



Date: 1/15/2014

CLIENT: Cameco Resources, Crow Butte Operation
Project: Marsland Garden Soil Samples
Lab Order: S1311293

CASE NARRATIVE
Report ID: S1311293001

Samples Furman, Metz, Richardson, Tollman, Troester 1, Troester 2, and Walters were received on November 19, 2013.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Cameco Resources, Crow Butte Operation
PO Box 169
Crawford, NE 69339

Date Reported 1/15/2014
Report ID S1311293001

ProjectName: Marsland Garden Soil Samples
Lab ID: S1311293-001
ClientSample ID: Furman
COC: WEB

WorkOrder: S1311293
CollectionDate: 8/1/2013
DateReceived: 11/19/2013 1:51:00 PM
FieldSampler: WN
Matrix: Soil

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.2	pCi/g		1	OTW01	12/20/2013 1228	SH
Lead 210 Precision (±)	0.4	pCi/g			OTW01	12/20/2013 1228	SH
Polonium 210	<2	pCi/g		2	OTW01	12/24/2013 1128	SH
Polonium 210 Precision (±)	NA	pCi/g			OTW01	12/24/2013 1128	SH
Radium 226	0.6	pCi/g		0.2	E901.1 Mod.	12/19/2013 1925	SH
Radium 226 Precision (±)	0.4	pCi/g			E901.1 Mod.	12/19/2013 1925	SH
Thorium 230	0.4	pCi/g		0.2	ACW10	12/17/2013 1013	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	12/17/2013 1013	MB
Thorium229 Tracer (30-120)	93.9	%			ACW10	12/17/2013 1013	MB
Metals - Total							
Uranium	0.5	pCi/g		0.2	EPA 200.8	12/02/2013 1829	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Cameco Resources, Crow Butte Operation
PO Box 169
Crawford, NE 69339

Date Reported 1/15/2014
Report ID S1311293001

ProjectName: Marsland Garden Soil Samples
Lab ID: S1311293-002
ClientSample ID: Metz
COC: WEB

WorkOrder: S1311293
CollectionDate: 8/1/2013
DateReceived: 11/19/2013 1:51:00 PM
FieldSampler: WN
Matrix: Soil

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.6	pCi/g		1	OTW01	12/20/2013 1228	SH
Lead 210 Precision (±)	0.4	pCi/g			OTW01	12/20/2013 1228	SH
Polonium 210	<2	pCi/g		2	OTW01	12/24/2013 1128	SH
Polonium 210 Precision (±)	NA	pCi/g			OTW01	12/24/2013 1128	SH
Radium 226	0.7	pCi/g		0.2	E901.1 Mod.	12/19/2013 1946	SH
Radium 226 Precision (±)	0.4	pCi/g			E901.1 Mod.	12/19/2013 1946	SH
Thorium 230	0.3	pCi/g		0.2	ACW10	12/17/2013 1013	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	12/17/2013 1013	MB
Thorium229 Tracer (30-120)	97.0	%			ACW10	12/17/2013 1013	MB
Metals - Total							
Uranium	0.5	pCi/g		0.2	EPA 200.8	12/02/2013 1835	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Cameco Resources, Crow Butte Operation
PO Box 169
Crawford, NE 69339

Date Reported 1/15/2014
Report ID S1311293001

ProjectName: Marsland Garden Soil Samples
Lab ID: S1311293-003
ClientSample ID: Walters
COC: WEB

WorkOrder: S1311293
CollectionDate: 8/7/2013
DateReceived: 11/19/2013 1:51:00 PM
FieldSampler: WN
Matrix: Soil

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.3	pCi/g		1	OTW01	12/20/2013 1228	SH
Lead 210 Precision (±)	0.4	pCi/g			OTW01	12/20/2013 1228	SH
Polonium 210	<2	pCi/g		2	OTW01	12/24/2013 1128	SH
Polonium 210 Precision (±)	NA	pCi/g			OTW01	12/24/2013 1128	SH
Radium 226	0.3	pCi/g		0.2	E901.1 Mod.	12/19/2013 2007	SH
Radium 226 Precision (±)	0.4	pCi/g			E901.1 Mod.	12/19/2013 2007	SH
Thorium 230	0.3	pCi/g		0.2	ACW10	12/17/2013 1013	MB
Thorium230 Precision (±)	0.2	pCi/g			ACW10	12/17/2013 1013	MB
Thorium229 Tracer (30-120)	52.5	%			ACW10	12/17/2013 1013	MB
Metals - Total							
Uranium	0.5	pCi/g		0.2	EPA 200.8	12/02/2013 1840	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Cameco Resources, Crow Butte Operation
PO Box 169
Crawford, NE 69339

