101%	90-110
1400884-CCB7		0.00008	µg/L		
1400884-CCV8	0.4000	0.409	µg/L	102%	90-110
1400884-CCB8		0.0008	µg/L		
1400884-CCV9	0.4000	0.424	µg/L	106%	90-110
1400884-CCB9		0.0007	µg/L		
1400884-CCVA	0.4000	0.420	µg/L	105%	90-110
1400884-CCBA		0.0005	µg/L		
1400884-CCVB	0.4000	0.419	µg/L	105%	90-110
1400884-CCBB		0.00006	µg/L		
1400884-CCVC	0.4000	0.422	µg/L	106%	90-110

Note - lab raised RL's due to ↓ IFA results - no additional quals were required.

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Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400884
Instrument: ICP-MS-3
Date: 10/16/2014
Analyte: Cd 114

Trace Metals by ICP-MS
Method: EPA 1638

Lab ID	True Value	Result	Units	REC & Limits	
1400884-CCBC		0.0004	µg/L		
1400884-CCVD	0.4000	0.429	µg/L	107%	90-110
1400884-CCBD		0.0001	µg/L		

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Project ID: CHM-CH1401
PM: Lydia Greaves

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MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400878
Instrument: ICP-MS-2
Date: 10/14/2014
Analyte: Ni-1 62

Trace Metals by ICP-DRC-MS
Method: EPA 1638 DRC

Lab ID	True Value	Result	Units	REC & Limits	
1400878-ICB1		0.00	µg/L		
1400878-CAL1	0.04000	0.04	µg/L	103%	
1400878-CAL2	0.2000	0.18	µg/L	88%	
1400878-CAL3	0.4000	0.37	µg/L	93%	
1400878-CAL4	2.000	1.91	µg/L	95%	
1400878-CAL5	5.000	4.95	µg/L	99%	
1400878-CAL6	10.00	9.90	µg/L	99%	
1400878-CAL7	50.00	52.62	µg/L	105%	
1400878-CAL8	100.0	108.3	µg/L	108%	
1400878-CAL9	200.0	216.8	µg/L	108%	
1400878-ICB2		0.05	µg/L		
1400878-ICV1	5.000	4.43	µg/L	89%	85-115
1400878-ICB3		0.008	µg/L		
1400878-IBL1		-0.003	µg/L		
1400878-IBL2		0.005	µg/L		
1400878-IBL3		0.009	µg/L		
1400878-IBL4		0.02	µg/L		
1400878-SCV1	25.32	23.91	µg/L	94%	75-125
1400878-IFA1	24.00	53.23	µg/L	222%	-100-100 Lab raised RLs as a result of high IFA1
1400878-IFB1	200.0	234.6	µg/L	117%	80-120 OK
1400878-CCV1	2.000	1.92	µg/L	96%	90-110
1400878-CCB1		-0.003	µg/L		
1400878-CCV2	2.000	2.04	µg/L	102%	90-110
1400878-CCB2		0.01	µg/L		
1400878-CCV3	2.000	2.36	µg/L	118%	90-110 NQ no +
1400878-CCB3		-0.006	µg/L		
1400878-CCV4	2.000	1.55	µg/L	78%	90-110 - none associated
1400878-CCB4		0.02	µg/L		
1400878-CCV5	2.000	2.50	µg/L	125%	90-110 NQ no +
1400878-CCB5		-0.003	µg/L		
1400878-CCV6	2.000	2.43	µg/L	121%	90-110 NQ no +
1400878-CCB6		-0.002	µg/L		
1400878-CCV7	5.000	5.21	µg/L	104%	90-110
1400878-CCB7		-0.006	µg/L		
1400878-CCV8	5.000	4.58	µg/L	92%	90-110
1400878-CCB8		-0.002	µg/L		
1400878-CCV9	5.000	4.74	µg/L	95%	90-110
1400878-CCB9		-0.003	µg/L		
1400878-CCVA	5.000	4.91	µg/L	98%	90-110
1400878-CCBA		0.007	µg/L		
1400878-CCVB	5.000	7.45	µg/L	149%	90-110 NQ no +

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Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400878
Instrument: ICP-MS-2
Date: 10/14/2014
Analyte: Ni-1 62

Trace Metals by ICP-DRC-MS
Method: EPA 1638 DRC

Lab ID	True Value	Result	Units	REC & Limits
1400878-CCBB		0.0008	µg/L	

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Project ID: CHM-CH1401
PM: Lydia Greaves

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MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400882
Instrument: ICP-MS-2
Date: 10/15/2014
Analyte: Cr 52

Trace Metals by ICP-MS
Method: EPA 1638 DRC

Lab ID	True Value	Result	Units	REC & Limits	
1400882-ICB1		0.000	µg/L		
1400882-CAL1	0.03004	0.031	µg/L	102%	
1400882-CAL2	0.1502	0.138	µg/L	92%	
1400882-CAL3	0.3004	0.283	µg/L	94%	
1400882-CAL4	1.502	1.474	µg/L	98%	
1400882-CAL5	12.51	12.15	µg/L	97%	
1400882-CAL6	25.02	24.04	µg/L	96%	
1400882-CAL7	125.1	125.8	µg/L	101%	
1400882-CAL8	250.2	265.6	µg/L	106%	
1400882-CAL9	500.4	563.9	µg/L	113%	
1400882-ICB2		0.245	µg/L		
1400882-ICV3	12.50	11.49	µg/L	92%	90-110 ✓
1400882-ICB3		-0.004	µg/L		
1400882-IBL1		-0.005	µg/L		
1400882-IBL2		-0.005	µg/L		
1400882-IBL3		-0.006	µg/L		
1400882-IBL4		-0.005	µg/L		
1400882-SCV1	40.54	38.40	µg/L	95%	75-125
1400882-IFA1	30.00	30.06	µg/L	100%	-100-100
1400882-IFB1	100.0	106.3	µg/L	106%	80-120
1400882-CCV1	1.502	1.481	µg/L	99%	90-110
1400882-CCB1		-0.005	µg/L		
1400882-CCV2	1.502	1.330	µg/L	89%	90-110 none associated
1400882-CCB2		0.023	µg/L		
1400882-CCV3	1.502	1.352	µg/L	90%	90-110
1400882-CCB3		0.022	µg/L		
1400882-CCV4	1.502	1.469	µg/L	98%	90-110
1400882-CCB4		-0.005	µg/L		
1400882-CCV5	1.502	1.505	µg/L	100%	90-110
1400882-CCB5		-0.006	µg/L		
1400882-CCV6	1.502	1.420	µg/L	95%	90-110
1400882-CCB6		-0.001	µg/L		
1400882-CCV7	1.502	1.502	µg/L	100%	90-110
1400882-CCB7		-0.005	µg/L		
1400882-CCV8	1.502	1.483	µg/L	99%	90-110
1400882-CCB8		-0.006	µg/L		
1400882-CCV9	1.502	1.491	µg/L	99%	90-110
1400882-CCB9		-0.005	µg/L		
1400882-CCVA	12.51	12.19	µg/L	97%	90-110
1400882-CCBA		-0.004	µg/L		
1400882-CCVB	12.51	12.48	µg/L	100%	90-110

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Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400882
Instrument: ICP-MS-2
Date: 10/15/2014
Analyte: Cr 52

Trace Metals by ICP-MS
Method: EPA 1638 DRC

Lab ID	True Value	Result	Units	REC & Limits	
1400882-CCBB		-0.003	µg/L		
1400882-CCVC	12.51	12.68	µg/L	101%	90-110
1400882-CCBC		-0.004	µg/L		
1400882-CCVD	12.51	13.04	µg/L	104%	90-110
1400882-CCBD		-0.002	µg/L		
1400882-CCVE	12.51	13.21	µg/L	106%	90-110
1400882-CCBE		-0.002	µg/L		

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Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400884
Instrument: ICP-MS-3
Date: 10/16/2014
Analyte: Ag 107

Trace Metals by ICP-MS
Method: EPA 1638

Lab ID	True Value	Result	Units	REC & Limits	
1400884-ICB1		0.000	µg/L		
1400884-CAL1	0.02000	0.020	µg/L	102%	
1400884-CAL2	0.04000	0.038	µg/L	95%	
1400884-CAL3	0.2000	0.198	µg/L	99%	
1400884-CAL4	0.4000	0.392	µg/L	98%	
1400884-CAL5	2.000	2.088	µg/L	104%	
1400884-CAL6	4.000	4.094	µg/L	102%	
1400884-CAL7	20.00	20.01	µg/L	100%	
1400884-CAL8	40.00	39.31	µg/L	98%	
1400884-ICB2		0.0001	µg/L		
1400884-ICV1	1.000	0.851	µg/L	85%	90-110 J/UJ in all samples
1400884-IBL1		-0.006	µg/L		
1400884-IBL2		-0.007	µg/L		
1400884-IBL3		-0.007	µg/L		
1400884-IBL4		-0.007	µg/L		
1400884-SCV1	8.081	7.948	µg/L	98%	75-125
1400884-SCV3	4.000	3.233	µg/L	81%	75-125
1400884-IFA1	3.000	-0.254	µg/L	-8.5%	-100-100
1400884-IFB1	100.0	94.73	µg/L	95%	80-120
1400884-CCV1	0.4000	0.393	µg/L	98%	90-110
1400884-CCB1		-0.007	µg/L		
1400884-CCV2	0.4000	0.378	µg/L	94%	90-110
1400884-CCB2		-0.007	µg/L		
1400884-CCV3	0.4000	0.385	µg/L	96%	90-110
1400884-CCB3		-0.007	µg/L		
1400884-CCV4	0.4000	0.392	µg/L	98%	90-110
1400884-CCB4		-0.006	µg/L		
1400884-CCV5	0.4000	0.406	µg/L	102%	90-110
1400884-CCB5		-0.006	µg/L		
1400884-CCV6	0.4000	0.404	µg/L	101%	90-110
1400884-CCB6		-0.006	µg/L		
1400884-CCV7	0.4000	0.407	µg/L	102%	90-110
1400884-CCB7		-0.006	µg/L		
1400884-CCV8	0.4000	0.419	µg/L	105%	90-110
1400884-CCB8		-0.006	µg/L		
1400884-CCV9	0.4000	0.409	µg/L	102%	90-110
1400884-CCB9		-0.006	µg/L		
1400884-CCVA	0.4000	0.420	µg/L	105%	90-110
1400884-CCBA		-0.006	µg/L		
1400884-CCVB	0.4000	0.395	µg/L	99%	90-110
1400884-CCBB		-0.007	µg/L		

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Project ID: CHM-CH1401
PM: Lydia Greaves

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MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400884
Instrument: ICP-MS-3
Date: 10/16/2014
Analyte: Ag 107

Trace Metals by ICP-MS
Method: EPA 1638

Lab ID	True Value	Result	Units	REC & Limits	
1400884-CCVC	0.4000	0.403	µg/L	101%	90-110
1400884-CCBC		-0.006	µg/L		
1400884-CCVD	0.4000	0.397	µg/L	99%	90-110
1400884-CCBD		-0.006	µg/L		

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400888
Instrument: ICP-MS-2
Date: 10/16/2014
Analyte: As 91

Trace Metals by ICP-DRC-MS
Method: EPA 1638 DRC

Lab ID	True Value	Result	Units	REC & Limits	
1400888-ICB1		0.000	µg/L		
1400888-CAL1	0.02500	0.025	µg/L	100%	
1400888-CAL2	0.05000	0.050	µg/L	101%	
1400888-CAL3	0.2500	0.251	µg/L	100%	
1400888-CAL4	1.000	1.015	µg/L	102%	
1400888-CAL5	5.000	4.966	µg/L	99%	
1400888-CAL6	25.00	25.04	µg/L	100%	
1400888-CAL7	125.0	126.1	µg/L	101%	
1400888-CAL8	500.0	487.1	µg/L	97%	
1400888-ICB2		0.210	µg/L		
1400888-ICV1	5.000	5.094	µg/L	102%	90-110
1400888-ICB3		0.014	µg/L		
1400888-IBL1		0.009	µg/L		
1400888-IBL2		0.008	µg/L		
1400888-IBL3		0.006	µg/L		
1400888-IBL4		0.005	µg/L		
1400888-SCV1	8.075	8.043	µg/L	100%	75-125
1400888-IFA1	40.00	3.614	µg/L	9%	-100-100
1400888-IFB1	100.0	103.0	µg/L	103%	80-120
1400888-CCV1	1.000	1.012	µg/L	101%	90-110
1400888-CCB1		0.010	µg/L		
1400888-CCV2	1.000	0.982	µg/L	98%	90-110
1400888-CCB2		0.004	µg/L		
1400888-CCV3	1.000	0.979	µg/L	98%	90-110
1400888-CCB3		0.006	µg/L		
1400888-CCV4	1.000	1.036	µg/L	104%	90-110
1400888-CCB4		0.004	µg/L		
1400888-CCV5	1.000	0.995	µg/L	100%	90-110
1400888-CCB5		0.015	µg/L		
1400888-CCV6	1.000	1.047	µg/L	105%	90-110
1400888-CCB6		0.021	µg/L		
1400888-CCV7	1.000	1.035	µg/L	103%	90-110
1400888-CCB7		0.006	µg/L		
1400888-CCV8	1.000	1.061	µg/L	106%	90-110
1400888-CCB8		0.005	µg/L		
1400888-CCV9	1.000	1.223	µg/L	*122%*	90-110
1400888-CCB9		0.011	µg/L		
1400888-CCVA	5.000	5.105	µg/L	102%	90-110
1400888-CCBA		0.060	µg/L		
1400888-CCVB	5.000	10.91	µg/L	*218%*	90-110
1400888-CCBB		0.312	µg/L		

assoc. samples were reanalyzed on a different sequence.

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Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400888
Instrument: ICP-MS-2
Date: 10/16/2014
Analyte: As 91

Trace Metals by ICP-DRC-MS
Method: EPA 1638 DRC

Lab ID	True Value	Result	Units	REC & Limits	
1400888-CCVC	5.000	5.274	µg/L	105%	90-110
1400888-CCBC		0.015	µg/L		
1400888-CCVD	5.000	4.872	µg/L	97%	90-110
1400888-CCBD		0.063	µg/L		
1400888-CCVE	5.000	4.985	µg/L	100%	90-110
1400888-CCBE		0.086	µg/L		
1400888-CCVF	5.000	4.994	µg/L	100%	90-110
1400888-CCBF		0.045	µg/L		
1400888-CCVG	5.000	5.226	µg/L	105%	90-110
1400888-CCBG		0.007	µg/L		
1400888-CCVH	5.000	5.204	µg/L	104%	90-110
1400888-CCBH		0.048	µg/L		

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Instrument Calibration

Sequence: 1400889
Instrument: ICP-MS-2
Date: 10/20/2014
Analyte: As 91

Trace Metals by ICP-DRC-MS
Method: EPA 1638 DRC

Lab ID	True Value	Result	Units	REC & Limits	
1400889-ICB1		0.000	µg/L		
1400889-CAL1	0.02500	0.025	µg/L	99%	
1400889-CAL2	0.05000	0.051	µg/L	102%	
1400889-CAL3	0.2500	0.260	µg/L	104%	
1400889-CAL4	1.000	1.000	µg/L	100%	
1400889-CAL5	5.000	4.984	µg/L	100%	
1400889-CAL6	25.00	24.75	µg/L	99%	
1400889-CAL7	125.0	124.4	µg/L	100%	
1400889-CAL8	500.0	486.9	µg/L	97%	
1400889-ICB2		1.713	µg/L		
1400889-ICV1	5.000	4.996	µg/L	100%	90-110
1400889-ICB3		0.014	µg/L		
1400889-IBL1		0.009	µg/L		
1400889-IBL2		0.013	µg/L		
1400889-IBL3		0.022	µg/L		
1400889-IBL4		0.007	µg/L		
1400889-SCV1	8.075	8.207	µg/L	102%	75-125
1400889-IFA1	40.00	2.665	µg/L	7%	-100-100
1400889-IFB1	100.0	105.0	µg/L	105%	80-120
1400889-CCV1	1.000	1.015	µg/L	101%	90-110
1400889-CCB1		0.006	µg/L		
1400889-CCV2	1.000	1.089	µg/L	109%	90-110
1400889-CCB2		0.014	µg/L		
1400889-CCV3	1.000	1.077	µg/L	108%	90-110
1400889-CCB3		0.012	µg/L		
1400889-CCV4	1.000	2.157	µg/L	216%	90-110 – no samples assoc.
1400889-CCB4		0.038	µg/L		
1400889-CCV5	1.000	1.038	µg/L	104%	90-110
1400889-CCB5		0.014	µg/L		
1400889-CCV6	1.000	1.039	µg/L	104%	90-110
1400889-CCB6		0.005	µg/L		
1400889-CCV7	1.000	1.144	µg/L	114%	90-110 – no samples assoc.
1400889-CCB7		0.014	µg/L		
1400889-CCV8	1.000	1.087	µg/L	109%	90-110
1400889-CCB8		0.014	µg/L		

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Project ID: CHM-CH1401
PM: Lydia Greaves

BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141783
Lab Matrix: Biota
Method: EPA 1630

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141783-SRM1	**Certified Reference Material (1426021, TORT-3)**						
	MeHg		0.1370	0.1506	mg/kg	110% 65-135	
B141783-SRM2	**Certified Reference Material (1426021, TORT-3)**						
	MeHg		0.1370	0.1404	mg/kg	102% 65-135	
B141783-DUP1	**Duplicate (1439006-06)**						
	MeHg	0.0235		0.0287	mg/kg		20% 35
B141783-MS1	**Matrix Spike (1439006-06)**						
	MeHg	0.0235	0.7455	1.199	mg/kg	*158%* 65-135	
B141783-MSD1	**Matrix Spike Duplicate (1439006-06)**						
	MeHg	0.0235	0.6372	1.001	mg/kg	*153%* 65-135	18% 35
B141783-DUP2	**Duplicate (1439006-17)**						
	MeHg	0.0973		0.0952	mg/kg		2% 35
B141783-MS2	**Matrix Spike (1439006-17)**						
	MeHg	0.0973	0.7267	1.122	mg/kg	*141%* 65-135	
B141783-MSD2	**Matrix Spike Duplicate (1439006-17)**						
	MeHg	0.0973	0.6702	1.082	mg/kg	*147%* 65-135	4% 35
B141783-DUP3	**Duplicate (1439006-26)**						
	MeHg	0.0585		0.0538	mg/kg		8% 35
B141783-MS3	**Matrix Spike (1439006-26)**						
	MeHg	0.0585	0.7303	0.9605	mg/kg	124% 65-135	
B141783-MSD3	**Matrix Spike Duplicate (1439006-26)**						
	MeHg	0.0585	0.7396	0.9786	mg/kg	124% 65-135	2% 35

J+ in native

J+ in native

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Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141785
Lab Matrix: Biota
Method: EPA 1632

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141785-BS1	**Laboratory Fortified Blank (1439052)**						
	As(Inorg)		0.1000	0.100	mg/kg	100% 65-135	
B141785-BS2	**Laboratory Fortified Blank (1439056)**						
	As(Inorg)		0.1003	0.106	mg/kg	105% 65-135	
B141785-SRM1	**Certified Reference Material (1425011, NIST 1568a)**						
	As(Inorg)		0.09200	0.097	mg/kg	106% 65-135	
B141785-SRM2	**Certified Reference Material (1425011, NIST 1568a)**						
	As(Inorg)		0.09200	0.096	mg/kg	104% 65-135	
B141785-DUP5	**Duplicate (1439006-06)**						
	As(Inorg)	0.038		0.043	mg/kg		14% 35
B141785-MS1	**Matrix Spike (1439006-06)**						
	As(Inorg)	0.038	0.3767	0.366	mg/kg	87% 65-135	
B141785-MSD1	**Matrix Spike Duplicate (1439006-06)**						
	As(Inorg)	0.038	0.3982	0.390	mg/kg	89% 65-135	6% 35
B141785-DUP2	**Duplicate (1439006-17)**						
	As(Inorg)	ND		ND	mg/kg		N/C 35
B141785-PS1	**Post Spike (1439006-17)**						
	As(Inorg)	ND	0.04845	0.042	mg/kg	87% 65-135	
B141785-DUP3	**Duplicate (1439006-26)**						
	As(Inorg)	ND		ND	mg/kg		N/C 35
B141785-PS2	**Post Spike (1439006-26)**						
	As(Inorg)	ND	0.04651	0.039	mg/kg	84% 65-135	

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Project ID: CHM-CH1401
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BROOKS RAND LABS
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BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141797
Lab Matrix: Biota
Method: EPA 1630

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141797-SRM1	**Certified Reference Material (1426021, TORT-3)**						
	MeHg		0.1370	0.1410	mg/kg	103% 65-135	
B141797-DUP1	**Duplicate (1439038-02)**						
	MeHg	0.0053		0.0057	mg/kg		7% 35
B141797-MS1	**Matrix Spike (1439038-02)**						
	MeHg	0.0053	0.09443	0.1566	mg/kg	*160%* 65-135	
B141797-MSD1	**Matrix Spike Duplicate (1439038-02)**						
	MeHg	0.0053	0.09960	0.1543	mg/kg	*150%* 65-135	1% 35

No Quals
Non-client samples

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Project ID: CHM-CH1401
PM: Lydia Greaves

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141785
Lab Matrix: Biota
Method: EPA 1632

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141785-DUP4	**Duplicate (1441017-01)**						
	As(Inorg)	0.011		0.011	mg/kg		4% 35
B141785-MS4	**Matrix Spike (1441017-01)**						
	As(Inorg)	0.011	0.2143	0.206	mg/kg	91% 65-135	
B141785-MSD4	**Matrix Spike Duplicate (1441017-01)**						
	As(Inorg)	0.011	0.2200	0.220	mg/kg	95% 65-135	7% 35

non client

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BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141818
Lab Matrix: Biota
Method: EPA 1632

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141818-BS1	**Laboratory Fortified Blank (1439052)**						
	As(Inorg)		0.1000	0.102	mg/kg	102% 65-135	
B141818-SRM1	**Certified Reference Material (1425011, NIST 1568a)**						
	As(Inorg)		0.09200	0.092	mg/kg	100% 65-135	
B141818-DUP1	**Duplicate (1440035-01)**						
	As(Inorg)	ND		ND	mg/kg		N/C 35
B141818-MS1	**Matrix Spike (1440035-01)**						
	As(Inorg)	ND	0.08955	0.087	mg/kg	97% 65-135	
B141818-MSD1	**Matrix Spike Duplicate (1440035-01)**						
	As(Inorg)	ND	0.08692	0.087	mg/kg	100% 65-135	0.2% 35

non-client

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BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141811
Lab Matrix: Biota
Method: EPA 1638

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141811-BS1	**Laboratory Fortified Blank (1442005)**						
	Ag		1.000	1.032	mg/kg	103% 75-125	
	Cd		0.2000	0.192	mg/kg	96% 80-120	
	Cu		20.00	20.46	mg/kg	102% 80-120	
	Pb		4.996	4.960	mg/kg	99% 80-120	
	Zn		100.0	89.29	mg/kg	89% 80-120	
B141811-SRM1	**Certified Reference Material (1426021, TORT-3)**						
	Cd		42.30	42.98	mg/kg	102% 75-125	
	Cu		497.0	478.0	mg/kg	96% 75-125	
	Zn		136.0	132.2	mg/kg	97% 75-125	
B141811-SRM2	**Certified Reference Material (1426021, TORT-3)**						
	Pb		0.2250	0.191	mg/kg	85% 75-125	
B141811-SRM3	**Certified Reference Material (0822035, NIST 1547 - peach leaves)**						
	Cu		3.700	3.54	mg/kg	96% 75-125	
	Pb		0.8700	0.758	mg/kg	87% 75-125	
	Zn		17.90	16.72	mg/kg	93% 75-125	
B141811-DUP1	**Duplicate (1439006-06)**						
	Ag	ND		ND	mg/kg		N/C 20
	Cd	ND		ND	mg/kg		N/C 20
	Cu	22.98		22.79	mg/kg		0.8% 20
	Pb	0.041		0.044	mg/kg		7% 20
	Zn	16.90		17.11	mg/kg		1% 20
B141811-MS1	**Matrix Spike (1439006-06)**						
	Ag	ND	0.8576	0.884	mg/kg	103% 80-120	
	Cd	ND	0.1715	0.186	mg/kg	109% 80-120	
	Cu	22.98	17.15	41.49	mg/kg	108% 80-120	
	Pb	0.041	4.285	4.139	mg/kg	96% 80-120	
	Zn	16.90	85.76	96.51	mg/kg	93% 80-120	

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BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
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Client PO: 953028

Accuracy & Precision Summary

Batch: B141811
Lab Matrix: Biota
Method: EPA 1638

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141811-MSD1	**Matrix Spike Duplicate (1439006-06)**						
	Ag	ND	0.9901	0.991	mg/kg	100% 80-120	11% 20
	Cd	ND	0.1980	0.203	mg/kg	102% 80-120	9% 20
	Cu	22.98	19.80	41.38	mg/kg	93% 80-120	0.3% 20
	Pb	0.041	4.947	4.627	mg/kg	93% 80-120	11% 20
	Zn	16.90	99.01	105.7	mg/kg	90% 80-120	9% 20
B141811-DUP2	**Duplicate (1439006-17)**						
	Ag	ND		ND	mg/kg		N/C 20
	Cd	ND		ND	mg/kg		N/C 20
	Cu	0.86		0.61	mg/kg		*34%* 20
	Pb	0.020		0.009	mg/kg		*74%* 20
	Zn	19.80		16.97	mg/kg		15% 20
B141811-MS2	**Matrix Spike (1439006-17)**						
	Ag	ND	0.9009	0.867	mg/kg	96% 80-120	
	Cd	ND	0.1802	0.180	mg/kg	100% 80-120	
	Cu	0.86	18.02	17.70	mg/kg	93% 80-120	
	Pb	0.020	4.501	4.411	mg/kg	98% 80-120	
	Zn	19.80	90.09	98.37	mg/kg	87% 80-120	
B141811-MSD2	**Matrix Spike Duplicate (1439006-17)**						
	Ag	ND	0.8945	0.861	mg/kg	96% 80-120	0.7% 20
	Cd	ND	0.1789	0.178	mg/kg	100% 80-120	0.7% 20
	Cu	0.86	17.89	17.64	mg/kg	94% 80-120	0.4% 20
	Pb	0.020	4.469	4.436	mg/kg	99% 80-120	0.6% 20
	Zn	19.80	89.45	98.83	mg/kg	88% 80-120	0.5% 20
B141811-DUP3	**Duplicate (1439035-10)** non-client						
	Ag	ND		ND	mg/kg		N/C 20
	Cd	0.128		0.156	mg/kg		20% 20
	Cu	9.73		10.87	mg/kg		11% 20
	Pb	0.925		0.939	mg/kg		2% 20
	Zn	64.12		71.09	mg/kg		10% 20

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BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141811
Lab Matrix: Biota
Method: EPA 1638

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141811-MS3	**Matrix Spike (1439035-10)**						
	Ag	ND	3.095	2.838	mg/kg	92% 80-120	
	Cd	0.037	0.6191	0.722	mg/kg	111% 80-120	
	Cu	2.84	61.91	65.43	mg/kg	101% 80-120	
	Pb	0.270	15.46	15.02	mg/kg	95% 80-120	
	Zn	18.70	309.5	334.3	mg/kg	102% 80-120	
B141811-MSD3	**Matrix Spike Duplicate (1439035-10)**						
	Ag	ND	3.292	3.066	mg/kg	93% 80-120	8% 20
	Cd	0.037	0.6583	0.790	mg/kg	114% 80-120	9% 20
	Cu	2.84	65.83	75.33	mg/kg	110% 80-120	14% 20
	Pb	0.270	16.44	16.66	mg/kg	100% 80-120	10% 20
	Zn	18.70	329.2	366.2	mg/kg	106% 80-120	9% 20

non-client

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BROOKS RAND LABS
MEANINGFUL METALS DATA

BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141812
Lab Matrix: Biota
Method: EPA 1638 DRC

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141812-BS1	**Laboratory Fortified Blank (1442005)**						
	Ni		2.000	2.09	mg/kg	104% 75-125	✓
B141812-SRM2	**Certified Reference Material (1426021, TORT-3)**						
	Ni		5.300	5.90	mg/kg	111% 75-125	✓
B141812-DUP1	**Duplicate (1439006-06)**						
	Ni	0.13		0.14	mg/kg		2% 30
B141812-MS1	**Matrix Spike (1439006-06)**						
	Ni	0.13	1.715	2.12	mg/kg	116% 70-130	
B141812-MSD1	**Matrix Spike Duplicate (1439006-06)**						
	Ni	0.13	1.980	2.23	mg/kg	106% 70-130	5% 30
B141812-DUP2	**Duplicate (1439006-17)**						
	Ni	ND		ND	mg/kg		N/C 30
B141812-MS2	**Matrix Spike (1439006-17)**						
	Ni	ND	1.802	1.83	mg/kg	101% 70-130	
B141812-MSD2	**Matrix Spike Duplicate (1439006-17)**						
	Ni	ND	1.789	1.63	mg/kg	91% 70-130	11% 30
B141812-DUP3	**Duplicate (1439035-10)**						
	Ni	0.68		0.62	mg/kg		9% 30
B141812-MS3	**Matrix Spike (1439035-10)**						
	Ni	0.20	6.191	6.51	mg/kg	102% 70-130	
B141812-MSD3	**Matrix Spike Duplicate (1439035-10)**						
	Ni	0.20	6.583	6.86	mg/kg	101% 70-130	5% 30

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BRL Report 1439006 & 1439024
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Accuracy & Precision Summary

Batch: B141813
Lab Matrix: Biota
Method: EPA 1638 DRC

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141813-BS1	**Laboratory Fortified Blank (1442005)**						
	As		20.00	18.68	mg/kg	93% 80-120	
	Se		5.000	4.61	mg/kg	92% 80-120	
B141813-SRM1	**Certified Reference Material (1327017, TORT-3)**						
	As		59.50	62.70	mg/kg	105% 75-125	
	Se		10.90	10.29	mg/kg	94% 75-125	
B141813-DUP1	**Duplicate (1439006-06)**						
	As	2.309		2.427	mg/kg		5% 20
	Se	0.26		0.27	mg/kg		4% 20
B141813-MS1	**Matrix Spike (1439006-06)**						
	As	2.309	17.15	20.78	mg/kg	108% 80-120	
	Se	0.26	4.288	4.53	mg/kg	100% 80-120	
B141813-MSD1	**Matrix Spike Duplicate (1439006-06)**						
	As	2.309	19.80	22.98	mg/kg	104% 80-120	10% 20
	Se	0.26	4.950	5.10	mg/kg	98% 80-120	12% 20
B141813-DUP2	**Duplicate (1439006-17)**						
	As	1.131		1.441	mg/kg		24% 20
	Se	0.31		0.28	mg/kg		11% 20
B141813-MS2	**Matrix Spike (1439006-17)**						
	As	1.131	18.02	19.99	mg/kg	105% 80-120	
	Se	0.31	4.505	4.77	mg/kg	99% 80-120	
B141813-MSD2	**Matrix Spike Duplicate (1439006-17)**						
	As	1.131	17.89	18.92	mg/kg	99% 80-120	6% 20
	Se	0.31	4.472	4.67	mg/kg	98% 80-120	2% 20
B141813-DUP3	**Duplicate (1439035-10)** non-client						
	Se	2.76		2.83	mg/kg		3% 20

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Accuracy & Precision Summary

Batch: B141813
Lab Matrix: Biota
Method: EPA 1638 DRC

non-client

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141813-MS3	**Matrix Spike (1439035-10)**						
	As	5.759	61.91	80.80	mg/kg	*121%* 80-120	
	Se	0.80	15.48	17.25	mg/kg	106% 80-120	
B141813-MSD3	**Matrix Spike Duplicate (1439035-10)**						
	As	5.759	65.83	89.25	mg/kg	*127%* 80-120	10% 20
	Se	0.80	16.46	19.09	mg/kg	111% 80-120	10% 20

No Quals - non client

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07

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BROOKS RAND LABS
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BRL Report 1439006 & 1439024
Client PM: Juliana Dean
Client PO: 953028

Accuracy & Precision Summary

Batch: B141921
Lab Matrix: Biota
Method: EPA 1638 DRC

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B141921-BS1	**Laboratory Fortified Blank (1442005)**						
	Cr		1.201	1.181	mg/kg	98% 80-120	
B141921-SRM1	**Certified Reference Material (1426021, TORT-3)**						
	Cr		1.950	1.328	mg/kg	*68%* 75-125	
B141921-SRM2	**Certified Reference Material (0822035, NIST 1547 - peach leaves)**						
	Cr		1.000	0.432	mg/kg	43% N/A	
B141921-DUP1	**Duplicate (1439006-06)**						
	Cr	0.226		0.225	mg/kg		0.7% 20
B141921-MS1	**Matrix Spike (1439006-06)**						
	Cr	0.226	1.030	1.401	mg/kg	114% 80-120	
B141921-MSD1	**Matrix Spike Duplicate (1439006-06)**						
	Cr	0.226	1.189	1.495	mg/kg	107% 80-120	6% 20
B141921-DUP2	**Duplicate (1439006-17)**						
	Cr	0.074		0.050	mg/kg		*39%* 20
B141921-MS2	**Matrix Spike (1439006-17)**						
	Cr	0.074	1.082	1.213	mg/kg	105% 80-120	
B141921-MSD2	**Matrix Spike Duplicate (1439006-17)**						
	Cr	0.074	1.074	1.201	mg/kg	105% 80-120	1% 20

✓

Historically low - No quals - see LFM

< 5X MRL NQ

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