Date Reported 1/15/2014
Report ID S1311293001

ProjectName: Marsland Garden Soil Samples
Lab ID: S1311293-004
ClientSample ID: Troester 1
COC: WEB

WorkOrder: S1311293
CollectionDate: 8/2/2013
DateReceived: 11/19/2013 1:51:00 PM
FieldSampler: WN
Matrix: Soil

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.3	pCi/g		1	OTW01	12/20/2013 1228	SH
Lead 210 Precision (±)	0.4	pCi/g			OTW01	12/20/2013 1228	SH
Polonium 210	<2	pCi/g		2	OTW01	12/24/2013 1128	SH
Polonium 210 Precision (±)	NA	pCi/g			OTW01	12/24/2013 1128	SH
Radium 226	0.9	pCi/g		0.2	E901.1 Mod.	12/19/2013 2028	SH
Radium 226 Precision (±)	0.4	pCi/g			E901.1 Mod.	12/19/2013 2028	SH
Thorium 230	0.4	pCi/g		0.2	ACW10	12/19/2013 1206	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	12/19/2013 1206	MB
Thorium229 Tracer (30-120)	105	%			ACW10	12/19/2013 1206	MB
Metals - Total							
Uranium	0.8	pCi/g		0.2	EPA 200.8	12/02/2013 1911	MS

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Cameco Resources, Crow Butte Operation
PO Box 169
Crawford, NE 69339

Date Reported 1/15/2014
Report ID S1311293001

ProjectName: Marsland Garden Soil Samples
Lab ID: S1311293-005
ClientSample ID: Richardson
COC: WEB

WorkOrder: S1311293
CollectionDate: 8/1/2013
DateReceived: 11/19/2013 1:51:00 PM
FieldSampler: WN
Matrix: Soil

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Lead 210	1.3	pCi/g		1	OTW01	12/20/2013 1228	SH
Lead 210 Precision (±)	0.4	pCi/g			OTW01	12/20/2013 1228	SH
Polonium 210	<2	pCi/g		2	OTW01	12/24/2013 1128	SH
Polonium 210 Precision (±)	NA	pCi/g			OTW01	12/24/2013 1128	SH
Radium 226	0.6	pCi/g		0.2	E901.1 Mod.	12/19/2013 2048	SH
Radium 226 Precision (±)	0.5	pCi/g			E901.1 Mod.	12/19/2013 2048	SH
Thorium 230	0.2	pCi/g		0.2	ACW10	12/19/2013 1206	MB
Thorium230 Precision (±)	0.1	pCi/g			ACW10	12/19/2013 1206	MB
Thorium229 Tracer (30-120)	92.3	%			ACW10	12/19/2013 1206	MB
Metals - Total							
Uranium	0.6	pCi/g		0.2	EPA 200.8	12/02/2013 1917	MS

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- * Value exceeds Maximum Contaminant Level
 - C Calculated Value
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by a contract laboratory
 - ND Not Detected at the Reporting Limit
 - S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Cameco Resources, Crow Butte Operation
PO Box 169
Crawford, NE 69339

Date Reported 1/15/2014
Report ID S1311293001

ProjectName: Marsland Garden Soil Samples
Lab ID: S1311293-006
ClientSample ID: Troester 2
COC: WEB

WorkOrder: S1311293
CollectionDate: 8/2/2013
DateReceived: 11/19/2013 1:51:00 PM
FieldSampler: WN
Matrix: Soil

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides (Lead 210, Polonium 210, Radium 226, Thorium 230) and Metals (Uranium).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: * Value exceeds Maximum Contaminant Level, C Calculated Value, H Holding times for preparation or analysis exceeded, L Analyzed by a contract laboratory, ND Not Detected at the Reporting Limit, S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank, E Value above quantitation range, J Analyte detected below quantitation limits, M Value exceeds Monthly Ave or MCL, O Outside the Range of Dilutions

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: Cameco Resources, Crow Butte Operation
PO Box 169
Crawford, NE 69339

Date Reported 1/15/2014
Report ID S1311293001

ProjectName: Marsland Garden Soil Samples
Lab ID: S1311293-007
ClientSample ID: Tollman
COC: WEB

WorkOrder: S1311293
CollectionDate: 8/15/2013
DateReceived: 11/19/2013 1:51:00 PM
FieldSampler: WN
Matrix: Soil

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides (Lead 210, Polonium 210, Radium 226, Thorium 230, Thorium 229) and Metals (Uranium).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: * Value exceeds Maximum Contaminant Level, C Calculated Value, H Holding times for preparation or analysis exceeded, L Analyzed by a contract laboratory, ND Not Detected at the Reporting Limit, S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank, E Value above quantitation range, J Analyte detected below quantitation limits, M Value exceeds Monthly Ave or MCL, O Outside the Range of Dilutions

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1311293
Project: Marsland Garden Soil Samples

Date: 1/15/2014
Report ID: S1311293001

Lead 210 in Soil

Sample Type **MBLK** Units: pCi/g

Sample ID	RunNo: 103248	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-336	12/20/13 12:28	Lead 210	ND	1					

Sample Type **LCS** Units: pCi/g

Sample ID	RunNo: 103248	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-336	12/19/13 14:36	Lead 210	13	1	12.1		109	50 - 150	

Sample Type **MS** Units: pCi/g

Sample ID	RunNo: 103248	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	12/19/13 14:36	Lead 210	14	1	12.4	ND	112	50 - 150	

Sample Type **MSD** Units: pCi/g

Sample ID	RunNo: 103248	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	12/19/13 14:36	Lead 210	15	1	14	5.42	118	30	

Radium By Gamma Spectroscopy in Soil

Sample Type **MBLK** Units: pCi/g

Sample ID	RunNo: 103246	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-353	12/19/13 15:16	Radium 226	ND	0.2					

Sample Type **LCS** Units: pCi/g

Sample ID	RunNo: 103246	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-353	12/19/13 15:37	Radium 226	527	0.2	534		98.8	70 - 130	

Sample Type **DUP** Units: pCi/g

Sample ID	RunNo: 103246	Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
S1311293-007BDUP	12/19/13 22:33	Radium 226	0.5	0.2	0.8	28.2		30	

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by a contract laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits



ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1311293
Project: Marsland Garden Soil Samples

Date: 1/15/2014
Report ID: S1311293001

Total Polonium 210 in Soil

Sample Type **MBLK** Units: pCi/g

Sample ID	RunNo: 103249	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-336	12/24/13 11:28	Polonium 210	ND	1					

Sample Type **LCS** Units: pCi/g

Sample ID	RunNo: 103249	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-336	12/24/13 11:28	Polonium 210	6	1	6.2		89.4	70 - 130	

Sample Type **MS** Units: pCi/g

Sample ID	RunNo: 103249	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
TAP WATER MS	12/24/13 11:28	Polonium 210	13	1	12	ND	104	70 - 130	

Sample Type **MSD** Units: pCi/g

Sample ID	RunNo: 103249	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
TAP WATER MSD	12/24/13 11:28	Polonium 210	12	1	13	6.93	96.4	30	

Thorium 230 in Soil

Sample Type **MBLK** Units: pCi/g

Sample ID	RunNo: 103171	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MB13-338	12/13/13 12:05	Thorium230	ND	0.2					

Sample Type **LCS** Units: pCi/g

Sample ID	RunNo: 103171	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS13-338	12/13/13 12:05	Thorium230	12.0	0.2	12.5		96.0	50 - 150	

Sample Type **LCSD** Units: pCi/g

Sample ID	RunNo: 103171	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
LCS13-338 DUP	12/13/13 12:05	Thorium230	13.0	0.2	12.0	8.20	104	30	

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by a contract laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits



ANALYTICAL QC SUMMARY REPORT

CLIENT: Cameco Resources, Crow Butte Operation
Work Order: S1311293
Project: Marsland Garden Soil Samples

Date: 1/15/2014
Report ID: S1311293001

Total (3050) Metals by EPA 200.8 - Soil

Sample Type **MBLK** Units: pCi/g

Sample ID	RunNo: 102549	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
MBLK	12/02/13 14:50	Uranium	ND	0.2					

Sample Type **LCS** Units: pCi/g

Sample ID	RunNo: 102549	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
LCS	12/02/13 14:45	Uranium	67.6	0.2	67.7		99.8	85 - 115	

Sample Type **MS** Units: pCi/g

Sample ID	RunNo: 102549	Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
S1311293-003BS	12/02/13 19:02	Uranium	709	0.2	745	0.5	95.2	70 - 130	

Sample Type **MSD** Units: pCi/g

Sample ID	RunNo: 102549	Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
S1311293-003BMSD	12/02/13 19:06	Uranium	709	0.2	709	0.0711	95.1	20	

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by a contract laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits